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Preface-1: Guideline Development

- The eviCore healthcare (eviCore) evidence-based, proprietary clinical guidelines evaluate a range of advanced imaging and procedures, including CT, MRI, PET, and Radiation Oncology, Sleep Studies and Cardiac and Spine interventions.

- eviCore reserves the right to change and update the guidelines. The guidelines undergo a formal review annually. eviCore’s guidelines are based upon major national and international association and society guidelines and criteria, peer-reviewed literature, major treatises and, input from health plans, practicing academic and community-based physicians.

- These Guidelines are not intended to supersede or replace sound medical judgment, but instead, should facilitate the identification of the most appropriate imaging procedure given the patient’s clinical condition. These guidelines are written to cover medical conditions as experienced by the majority of patients. However, these guidelines may not be applicable in certain clinical circumstances, and physician judgment can override the guidelines.

- Clinical decisions, including treatment decisions, are the responsibility of the patient and his/her provider. Clinicians are expected to use independent medical judgment, which takes into account the clinical circumstances to determine patient management decisions.

- eviCore supports the Choosing Wisely initiative (www.choosingwisely.org) by the American Board of Internal Medicine (ABIM) Foundation and many national physician organizations, to reduce the overuse of diagnostic tests that are low value, no value, or whose risks are greater than the benefits.
Benefits, coverage policies, and eligibility issues pertaining to each Health Plan may take precedence over eviCore’s guidelines. Providers are urged to obtain written instructions and requirements directly from each payor.

**Medicare Coverage Policies**

For Medicare and Medicare Advantage enrollees, the coverage policies of CMS (Centers for Medicare and Medicaid Services) take precedence over eviCore’s guidelines.

**Investigational and Experimental Studies**

Certain imaging studies described in these guidelines are considered investigational by various payers, and their coverage policies may take precedence over eviCore’s guidelines. Certain advanced imaging studies, or other procedures, may be considered investigational and experimental if there is a paucity of supporting evidence; if the evidence has not matured to exhibit improved health parameters or; the advanced imaging study/procedure lacks a collective opinion of support.

**Clinical and Research Trials**

Similar to investigational and experimental studies, clinical trial imaging requests will be considered to determine whether they meet Health Plan coverage and eviCore’s evidence-based guidelines.

- State and federal legislations may need to be considered in the review of advanced imaging requests. For example:
  - Various Breast Density Laws
  - Texas HB 1290 Coronary Calcium CT Law

**Reference**

Preface-3: Clinical Information

eviCore guidelines use an evidence-based approach to determine the most appropriate imaging procedure for each patient, at the most appropriate time in the diagnostic and treatment cycle. eviCore guidelines direct by:

- Clinical presentation of the patient, not by the studies requested
- Current evaluation (within 60 days), to include any of the following: a recent detailed history, physical examination, or appropriate laboratory studies. The Spine and Musculoskeletal guidelines require x-ray studies from when the current episode of symptoms has started or changed; x-ray imaging does not have to be within the past 60 days.
  - Advanced imaging should not be ordered prior to clinical evaluation of a patient by the physician treating the individual. This may include referral to Consultant Specialist who will make further treatment decisions.
  - Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation.
  - An exception can be made if the patient is undergoing a guideline-supported, scheduled follow-up imaging evaluation. These routine surveillance indications are addressed in the applicable guideline sections.

Imaging – General Process

- “Standard” or “conventional” imaging is most often performed in the initial and subsequent evaluations of malignancy. Standard or conventional imaging includes plain film, CT, MR, or US.

- Often, further advanced imaging is needed when initial imaging, such as ultrasound or CT does not answer the clinical question. Uncertain, indeterminate, inconclusive, or equivocal may describe these situations.

- Requests for many Healthcare Common Procedure Coding System (HCPCS) codes, including nonspecific codes such as S8042 [Magnetic resonance imaging (MRI), low-field], should be redirected to a more appropriate and specific CPT® code. Exceptions are noted in the applicable guidelines.

Imaging – Contrast Media

- Contrast is the second important component, along with the advanced imaging modality (refer to specific guideline contrast section)
  - If, during the performance of a non-contrast imaging study, there is the need to use contrast in order to evaluate a possible abnormality, then that is appropriate.¹

Imaging – Metal devices or implants

- Most orthopedic and dental implants are not magnetic. These include hip and knee replacements; plates, screws, and rods used to treat fractures; and cavity fillings. Yet, all of these metal implants can distort the MRI image if near the part of the body being scanned.
Other implants, however, may have contraindications to MRI. These include:
- Pacemakers
- ICD or heart valves
- Metal implants in the brain
- Metal implants in the eyes or ears
- Infusion catheters and bullets or shrapnel.
- CT can therefore be an alternative study to MRI in these scenarios.

**Computed Tomography (CT):**
- CT can be performed without contrast, with contrast, or without and with contrast depending on the clinical indication and body part.
- CT without contrast maybe appropriate if clinical criteria are met AND:
  - Patient has elevated BUN and/or creatinine
  - Renal insufficiency
  - Renal failure and allergies to iodinated CT contrast
  - Or thyroid disease.
- There are significant adverse effects associated with the use of iodinated contrast media. These include hypersensitivity reactions, thyroid dysfunction, and contrast-induced nephropathy (CIN). Patients with impaired renal function are at increased risk for CIN.\(^2\).
- Both contrast CT and MRI may be considered to have the same risk profile with renal failure (GFR < 30 mL/min).
- The use of CT contrast should proceed with caution in pregnant and breast feeding patients. There is a theoretical risk of contrast to the fetal and infant thyroid. The procedure can be performed if the specific need for that procedure outweighs risk to the fetus. Breast feeding patients may pump and discard breast milk for 12-24 hours after the contrast injection.

**Magnetic Resonance Imaging (MRI):**
- MR imaging may be utilized through these guidelines, when further definition is needed based on CT imaging.
- MRI imaging may be preferred in cases of renal failure, and in patients allergic to intravenous CT contrast.
  - Both contrast CT and MRI may be considered to have the same risk profile with renal failure (GFR < 30 mL/min).
  - Gadolinium can cause Nephrogenic Systemic Fibrosis (NSF). The greater the number exposure of gadolinium in patients with a low GFR (especially if on dialysis), the greater the chance of NSF.
  - Multiple studies have demonstrated potential for gadolinium deposition following the use of gadolinium-based contrast agents (GBCAs) for MRI studies.\(^3,4,5,6,7\) The FDA has advised: Minimize repeated GBCA imaging studies when possible, particularly closely spaced MRI studies.\(^8\)
A CT (contrast mirrors what is appropriate for MRI) may be approved in place of an MRI when:

- Clinical criteria are met for MRI AND there is a contraindication to having an MRI (pacemaker, ICD, insulin pump, neurostimulator, etc.)
- Caution should be taken in the use of gadolinium in patients with renal failure
- The use of gadolinium contrast agents is contraindicated during pregnancy unless the specific need for that procedure outweighs risk to the fetus.
- MRI can be performed for non ferromagnetic body metals, although some imaging facilities will consider it contraindicated if recent surgery, regardless of the metal type

MRI should not be used as a replacement for CT, for the reason of lack of ionizing radiation, especially when the indication does not meet these Guidelines, since it does not solve the problem of over-utilization.

**Overutilization of Advanced Imaging:**

- An increasing number of current reports describe over-utilization in all areas of advanced imaging, which may include:
  - High level testing without consideration of lesser invasive, lesser cost and low technology options
  - Excessive radiation and costs with unnecessary testing
  - Defensive medical practice
  - CT without and with contrast (so called “double contrast studies) requesting, which are needed less often
  - MRI trading in place of CT scanning to avoid radiation without considering the primary need for imaging
  - Adult CT settings used for smaller people and children
  - Unnecessarily ordering imaging procedures when the same or similar studies have already been conducted.

- A review of the imaging histories of all patients presenting for studies has been recognized as one of the more important processes that can be implemented. By recognizing that a duplicate or questionably indicated examination has been ordered for patients, it may be possible to avoid exposing them to unnecessary risks. To avoid these unnecessary risks, the precautions below should be considered.
  - The results of initial diagnostic tests or radiologic studies to narrow the differential diagnosis should be obtained prior to performing further tests or radiologic studies.
  - The clinical history should include a potential indication such as a known or suspected abnormality involving the body part for which the imaging study is being requested. These potential indications are addressed in greater detail within the applicable guidelines.
  - The results of the requested imaging procedures should be expected to have an impact on patient management or treatment decisions.
Repeat imaging studies are not generally necessary unless there is evidence of disease progression, recurrence of disease, and/or the repeat imaging will affect a patient’s clinical management.

References
# Preface-4: Coding Issues

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Preface-4.1: 3D Rendering

**CPT® 76376 and CPT® 76377:**

- Both codes require concurrent supervision of the image post-processing 3D manipulation of the volumetric data set and image rendering.

- These two codes differ in the need for and use of an independent workstation for post-processing.
  - CPT® 76376 reports procedures not requiring image post-processing on an independent workstation.
  - CPT® 76377 reports procedures that require image post-processing on an independent workstation.

- These 3D rendering codes should not be used for 2D reformatting.

- Two-dimensional reconstruction (e.g. reformatting an axial scan into the coronal plane) is now included in all cross-sectional imaging base codes and is not separately reimbursable.

- Some payers do not reimburse separately for CPT® 76376 or CPT® 76377. In addition, these CPT® codes are not included in every eviCore patient's radiology management program.
  - The codes used to report 3D rendering for ultrasound and echocardiography are also used to report the 3D post processing work on CT, MRI, and other tomographic modalities.

- Providers may be required to obtain prior authorization on these 3D codes even if prior authorization is not required for the echocardiography and/or ultrasound procedure codes. It may appear that eviCore pre-authorizes echocardiography and/or ultrasound when, in fact, it may only be the 3D code that needs the prior authorization.
  - Prior authorization requirements are established on a CPT® code level and vary by the individual health plan payor.
  - Providers are urged to obtain written instructions and requirements directly from each payor.

- CPT® codes for 3D rendering should not be billed in conjunction with computer-aided detection (CAD), MRA, CTA, nuclear medicine SPECT studies, PET, PET/CT, CT colonography (virtual colonoscopy), cardiac MRI, cardiac CT, or coronary CTA studies.

- In general, eviCore maintains that CPT® 76376 (3D rendering not requiring image post-processing on an independent workstation) should not be separately reimbursed, since this function is built into the imaging software and generally takes less than 15 minutes to perform.
CPT® 76377 (3D rendering requiring image post-processing on an independent workstation) can be considered in the following clinical scenarios:

- **Bony conditions:**
  - Evaluation of congenital skull abnormalities in babies/toddlers (usually for preoperative planning)
  - Complex joint fractures or pelvis fractures
  - Spine fractures (usually for preoperative planning)
  - Complex facial fractures
- **Preoperative planning for other complex surgical cases**
- **Pelvis conditions:**
  - Uterine intra-cavitary lesion when initial US is indeterminate (See PV-2.1: Abnormal Uterine Bleeding (AUB) and PV-12.1: Leiomyomata)
  - Hydrosalpinxes or peritoneal cysts when initial US is indeterminate (See PV-5.2: Complex Adnexal Masses – Pre-Menopausal, PV-5.3: Complex Adnexal Masses – Post-Menopausal)
  - Lost IUD (inability to feel or see IUD string) with initial US (See PV-10.1: Intrauterine Device)
  - Uterine anomalies with initial US (See PV-14.1: Uterine Anomalies)
  - Infertility (See PV-9.1: Infertility Evaluation, Female)

**Preface-4.2: CT-, MR-, or Ultrasound-Guided Procedures**

- CT, MR, and Ultrasound guidance procedure codes contain all the imaging necessary to guide a needle or catheter. It is inappropriate to routinely bill a diagnostic procedure code in conjunction with a guidance procedure code.

- Imaging studies performed as part of a CT-, MR-, or Ultrasound-guided procedure should be reported using the CPT® codes in the following table.
TABLE: Imaging Guidance Procedure Codes

<table>
<thead>
<tr>
<th>CPT®</th>
<th>Description</th>
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<tr>
<td>19085</td>
<td>Biopsy, breast, with placement of breast localization device(s), when performed, and imaging of the biopsy specimen, when performed, percutaneous; first lesion, including MR guidance</td>
</tr>
<tr>
<td>19086</td>
<td>Biopsy, breast, with placement of breast localization device(s), when performed, and imaging of the biopsy specimen, when performed, percutaneous; first lesion, including MR guidance; each additional lesion, including MR guidance</td>
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<tr>
<td>75989</td>
<td>Imaging guidance for percutaneous drainage with placement of catheter (all modalities)</td>
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<tr>
<td>77011</td>
<td>CT guidance for stereotactic localization</td>
</tr>
<tr>
<td>77012</td>
<td>CT guidance for needle placement</td>
</tr>
<tr>
<td>77013</td>
<td>CT guidance for, and monitoring of parenchymal tissue ablation</td>
</tr>
<tr>
<td>77021</td>
<td>MR guidance for needle placement</td>
</tr>
<tr>
<td>77022</td>
<td>MR guidance for, and monitoring of parenchymal tissue ablation</td>
</tr>
<tr>
<td>76942</td>
<td>Ultrasonic guidance for needle placement</td>
</tr>
</tbody>
</table>

**CPT® 75989:**
- This code is used to report imaging guidance for a percutaneous drainage procedure in which a catheter is left in place.
- This code can be used to report whether the drainage catheter is placed under fluoroscopy, ultrasound, CT, or MR guidance modality.

**CPT® 77011:**
- A stereotactic CT localization scan is frequently obtained prior to sinus surgery. The dataset is then loaded into the navigational workstation in the operating room for use during the surgical procedure. The information provides exact positioning of surgical instruments with regard to the patient’s 3D CT images.
- In most cases, the preoperative CT is a technical-only service that does not require interpretation by a radiologist.
  - The imaging facility should report CPT® 77011 when performing a scan not requiring interpretation by a radiologist.
  - If a diagnostic scan is performed and interpreted by a radiologist, the appropriate diagnostic CT code (e.g., CPT® 70486) should be used.
  - It is not appropriate to report both CPT® 70486 and CPT® 77011 for the same CT stereotactic localization imaging session.
  - 3D Rendering (CPT® 76376 or CPT® 76377) should not be reported in conjunction with CPT® 77011 (or CPT® 70486 if used). The procedure inherently generates a 3D dataset.
**CPT® 77012 (CT) and CPT® 77021 (MR):**
- These codes are used to report imaging guidance for needle placement during biopsy, aspiration, and other percutaneous procedures.
- They represent the radiological supervision and interpretation of the procedure and are often billed in conjunction with surgical procedure codes.
  - For example, CPT® 77012 is reported when CT guidance is used to place the needle for a conventional arthrogram.
  - Only codes representing percutaneous surgical procedures should be billed with CPT® 77012 and CPT® 77021. It is inappropriate to use with surgical codes for open, excisional, or incisional procedures.

**CPT® 77013 (CT) and CPT® 77022 (MR):**
- These codes include the initial guidance to direct a needle electrode to the tumor(s), monitoring for needle electrode repositioning within the lesion, and as necessary for multiple ablations to coagulate the lesion and confirmation of satisfactory coagulative necrosis of the lesion(s) and comparison to pre-ablation images.
  - **NOTE:** CPT® 77013 should only be used for non-bone ablation procedures.
  - CPT® 20982 includes CT guidance for bone tumor ablations.
  - Only codes representing percutaneous surgical procedures should be billed with CPT® 77013 and CPT® 77022. It is inappropriate to use with surgical codes for open, excisional, or incisional procedures.

**CPT® 77012 and CPT® 77021 (as well as guidance codes CPT® 76942 [US], and CPT® 77002-CPT® 77003 [fluoroscopy]) describe radiologic guidance by different modalities.**
- Only one unit of any of these codes should be reported per patient encounter (date of service). The unit of service is considered to be the patient encounter, not the number of lesions, aspirations, biopsies, injections, or localizations.

**Preface-4.3: Unlisted Procedures/Therapy Treatment Planning**

<table>
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<tr>
<th>CPT®</th>
<th>Description</th>
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<tr>
<td>76497</td>
<td>Unlisted CT procedure (e.g., diagnostic or interventional)</td>
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<td>76498</td>
<td>Unlisted MR procedure (e.g., diagnostic or interventional)</td>
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<tr>
<td>78999</td>
<td>Unlisted procedure, diagnostic nuclear medicine</td>
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- In the absence of written payor instructions, these unlisted codes should be reported whenever a diagnostic or interventional CT or MR study is performed in which an appropriate anatomic site-specific code is not available.
- A Category III code that describes the procedure performed must be reported rather than an unlisted code if one is available.
- CPT® 76497 or CPT® 76498 (Unlisted CT or MRI procedure) can be considered in the following clinical scenarios:
Studies done for navigation and planning for neurosurgical procedures (i.e. Stealth or Brain Lab Imaging)\(^1,2\)

Custom knee Arthroplasty planning if covered by payor (not as Alternative Recommendation) (See MS-25: Knee)

Any procedure/surgical planning if thinner cuts or different positional acquisition (than those on the completed diagnostic study) are needed. These could include sinus surgery or navigational bronchoscopy. (See CH-33: Lung Transplantation, CH-29.1: Aortic Dissection)\(^3,4\)

**Therapy Treatment Planning**

- Radiation Therapy Treatment Planning: See [ONC-1.5: Unlisted Procedure Codes in Oncology](#)

**References**

1. [https://neurosurgery.mgh.harvard.edu/IGSimages.htm](https://neurosurgery.mgh.harvard.edu/IGSimages.htm).

**Preface-4.4: Unilateral versus Bilateral Breast MRI**

- Diagnostic MRI of both breasts should be coded as CPT\(^\circledR\) 77049 regardless of whether both breasts are imaged simultaneously or whether unilateral breast MRI is performed in two separate imaging sessions.

**Preface-4.5: CPT\(^\circledR\) 76380 Limited or Follow-up CT**

- CPT\(^\circledR\) 76380 describes a limited or follow-up CT scan. The code is used to report any CT scan, for any given area of the body, in which the work of a full diagnostic code is not performed.

- Common examples include (but are not limited to):
  - Limited sinus CT imaging protocol
  - Limited or follow-up slices through a known pulmonary nodule
  - Limited slices to assess a non-healing fracture (such as the clavicle)

- It is inappropriate to report CPT\(^\circledR\) 76380, in conjunction with other diagnostic CT codes, to cover ‘extra slices’ in certain imaging protocols.
  - There is no specific number of sequences or slices defined in any CT CPT\(^\circledR\) code definition.
  - The AMA, in *CPT\(^\circledR\) 2018*, does not describe nor assign any minimum or maximum number of sequences or slices for any CT study.
    - A few additional slices or sequences are not uncommon.
    - CT imaging protocols are often influenced by the individual clinical situation of the patient. Sometimes the protocols require more time and sometimes less.
Preface-4.6: SPECT/CT Imaging

SPECT/CT involves SPECT (Single Photon Emission Computed Tomography) nuclear medicine imaging and CT for optimizing location, accuracy, and attenuation correction and combines functional and anatomic information.

- Common studies using this modality include $^{123}$I- or $^{131}$I-Metaiodobenzylguanidine (MIBG) and octreotide scintigraphy for neuroendocrine tumors.

There is currently no evidence-based data to formulate appropriateness criteria for these hybrid scans.

A procedure code for SPECT/CT parathyroid nuclear imaging, (CPT® 78072), became effective January 1, 2013. No other unique codes have yet been established to specifically report these imaging procedures.

It is not appropriate to separately report any CT, performed only for localization and/or attenuation correction purposes, with any diagnostic CT code, including CPT® 76380).

Reference

   
## Preface-5: Whole Body Imaging

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Preface-5.1: Whole Body CT Imaging

- Whole body CT or LifeScan (CT of Brain, Chest, Abdomen, and Pelvis) for screening of asymptomatic patients is not a covered benefit of any of the current health plans who have delegated utilization review to eviCore. The performance of whole body screening CT examinations in healthy patients does not meet any of the current validity criteria for screening studies and there is no clear documentation of benefit versus radiation risk.

Preface-5.2: Whole Body MR Imaging

- Whole body MRI (WBMRI) is, generally, not supported by eviCore at this time due to lack of standardization in imaging technique and lack of evidence that WBMRI improves patient outcome for any individual disease state.
  - While WBMRI has the benefit of whole body imaging and lack of radiation exposure, substantial variation still exists in the number of images, type of sequences (STIR vs. diffusion weighting, for example), and contrast agent(s) used.

Coding considerations:

- There are no established CPT® or HCPCS codes for reporting WBMRI.
- WBMRI is at present only reportable using CPT® 76498. All other methods of reporting whole body MRI are inappropriate, including:
  - Separate diagnostic MRI codes for multiple individual body parts
  - MRI Bone Marrow Supply (CPT® 77084)

Disease-specific considerations:

- Cancer screening:
  - WBMRI has not been shown to improve outcomes for cancer screening for any group of patients, including Li-Fraumeni Syndrome. See PEDONC-2.2: Li-Fraumeni Syndrome (LFS) for additional information
  - The primary reference cited by providers to support requests for WBMRI in LFS is Villani et al, Lancet Oncol 2011. In this study, the overall screening program was feasible and successful. However, the WBMRI component only detected a single malignancy, which was concurrently detectable on clinical examination. This article does not provide sufficient scientific rationale to justify WBMRI use in Li-Fraumeni patients.

- Cancer staging and restaging
  - While the feasibility of WBMRI has been established, data remain conflicting on whether WBMRI is of equivalent diagnostic accuracy compared with standard imaging modalities such as CT, scintigraphy, and PET imaging. Evidence has not been published establishing WBMRI as a standard evaluation for any type of cancer.

- Autoimmune disease
  - WBMRI has been shown to increase the number of detected lesions in chronic multifocal osteomyelitis and other inflammatory arthritides, but no improvement in outcomes from the use of WBMRI has yet been shown.
Preface-5.3: PET-MRI

PET-MRI is, generally, not supported by eviCore at this time due to lack of standardization in imaging technique and lack of evidence that PET-MRI improves patient outcome for any individual disease state.

References
Complete reference citations for the journal articles are embedded within the body of the guidelines and/or may be found on the Reference pages at the end of some guideline sections.

The website addresses for certain references are included in the body of the guidelines but are not hyperlinked to the actual website.

The website address for the American College of Radiology (ACR) Appropriateness Criteria® is http://www.acr.org.
Preface-7: Copyright Information

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## Abdomen Imaging Guidelines

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### Abbreviations for Abdomen Imaging Guidelines

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<td>AAA</td>
<td>abdominal aortic aneurysm</td>
</tr>
<tr>
<td>AASLD</td>
<td>American Association for the Study of Liver Diseases</td>
</tr>
<tr>
<td>ACE</td>
<td>angiotensin-converting enzyme</td>
</tr>
<tr>
<td>ACG</td>
<td>American College of Gastroenterology</td>
</tr>
<tr>
<td>ACR</td>
<td>American College of Radiology</td>
</tr>
<tr>
<td>ACTH</td>
<td>adrenocorticotropic hormone</td>
</tr>
<tr>
<td>AFP</td>
<td>alpha-fetoprotein</td>
</tr>
<tr>
<td>AGA</td>
<td>American Gastroenterological Association</td>
</tr>
<tr>
<td>ALT</td>
<td>alanine aminotransferase</td>
</tr>
<tr>
<td>ASGE</td>
<td>American Society for Gastrointestinal Endoscopy</td>
</tr>
<tr>
<td>AST</td>
<td>aspartate aminotransferase</td>
</tr>
<tr>
<td>AUA</td>
<td>American Urological Association</td>
</tr>
<tr>
<td>BEIR</td>
<td>Biological Effects of Ionizing Radiation</td>
</tr>
<tr>
<td>BUN</td>
<td>blood urea nitrogen</td>
</tr>
<tr>
<td>CAG</td>
<td>Canadian Association of Gastroenterology</td>
</tr>
<tr>
<td>CNS</td>
<td>central nervous system</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>CTA</td>
<td>computed tomography angiography</td>
</tr>
<tr>
<td>CTC</td>
<td>computed tomography colonography (aka: virtual colonoscopy)</td>
</tr>
<tr>
<td>DVT</td>
<td>deep vein thrombosis</td>
</tr>
<tr>
<td>ERCP</td>
<td>endoscopic retrograde cholangiopancreatography</td>
</tr>
<tr>
<td>EUS</td>
<td>endoscopic ultrasound</td>
</tr>
<tr>
<td>FNH</td>
<td>focal nodular hyperplasia</td>
</tr>
<tr>
<td>GFR</td>
<td>glomerular filtration rate</td>
</tr>
<tr>
<td>GGT</td>
<td>gamma glutamyltransferase</td>
</tr>
<tr>
<td>GI</td>
<td>gastrointestinal</td>
</tr>
<tr>
<td>HCC</td>
<td>hepatocellular carcinoma</td>
</tr>
<tr>
<td>HCPCS</td>
<td>Healthcare Common Procedural Coding System (commonly pronounced: “hix pix”)</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>--------------</td>
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<tr>
<td>HU</td>
<td>Hounsfield units</td>
</tr>
<tr>
<td>IAA</td>
<td>iliac artery aneurysm</td>
</tr>
<tr>
<td>IV</td>
<td>intravenous</td>
</tr>
<tr>
<td>KUB</td>
<td>kidneys, ureters, bladder (plain frontal supine abdominal radiograph)</td>
</tr>
<tr>
<td>LFT</td>
<td>liver function tests</td>
</tr>
<tr>
<td>MRCP</td>
<td>magnetic resonance cholangiopancreatography</td>
</tr>
<tr>
<td>MRA</td>
<td>magnetic resonance angiography</td>
</tr>
<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
</tr>
<tr>
<td>mSv</td>
<td>millisievert</td>
</tr>
<tr>
<td>NAFLD</td>
<td>nonalcoholic fatty liver disease</td>
</tr>
<tr>
<td>PA</td>
<td>posteroanterior projection</td>
</tr>
<tr>
<td>PET</td>
<td>positron emission tomography</td>
</tr>
<tr>
<td>RAS</td>
<td>renal artery stenosis</td>
</tr>
<tr>
<td>RBC</td>
<td>red blood cell</td>
</tr>
<tr>
<td>SBFT</td>
<td>small bowel follow through</td>
</tr>
<tr>
<td>SPECT</td>
<td>single photon emission computed tomography</td>
</tr>
<tr>
<td>VC</td>
<td>virtual colonoscopy (CT colonography)</td>
</tr>
<tr>
<td>PFT</td>
<td>pulmonary function tests</td>
</tr>
<tr>
<td>WBC</td>
<td>white blood cell</td>
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<td>ZES</td>
<td>Zollinger-Ellison Syndrome</td>
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**AB-1.1: Overview**

- A current clinical evaluation (within 60 days) is required before advanced imaging can be considered. The clinical evaluation may include a relevant history and physical examination, appropriate laboratory studies, and non-advanced imaging modalities such as plain X-ray or ultrasound. Other meaningful contact (telephone call, electronic mail or messaging) by an established individual can substitute for a face-to-face clinical evaluation.

- GI Specialist evaluations can be helpful, particularly in determining mesenteric/colonic ischemia, diarrhea/constipation, irritable bowel syndrome (IBS), or need for MRCP.

- Conservative treatment for abdominal pain can include (list is not exhaustive):
  - Anti-secretory or H. Pylori medications
  - Non-steroidal or opiate analgesia
  - Plain abdominal radiography
  - Diet modification
  - Pro- or anti-motility agents

- Abdominal imaging begins at the diaphragm and extends to the umbilicus or iliac crest.

- Pelvic imaging begins at the iliac crest and extends to the pubis.

- Clinical concerns at the dividing line can be providers’ choice (abdomen and pelvis; abdomen or pelvis).

**AB-1.2: CT Imaging**

- CT imaging is a more generalized modality. Abdominal CT is usually performed with contrast (CPT®74160):
  - Oral contrast has no relation to the IV contrast administered.
  - Exceptions are noted in these guidelines, and include:
    - Abdominal CT with contrast (CPT®74160) or without and with contrast (CPT®74170) with suspicion of a solid organ lesion (liver, kidney, pancreas, spleen).
    - Abdominal CT without contrast (CPT®74150) or Abdomen and Pelvis CT (CPT®74176) if there is renal insufficiency/failure, or a documented allergy to contrast. It can also be considered for diabetics or the very elderly.
  - Abdomen with Pelvis CT, usually with contrast (CPT®74177), should be considered when signs or symptoms are generalized, or involve a lower quadrant of the abdomen.
  - CT Enterography (CPT®74177) combines CT imaging with large volumes of ingested neutral bowel contrast material to allow visualization of the small bowel.
    - Usually, only 2D reformatting is used (coronal reformatted images);
    - If the 3D rendering codes are requested (CPT®76376 or CPT®76377), then the final radiology report should be obtained first to verify that true 3D rendering was performed.
- See **AB-23: Inflammatory Bowel Disease Rule Out Crohn’s Disease or Ulcerative Colitis**
  - **CT Enteroclysis**
    - A tube is placed through the nose or mouth and advanced into the duodenum or jejunum. Bowel contrast material is infused through the tube and CT imaging is performed either with or without intravenous contrast.
    - CT enteroclysis is used to allow visualization of the small bowel wall and lumen. CT enteroclysis may allow better or more consistent distention of the small bowel than CT enterography.
    - Report by assigning: CPT® 74176 or CPT® 74177
    - Usually, only 2D reformatting is used (coronal reformatted images).
    - The final radiology report should be obtained first to verify that true 3D rendering was performed when 3D rendering codes are requested (CPT® 76376 or CPT® 76377).
- See **AB-23: Inflammatory Bowel Disease Rule Out Crohn’s Disease or Ulcerative Colitis**
  - **Triple-phase CT** - There is a common misunderstanding about the imaging sequences of a triple-phase CT for evaluation of the liver. In this setting, the 3 phases of a triple-phase CT are: 1) a hepatic arterial phase, 2) a portal venous phase, and 3) a washout or delayed acquisitions phase. It should be noted that, in general, a precontrast or noncontrast CT is generally not needed, except in those individuals previously treated with locoregional embolic or ablative therapies. Thus, for the evaluation of liver lesions EITHER a CT abdomen with contrast (CPT® 74160) or CT abdomen without and with contrast (CPT® 74170) can be approved. This is in contradistinction to MRI, in which precontrast imaging is needed.

**AB-1.3: MR Imaging**
- MRI may be preferred as a more targeted study in cases of renal failure in individuals allergic to intravenous CT contrast, and as noted in these guidelines.
  - MRI of the abdomen with contrast only is essentially never performed. If contrast is indicated, MRI Abdomen without and with contrast (CPT® 74183) should be performed.
  - For pregnant women ultrasound or MRI without contrast should be used to avoid radiation exposure. The use of gadolinium contrast agents is contraindicated during pregnancy, as gadolinium contrast agents cross the placenta and enter the amniotic fluid with unknown long term effects on the fetus.
AB-1.4: MR Enterography Coding Notes

- In the absence of written payer claims/billing guidelines, MRI Enterography is reported in one of two ways:
  - MRI Abdomen without and with contrast (CPT® 74183), or
  - MRI Abdomen without and with contrast (CPT® 74183) and MRI Pelvis with and without contrast (CPT® 72197)

AB-1.5: Ultrasound

- Ultrasound, also called sonography, uses high frequency sounds waves to image body structures.
  - The routine use of 3D and 4D rendering, (post-processing), in conjunction with ultrasound is considered investigational.
  - All ultrasound studies require permanently recorded images either stored on film or in a Picture Archiving and Communication System (PACS).
  - The use of a hand-held or any Doppler device that does not create a hard-copy output is considered part of the physical examination and is not separately billable. This exclusion includes devices that produce a record that does not permit analysis of bi-directional vascular flow.
  - Duplex scan describes an ultrasonic scanning procedure for characterizing the pattern and direction of blood flow in arteries and veins with the production of real-time images integrating B-mode 2D vascular structures, Doppler spectral analysis, and color flow Doppler imaging.
  - The minimal use of color Doppler alone, when performed for anatomical structure identification during a standard ultrasound procedure, is not separately reimbursable.

AB-1.6: Abdominal Ultrasound

- Complete abdominal ultrasound (CPT® 76700) includes all of the following required elements:
  - Liver, gallbladder, common bile duct, pancreas, spleen, kidneys, upper abdominal aorta, and inferior vena cava.
  - If a particular structure or organ cannot be visualized, the report should document the reason.

- Limited abdominal ultrasound (CPT® 76705) is without all of these required elements and can refer to a specific study of a single organ, a limited area of the abdomen, or a follow-up study.
  - Further, CPT® 76705 should:
    - Be assigned to report follow-up studies once a complete abdominal ultrasound (CPT® 76700) has been performed; and
    - Be assigned to report ultrasonic evaluation of diaphragmatic motion; and
    - Be reported only once per individual imaging session; and
      - Not be reported with CPT® 76700 for the same individual for the same imaging session.
AB-1.7: Retroperitoneal Ultrasound

Complete retroperitoneal ultrasound (CPT® 76770) includes all of the following required elements:
- Kidneys, lymph nodes, abdominal aorta, common iliac artery origins, inferior vena cava.
- For urinary tract indications, a complete study can consist of kidneys and bladder.

Limited retroperitoneal ultrasound (CPT® 76775) studies are without all of these required elements and can refer to a specific study of a single organ, a limited area of the abdomen, or a follow-up study.
- Further, CPT® 76775 should:
  - Be assigned to report follow-up studies once a complete retroperitoneal ultrasound (CPT® 76770) has been performed; and
  - Be reported only once per individual imaging session; and
  - Not be reported with CPT® 76770 for the same individual for the same imaging session.

AB-1.8: CT-, MR-, Ultrasound-guided Procedures

See Preface-4.2: CT-, MR-, or Ultrasound-Guided Procedures

AB-1.9: Contrast-Enhanced Ultrasound

Ultrasound with contrast (CEUS, CPT® 76978, CPT® 76979) is only considered when MRI or CT cannot be performed, and the clinical situation requires ultrasound contrast to further delineate the nature of the lesion. CEUS of the liver is otherwise considered investigational or experimental at this time.

AB-1.10: Special Considerations

CT of the Abdomen and Pelvis either with or without contrast (CPT® 74177 or CPT® 74176) can be performed prior to endoscopy if requested by the physician who will be performing the endoscopy, especially if there is suspected inflammatory bowel disease.

Persistent unexplained nausea and vomiting:
- One non-contrast brain MRI (CPT® 70551) can be performed in individual with persistent, unexplained nausea and vomiting and a negative GI evaluation.
- See HD-1.7: General Guidelines – Other Imaging Situations in the Head Imaging Guidelines.
Fever of unknown origin; unexplained weight loss
- In the Oncology Imaging Guidelines, See ONC-30: Medical Conditions with Cancer in the Differential Diagnosis

Suspected ascites should be initially evaluated by ultrasound.
- Ultrasound (CPT® 76700 or CPT® 76705) results can then determine the need for peritoneal fluid analysis or further imaging specific to the findings.\textsuperscript{3,4}

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<td>AB-2.5: Epigastric Pain and Dyspepsia</td>
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**AB-2.1: General Information**

The tables in **AB-2.2: Abdominal Pain** provide imaging guidance for generalized and quadrant specific abdominal pain. The column headers are defined as the following:

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<tr>
<th>Pain Location</th>
<th>Initial Ultrasound?</th>
<th>Conservative Treatment?</th>
<th>Advanced Imaging Indicated?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location/type of abdominal pain</td>
<td>Is an initial US required before advanced imaging?</td>
<td>Is conservative treatment required before advanced imaging?</td>
<td>Advanced imaging indicated for the specific abdominal pain</td>
<td>Additional comments related to indication</td>
</tr>
</tbody>
</table>

**Red Flag Signs and Symptoms**

- In “red flag” situations, the imaging indications may vary from the usual imaging pathway. A red flag situation is described as the following:
  - Persistent abdominal pain and at least one of the following:
    - Failure of conservative treatment for 4 weeks
    - Cancer history
    - Fever (101 degrees or greater)
    - Mass
    - GI bleeding
    - Moderate to severe abdominal tenderness
    - Guarding, rebound tenderness, or other peritoneal signs
    - Elevated WBC as per the testing laboratory’s range
    - History of bariatric surgery

- Please note, that when any one red flag is present with abdominal pain, the initial ultrasound is not required. Please proceed to the imaging indications under the “**Advanced Imaging**” column.

**Pregnant Women**

- For pregnant women, abdominal US (CPT® 76700), and/or pelvic US (if below the umbilicus) (CPT® 76856) and/or TVUS (CPT® 76830) should be performed first. If ultrasound is equivocal or red flags are present, proceed to:
  - MRI abdomen without contrast (CPT® 74181) and/or MRI Pelvis without contrast (CPT® 72195) (if below the umbilicus).
### AB-2.2: Abdominal Pain

<table>
<thead>
<tr>
<th>Pain Location</th>
<th>Initial Ultrasound?</th>
<th>Conservative Treatment?</th>
<th>Advanced Imaging Indicated?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalized, men and also women not of childbearing age</td>
<td>Yes</td>
<td>No*</td>
<td>*If equivocal ultrasound or if pain is accompanied with any one red flag CT of the Abdomen and Pelvis with contrast</td>
<td>See red flags in AB-2.1</td>
</tr>
<tr>
<td>Generalized, women of childbearing age, not pregnant</td>
<td>Yes</td>
<td>No*</td>
<td>*If equivocal ultrasound or if pain is accompanied with any one red flag: CT Abdomen and Pelvis with contrast or MRI Abdomen and/or Pelvis without and with contrast</td>
<td>See red flags in AB-2.1 See imaging for pregnant women in AB-2.1</td>
</tr>
<tr>
<td>Generalized, pregnant</td>
<td>Yes</td>
<td>No</td>
<td>If ultrasound is equivocal with acute pain or any one red flag, MRI Abdomen and/or Pelvis without contrast. In carefully selected patients where CT imaging may be considered life saving for the mother, it can be safely performed with careful attention to radiation protection and technique. Requests for CT should go to MD for review.</td>
<td>See red flags in AB-2.1 and imaging for pregnant women in AB-2.1</td>
</tr>
<tr>
<td>Left Lower Quadrant, rule out diverticulitis – ALL men and non-pregnant women</td>
<td>No</td>
<td>No</td>
<td>CT Abdomen and Pelvis with contrast</td>
<td>See imaging for pregnant women in AB-2.1</td>
</tr>
<tr>
<td>Left Lower Quadrant, suspected or known intraabdominal abscess – ALL men and non-pregnant women</td>
<td>No</td>
<td>No</td>
<td>If fever or elevated WBC, then CT Abdomen and/or Pelvis with contrast.</td>
<td>See imaging for pregnant women in AB-2.1 See AB-3: Abdominal Sepsis (Suspected Abdominal Abscess)</td>
</tr>
<tr>
<td>Pain Location</td>
<td>Initial Ultrasound?</td>
<td>Conservative Treatment</td>
<td>Advanced Imaging Indicated?</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>---------------------</td>
<td>------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Left Lower Quadrant, follow-up known intraabdominal abscess – ALL men and non-pregnant women</td>
<td>No</td>
<td>No</td>
<td>Serial abdominal and/or pelvic ultrasound (CPT® 76700 and/or CPT® 76856) or CT Abdomen and/or Pelvis with contrast: The interval can be days, weeks, or months†</td>
<td></td>
</tr>
<tr>
<td>Left Upper Quadrant – ALL men and non-pregnant women</td>
<td>See AB-2.4: Left Upper Quadrant (LUQ) Pain</td>
<td>See AB-2.4: Left Upper Quadrant (LUQ) Pain</td>
<td>See AB-2.4: Left Upper Quadrant (LUQ) Pain</td>
<td>See imaging for pregnant women in AB-2.1</td>
</tr>
<tr>
<td>Right Lower Quad, rule out appendicitis in – ALL men and non-pregnant women</td>
<td>Ultrasound may be performed but is not required prior to performing a CT of the Abdomen and Pelvis with contrast or without contrast.</td>
<td>No</td>
<td>CT of the Abdomen and Pelvis either with contrast or without contrast.</td>
<td>See imaging for pregnant women in AB-2.1</td>
</tr>
<tr>
<td>Right Upper Quadrant, rule out cholecystitis - ALL men and non-pregnant women</td>
<td>See AB-2.3: Right Upper Quadrant Pain including Suspected Gallbladder Disease</td>
<td>See AB-2.3: Right Upper Quadrant Pain including Suspected Gallbladder Disease</td>
<td>See AB-2.3: Right Upper Quadrant Pain including Suspected Gallbladder Disease</td>
<td>See imaging for pregnant women in AB-2.1</td>
</tr>
<tr>
<td>Epigastric pain, dyspepsia, gastritis, and postprandial fullness – ALL men and non-pregnant women</td>
<td>See AB-2.5: Epigastric Pain and Dyspepsia</td>
<td>See AB-2.5: Epigastric Pain and Dyspepsia</td>
<td>See AB-2.5: Epigastric Pain and Dyspepsia</td>
<td>See imaging for pregnant women in AB-2.1</td>
</tr>
<tr>
<td>Acute epigastric pain with any red flag symptoms – ALL men and non-pregnant women</td>
<td>See AB-2.5: Epigastric Pain and Dyspepsia</td>
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<td>See AB-2.5: Epigastric Pain and Dyspepsia</td>
<td>See imaging for pregnant women in AB-2.1</td>
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### CPT® Codes for AB 2.2

<table>
<thead>
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<tr>
<td>74150</td>
<td>CT Abdomen without contrast</td>
<td>76700</td>
<td>Ultrasound, complete Abdomen</td>
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<tr>
<td>74160</td>
<td>CT Abdomen with contrast</td>
<td>76705</td>
<td>Ultrasound, limited Abdomen</td>
</tr>
<tr>
<td>74176</td>
<td>CT Abdomen and Pelvis without contrast</td>
<td>76830</td>
<td>Ultrasound, Transvaginal</td>
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<td>74177</td>
<td>CT Abdomen and Pelvis with contrast</td>
<td>76856</td>
<td>Ultrasound, complete Pelvis</td>
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<tr>
<td>74181</td>
<td>MRI Abdomen without contrast</td>
<td>72195</td>
<td>MRI Pelvis without contrast</td>
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<tr>
<td>74183</td>
<td>MRI Abdomen without and with contrast</td>
<td>72197</td>
<td>MRI Pelvis without and with contrast</td>
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### AB-2.3: Right Upper Quadrant Pain including Suspected Gallbladder Disease

- For Pregnant Women, refer to **AB-2.1: General Information**
- For all others:
  - Abdominal US (complete or limited) is the initial diagnostic test in the absence of red flags.
  - CT abdomen with contrast, or MRI abdomen without or without and with contrast if US is equivocal or red flags present
- Hepatobiliary System Imaging (HIDA) with OR without pharmacologic intervention (CPT® 78226 or CPT® 78227) can be considered:
  - If there is suspicion of gallbladder disease, with an equivocal or non-diagnostic ultrasound
    - NOTE: If findings on US suggest acute cholecystitis in a symptomatic patient (presence of gallstones with gallbladder wall thickening, Murphy’s sign, and peri-cholecystic fluid) then a HIDA scan is generally not needed.
    - If the HIDA without pharmacologic intervention (CPT® 78226) is initially performed and is normal or inconclusive, the site can convert the study to HIDA with pharmacologic intervention (CPT® 78227). The member will not need to return for a second study with injection of a pharmaceutical.
  - Suspected bile leak after trauma or surgery.
  - Monitoring of liver regeneration
  - Assessment of liver transplant
  - Assessment of choledochal cyst
  - Pre-operative assessment prior to partial hepatectomy.
Chronic acalculous cholecystitis can be imaged with a HIDA with or without pharmacologic intervention (CPT® 78226 or CPT® 78227)

**AB-2.4: Left Upper Quadrant (LUQ) Pain**

LUQ pain is more difficult to categorize with regards to imaging as there are many potential etiologies, which might be better evaluated with different imaging procedures.

Most common causes which may be more specifically evaluated:

- **Splenetic etiologies:**
  - Suspected trauma, or splenomegaly
    - See [AB-34: Spleen](#)
  - Suspected infarct or abscess (severe pain and tenderness, fever, history of atrial fibrillation)
    - CT Abdomen without and with contrast or with contrast (CPT® 74170 or CPT® 74160)

- **Pancreatic etiologies:**
  - Suspected pancreatitis
    - See [AB-33.1: Pancreatitis](#)

- **Renal etiologies**
  - Suspected nephrolithiasis
    - See [AB-4.1: Suspected Renal Stone](#)
  - Suspected pyelonephritis or abscess
    - See [AB-40.1: Upper (Pyelonephritis)](#)

- **Suspected small or large bowel etiologies (e.g., ischemia, obstruction, volvulus, diverticulitis, mesenteric adenitis)**
  - CT Abdomen (CPT® 74160) or CT Abdomen and Pelvis (CPT® 74177)

- **Gastric etiologies**
  - If there is concern for peptic ulcer disease, or if the complaint is dyspepsia, without any red flags suggesting possible perforation or penetration, endoscopy would be the best study for assessing these potential conditions.
  - If there is concern for a more urgent gastric problem, such as perforation, or any red flag is present, then a CT Abdomen (CPT® 74160) or CT Abdomen and Pelvis (CPT® 74177) can be approved.

- **Suspected aortic dissection**
  - See [PVD-6.7: Aortic Dissection and Other Aortic Conditions](#)

- **Unknown etiology, simply reported as LUQ pain**
  - LUQ pain with any red flag: A CT Abdomen or CT Abdomen and Pelvis (CPT® 74160 or CPT® 74177) can be approved.
  - LUQ pain without any red flags
    - Prior to advanced imaging, an adequate history and physical examination, with lab work to include: CBC, chemistry profile including electrolytes, BUN, creatinine, LFTs (ALT, AST, alkaline phosphatase and bilirubin)
lipase, amylase, and urinalysis, should be performed with the intention of trying to establish a potential etiology.

If these evaluations and lab studies are negative or inconclusive for establishing a potential etiology which can be more specifically evaluated as described above, a CT Abdomen or CT Abdomen and Pelvis (CPT® 74160 or CPT® 74177) can be approved.

**AB-2.5: Epigastric Pain and Dyspepsia**

- Epigastric pain with red flags: (non-pregnant individuals)
  - Any of the following:
    - US abdomen (CPT® 76700 or CPT® 76705)
    - CT abdomen with contrast (CPT® 74160)
    - MRI abdomen with and without contrast (CPT® 74183)

- Epigastric pain without red flags and dyspepsia (defined by the ACG and CAG as predominant epigastric pain lasting at least one month and can be associated with any upper gastrointestinal symptoms such as epigastric fullness, nausea, vomiting, or heartburn):
  
  (Note: Those individuals with abnormal laboratory tests or physical findings should also be assessed under the appropriate guidelines for those findings, e.g. LFTs, jaundice, etc.)

  - US abdomen (CPT® 76700 or CPT® 76705) to assess for biliary/pancreatic disease
  - CT abdomen (CPT® 74160) or MRI abdomen (CPT® 74183), or MRCP (CPT® 74181 or CPT® 74183), may be appropriate to evaluate positive findings on US. The use of these advanced imaging procedures to evaluate the US findings may be specifically addressed in the dedicated guideline. For example, the use of MRCP to evaluate potential pathology in the biliary tree or pancreatic duct is addressed in **AB-27: MR Cholangiopancreatography (MRCP)**.
  - Advanced imaging (CT abdomen CPT® 74160, or MRI abdomen CPT® 74183) can be considered for persistent symptoms after a negative or inconclusive upper gastrointestinal endoscopy and ultrasound as well as one of the following:
    - Test and treat for Helicobacter pylori (H. pylori) and a trial of acid suppression with a proton pump inhibitor (PPI) for 4–8 weeks if eradication is successful, but symptoms do not resolve OR
    - An empiric trial of acid suppression with a PPI for 4–8 weeks.

**NOTE:** See imaging for pregnant women **AB-2.1: General Information**
References


AB-3: Abdominal Sepsis (Suspected Abdominal Abscess)

AB-3.1: Abdominal Sepsis
AB-3.1: Abdominal Sepsis

- CT Abdomen and/or Pelvis with contrast (CPT® 74160, or CPT® 72193, or CPT® 74177) for abdominal symptoms associated with fever and/or elevated white blood cell count.¹

- Intraperitoneal abscess can undergo interval CT Abdomen and Pelvis with contrast (CPT® 74177).

- Serial Ultrasound (CPT® 76705) or CT with contrast (CPT® 74160, or CPT® 72193, or CPT® 74177) studies may be performed for follow-up of known abnormal fluid collections, especially following catheter drainage. The interval can be days, weeks, or months, based on the clinical course of the individual.

Reference

## AB-4: Flank Pain, Rule Out or Known Renal/Ureteral Stone

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**AB-4.1: Suspected Renal Stone**

- Suspected renal stone with symptoms in non-pregnant adults (flank pain/renal colic).\(^1\)\(^2\)
  - CT Abdomen and Pelvis without contrast (CPT\(^\circledR\) 74176)
- Suspected renal stone in pregnant women (flank pain/renal colic)\(^3\)\(^4\)
  - Ultrasound (CPT\(^\circledR\) 76770 or CPT\(^\circledR\) 76775) or MRI Abdomen and Pelvis without contrast (CPT\(^\circledR\) 74181 and CPT\(^\circledR\) 72195).
    - The use of gadolinium contrast agents is contraindicated during pregnancy unless the specific need for that procedure outweighs risk to the fetus.
- Suspected renal Stone in Children (flank pain/renal colic)\(^4\)
  - In children, ultrasound (CPT\(^\circledR\) 76770 or CPT\(^\circledR\) 76775) or MR urography (MRI Abdomen and Pelvis, without or with and without contrast [CPT\(^\circledR\) 74183 and CPT\(^\circledR\) 72195 or CPT\(^\circledR\) 72197]) is the best initial study to avoid radiation exposure.
  - See PEDAB-4: Flank Pain, Renal Stone
- Suspicion Renal Stones (Flank pain/renal colic) with Hematuria
  - CT Abdomen and Pelvis without contrast (CPT\(^\circledR\) 74176) or CT Urogram (CPT\(^\circledR\) 74178)

**AB 4.2: Observation of Known Ureteral Stone**

- If the stone is radiopaque, individual is symptomatic, and/or has not passed the stone: The individual should be followed with retroperitoneal ultrasound (CPT\(^\circledR\) 76770 or CPT\(^\circledR\) 76775) and KUB X-ray.
  - If the individual is asymptomatic and has passed the stone, follow-up imaging is not necessary.
  - If the individual has not passed the stone, but is asymptomatic and no stone or hydronephrosis is seen with the retroperitoneal US and KUB, follow-up imaging is not necessary.
- If the stone is non-radiopaque, the individual is symptomatic, and/or has not passed the stone, the individual should be followed with CT Abdomen and Pelvis without contrast (CPT\(^\circledR\) 74176).
  - If the individual is not symptomatic and has passed the stone, follow-up imaging is not necessary.
- Annual surveillance for stable individuals who have a history of stones may be indicated to assess for stone growth or formation of new stones:
  - Plain X-ray (KUB) should be performed for individuals with radiopaque stones.
  - Retroperitoneal ultrasound (CPT\(^\circledR\) 76770 or CPT\(^\circledR\) 76775) is the preferred modality for individuals with non-radiopaque stones.
**AB-4.3: Follow-Up of Treated Ureteral Stone**

- **Post-shock wave lithotripsy (SWL):**
  - Retroperitoneal ultrasound (CPT® 76770 or CPT® 76775) is the appropriate initial follow-up imaging.
  - Retroperitoneal ultrasound (CPT® 76770 or CPT® 76775) and/or CT Abdomen and Pelvis (contrast as requested) may be indicated for:
    - Individuals who are symptomatic
    - Individuals with hydronephrosis
    - Individuals who have residual fragments
  - Individuals treated by SWL who have passed fragments, are asymptomatic and without hydronephrosis: No further imaging is required.

- **Post-medical expulsive therapy (MET):**
  - Individuals treated by MET who have passed a stone and are symptomatic should undergo retroperitoneal US.
    - If hydronephrosis is demonstrated with US, a CT Abdomen/Pelvis without and with contrast (CPT® 74178) is indicated.
  - Individuals treated by MET who have passed a stone and are asymptomatic do not usually require follow-up imaging.

- **Post-ureteroscopic extraction with an intact stone:**
  - Individuals without symptoms should have a retroperitoneal US.
  - Individuals with symptoms or hydronephrosis with US should have a CT Abdomen and Pelvis with contrast (CPT® 74177).
  - Individuals without symptoms or hydronephrosis with US do not usually require follow-up imaging.

- **Post-ureteroscopic extraction requiring fragmentation of the stone(s):**
  - Individuals without symptoms should have a retroperitoneal US.
    - Individuals without symptoms, but hydronephrosis with US, should have a CT Abdomen/Pelvis without contrast (CPT® 74176).
    - Individuals without symptoms or hydronephrosis with US do not usually require follow-up imaging.
  - Individuals with symptoms and a radiopaque stone should have a retroperitoneal US and KUB.
  - Individuals with symptoms and a non-radiopaque stone should have a CT Abdomen/Pelvis without contrast (CPT® 74176).

  - Individuals with persistent symptoms and/or hydronephrosis: Retroperitoneal US and/or CT Abdomen and Pelvis with contrast (CPT® 74177) as requested may be indicated.

**AB-4.4: Ultrasound**

- Retroperitoneal ultrasound (CPT® 76770 or CPT® 76775) can be used in place of CT Abdomen and Pelvis at any of the initial or follow-up indications, if requested by Provider.
AB-4.5: Nuclear kidney imaging

- Nuclear kidney imaging (CPT® 78707, CPT® 78708, or CPT® 78709) can be considered for evaluation of any of the following:\(^5,6\)
  - Recurrent flank pain when CT and ultrasound are non-diagnostic.
  - Prior imaging (CT or US) shows hydronephrosis and to determine if this truly obstructive in nature.

References


AB-5: Gastroenteritis

AB-5.1: Gastroenteritis
AB-5.1: Gastroenteritis

CT Abdomen and Pelvis with contrast (CPT® 74177) if:

- Acute abdomen suggesting bowel obstruction, toxic megacolon (abdominal swelling, fever, tachycardia, elevated white blood cell count), or perforation.
- Any "Red Flag" (See AB-2.1: General Information), bloody stools, immunocompromised, or have had a previous gastric bypass.

Practice Note

Gastroenteritis is a nonspecific term which denotes a constellation of symptoms including, to a varying degree, nausea, vomiting, diarrhea, and abdominal pain. It is usually caused by infectious agents such as norovirus. The broad differential of such symptoms evades establishing a guideline to evaluate gastroenteritis, as a specific entity, from an imaging standpoint.

References

### AB-6: Mesenteric/Colonic Ischemia

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**AB-6.1: Mesenteric Ischemia**

- Suspicion of acute mesenteric ischemia – typical presentation based on severe abdominal pain out of proportion to findings on physical exam, usually in individuals with underlying risk factors including cardiovascular disease, atrial fibrillation, hypertension, etc.:
  - Abdominal and/or Pelvic (Mesenteric) CTA (CPT® 74174, CPT® 74175, or CPT® 72191) (preferable), or
  - Abdominal and/or Pelvic MRA (CPT® 72198 and/or CPT® 74185), or
  - CT Abdomen and Pelvis with contrast (CPT® 74177).

- Routine post-procedure imaging following invasive treatment for mesenteric ischemia (bowel resection, embolectomy, etc.) is not needed in asymptomatic individuals.

**AB-6.2: Colonic ischemia (including ischemic colitis)**

- CT Abdomen and Pelvis with contrast (CPT® 74177) is considered the first imaging modality in order to assess the distribution and phase of the colitis, and it can be performed if abdominal pain and: Rectal bleeding; or
  - Moderate or severe tenderness; or
  - Fever (101 degrees or greater); or
  - Guarding, rebound tenderness, or other peritoneal signs; or
  - Elevated WBC as per the testing laboratory’s range

- Repeat imaging for asymptomatic or improving patients is not needed.

- Abdominal CTA (CPT® 74175) or MRA (CPT® 74185) can be performed for suspicion of right sided or pancolonic ischemia (as suggested on the initial CT Abdomen and Pelvis or by history)

*Practice Note*

Suspicion of colonic ischemia based on sudden cramping abdominal pain accompanied by urgency to defecate and passage of bright red blood, maroon blood, or bloody diarrhea, with risk factors including cardiovascular disease, diabetes mellitus, kidney disease, previous abdominal surgery, use of constipating medications, COPD, and atrial fibrillation.
References


AB-7: Post-Operative Pain Within 60 Days Following Abdominal Surgery – Abdominal Procedure

AB-7.1: Post-Op Pain within 60 Days
AB-7.1: Post-Op Pain within 60 Days

- CT Abdomen and/or Pelvis with contrast (CPT® 74177 or CPT® 74160 or CPT® 72193) can be performed for suspected postoperative/post procedure complications (For example: bowel obstruction, abscess or anastomatic leak).\(^1\,^2\)

- Beyond 60 days postoperatively, See **AB-2: Abdominal Pain**

**References**


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AB-8.1: Abdominal Lymphadenopathy

- History of malignancy
  - Refer to oncology guidelines specific for that known malignancy
  - Biopsy may be considered
- Clinical or lab findings suggesting a lymphoproliferative disorder:
  - Biopsy
  - If biopsy is negative or inconclusive, PET/CT (CPT® 78815) can be considered
  - PET/CT (CPT® 78815) can be considered if requested to find the most appropriate LN for biopsy in this scenario.
  - Clinical note: Due to its relative lack of specificity as well as higher cost, PET is a less efficient alternative to biopsy.
- Clinical or laboratory findings suggesting benign etiology, and no history of malignancy:
  - 3-month follow-up CT Abdomen/Pelvis (CPT® 74177).
  - If no changes at 3 months, 2 additional follow-up scans (at 6 months and one year) can be approved.
  - If no changes by one year, the finding can be considered benign. No further imaging.
- If a follow-up CT demonstrates a concerning change, biopsy should be performed. If biopsy is inconclusive, PET/CT (CPT® 78815) can be approved

AB-8.2: Inguinal Lymphadenopathy

There is no evidence-based support for advanced imaging of clinically evidenced inguinal lymph adenopathy without biopsy.

- Localized inguinal lymphadenopathy should prompt:
  - Search for adjacent extremity injury or infection;
  - 3 to 4 weeks of observation if clinical picture is benign;
  - Excisional or image guided core needle biopsy under ultrasound or CT guidance of most abnormal lymph node if condition persists or malignancy suspected;
  - No advanced imaging indicated.
- Generalized inguinal lymphadenopathy should prompt:
  - Diagnostic work-up, including serological tests, for systemic diseases and
  - Excisional or image guided core needle biopsy under ultrasound or CT guidance of most abnormal lymph node if condition persists or malignancy suspected.

- Prior history of malignancy See ONC-31: Metastatic Cancer, Carcinoma of Unknown Primary Site, and Other Types of Cancer in the Oncology Imaging Guidelines
References


AB-9.1: Bariatric Surgery

- Pre-operative Assessment:
  - Abdominal US (CPT® 76700 or CPT® 76705) to assess the liver and gallbladder

- Post-operative complications:
  - CT Abdomen and Pelvis with contrast (CPT® 74177) or CT abdomen with contrast (CPT® 74160) may be used for individuals who have had weight loss surgery and present with suspected complications including:
    - Weight loss failure
    - Heartburn
    - Nausea or vomiting
    - Abdominal pain
    - Fever
    - Abdominal distension
    - Suspected hernia

Note: Internal hernias in patients who have had Roux-en-Y gastric bypasses may have intermittent and relatively mild abdominal symptoms which require immediate evaluation with CT imaging.

See AB-7: Post-Operative Pain With-in 60 Days Following Abdominal Surgery – Abdominal Procedure

Practice Notes:

- Bariatric procedures include gastric banding, gastric bypass, sleeve gastrectomy, and biliopancreatic diversion procedures.

- Though abdominal pain in post-operative bariatric patients may be gallbladder-induced and an US would be helpful for this diagnosis, the complications of bariatric surgery can become quickly life-threatening, and so any request for CT imaging in the post-operative bariatric patient should not be delayed with recommendations for US, even if the examination does not indicate any “red flags”.

References


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AB-10.1: Blunt Abdominal Trauma

Abdominal and/or pelvic ultrasound (CPT® 76700 and/or CPT® 76856) can be approved for the evaluation of blunt abdominal trauma when requested.

CT Abdomen and/or Pelvis with contrast (CPT® 74160, or CPT® 72193, or CPT® 74177):

- High probability intra-abdominal injury
  - Abdominal pain or tenderness
  - Pelvic or femur fracture
  - Lower rib fracture
  - Costal margin tenderness or evidence of thoracic wall trauma
  - Diminished breath sounds
  - Vomiting
  - Pneumothorax
  - Hematocrit < 30%
  - Hematuria
  - Elevated AST
  - Non-examinable individual (intoxicated, less than fully conscious, Glasgow Coma Scale Score > 13, etc.)
  - Evidence of abdominal wall trauma or seat-belt sign
- If ultrasound demonstrates any positive finding(s)

References

**AB-11: Gaucher’s Disease and Hemochromatosis**

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AB-11.1: Gaucher’s Disease

MRI abdomen without contrast (CPT® 74181) and MRI lower extremity without contrast (CPT® 73718) should be used as follows:

- Individuals not on enzyme therapy every 12 to 24 months
- Individuals on enzyme therapy every 12 months:
  - For change in dose of medication, complication from medication specific for treatment of Gaucher’s disease or clinical complication, individuals with active bone disease may require more frequent monitoring than once a year.

See PEDPN-4: Gaucher Disease in the Pediatric Guidelines

Practice Note

Gaucher’s disease is a lysosomal storage disease characterized by glucosylceramide accumulation in the spleen, liver, kidneys, lung, brain, and bone marrow

AB-11.2: Hereditary (Primary) Hemochromatosis (HH) and Other Iron Storage Diseases

- Elevated serum ferritin and transferrin saturation >45%
  - Positive HFE genetic testing (C282Y homozygote or C282Y/H63D or C282Y/S65C heterozygotes):
    - Transient elastography (CPT® 91200) or MRI abdomen without contrast (CPT® 74181) for iron quantification if:
      - Elevated AST or ALT or
      - Serum ferritin >1000
  - Negative HFE genetic testing
    - MRI abdomen without contrast (CPT® 74181) for iron quantification

- Elevated serum ferritin (males >300ng/mL, females >200ng/mL) and transferrin saturation <45%
  - MRI abdomen without contrast (CPT® 74181) for iron quantification

- For the evaluation of suspected hepatic iron overload in chronic transfusional states (e.g., sickle cell disease, thalassemia, oncology patients, bone marrow failure, and stem cell transplant patients):
  - MRI abdomen without contrast (CPT® 74181) for iron quantification can be performed annually

See PEDAB-18.2: Transfusion-Associated (Secondary) Hemochromatosis in the Pediatric Abdomen Imaging guidelines regarding transfusion-associated hepatic iron deposition.

If transient elastography, biopsy, or MR reveal advanced fibrosis or cirrhosis, then follow HCC screening guidelines (See AB-26.1: Chronic Liver Disease, Cirrhosis and Screening for HCC).
Practice Note

- An elevated serum ferritin >1000mcg/l is associated with an increased risk of cirrhosis and mortality in C282 homozygotes, while a serum ferritin <1000 mcg/l is associated with a very low likelihood of cirrhosis.

- The role of serial MRI for monitoring hepatic iron concentration in hemochromatosis has not been defined. Treatment is phlebotomy and results are monitored by serum ferritin.

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AB-12.1: Inguinal or Femoral Hernia

- Initial imaging for known or suspected primary or recurrent inguinal or femoral hernia.
  - Limited (CPT® 76857) or complete (CPT® 76856) pelvic ultrasound; and/or
  - Limited (CPT® 76705) or complete (CPT® 76700) abdominal ultrasound
- CT Pelvis with contrast (CPT® 72193) or without contrast (CPT® 72192) should be used if there is suspected incarceration or strangulation of an inguinal or femoral hernia or if requested by a specialist or surgeon.
- In most cases, a clinical examination alone is sufficient for the diagnosis of an inguinal or femoral hernia, and the patient can proceed to surgery without additional imaging.
  - Ultrasound (pelvic limited [CPT® 76857] or pelvic complete [CPT® 76856]) is the initial imaging study if:
    - Vague groin swelling with diagnostic uncertainty
    - Poor localization of swelling (as might be seen with a small hernia and prominent overlying fat)
    - Intermittent swelling not present on examination
    - Other groin complaints without swelling
  - CT Pelvis (with contrast, CPT® 72193, or without contrast, CPT® 72192) if ultrasound is indeterminate, or if a complication such as incarceration or strangulation is suspected.
  - MRI Pelvis without contrast (CPT® 72195) or with and without (CPT® 72197) if CT and US are indeterminate or non-diagnostic.
- For chronic post-surgical groin pain (after hernia repair):
  - Pelvic ultrasound (CPT® 76856 or CPT® 76857) or US-guided nerve block
  - CT Pelvis with contrast (CPT® 72193) or without contrast (CPT® 72192) or MRI Pelvis without contrast (CPT® 72195) can be approved if either of the above studies are indeterminate or non-diagnostic, to assess for non-neuropathic causes.

AB-12.2: Spigelian, Ventral, Umbilical, or Incisional Hernia

- Known or suspected primary or recurrent Spigelian hernia (anterior abdominal wall hernia through the semilunar line), ventral hernia, umbilical, or incisional hernia:
  - CT Abdomen without or with contrast (if above the umbilicus) (CPT® 74150 or CPT® 74160)
  - CT Pelvis without or with contrast (if below the umbilicus) (CPT® 72192 or CPT® 72193)
  - CT Abdomen and/or Pelvis without or with contrast (if above and below the umbilicus) (CPT® 74176 or CPT® 74177)
AB-12.3: Hiatal Hernia

- Chest and/or Abdomen CT with contrast (CPT® 71260 and/or CPT® 74160) to evaluate any of the following:
  - GI specialist or surgeon request for treatment/pre-operative planning.
  - Suspected complication of primary disease or surgery.

**Practice Note**

- Some complications might include suspicion of a gastric volvulus (torsion) within the chest cavity, vomiting, chest pain, and difficulty in swallowing

AB-12.4: Indeterminate Groin Pain

- See MS-23: Pelvis in the Musculoskeletal Guidelines

**References**


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<td>AB-13.1: Abdominal Wall Mass</td>
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</tr>
<tr>
<td>AB-13.2: Intra-Abdominal Mass</td>
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</tbody>
</table>
**AB-13.1: Abdominal Wall Mass**

- Ultrasound (CPT®76700 or CPT®76705) or CT Abdomen and/or Pelvis (if below the umbilicus) with contrast (CPT®74160 or CPT®72193 or CPT®74177) or without contrast (CPT®74150 or CPT®72192 or CPT®74176).

- MRI Abdomen without and with contrast (CPT®74183) or MRI Abdomen without contrast (CPT®74181) can be considered if ultrasound and/or CT are equivocal, or for preoperative planning.\(^1\)

**AB-13.2: Intra-Abdominal Mass**

- If the physical exam suggests a palpable mass or a mass is seen on prior imaging, imaging can include one of the following:
  - CT Abdomen and/or Pelvis (if mass palpated below the umbilicus) with contrast (CPT®74160 or CPT®72193 or CPT®74177) or
  - CT Abdomen and/or Pelvis (if mass palpated below the umbilicus) without contrast (CPT®74150 or CPT®72192 or CPT®74176) or
  - MRI Abdomen and/or Pelvis (if mass palpated below the umbilicus) without contrast (CPT®74181 and/or CPT®72195) or
  - MRI Abdomen and/or Pelvis (if mass palpated below the umbilicus) without and with contrast (CPT®74183 and/or CPT®72197)

- Pregnant individual:
  - Initial Imaging: Abdominal and/or Pelvic and/or Transvaginal ultrasound (CPT®76700 and/or CPT®76856 and/or CPT®76830) is appropriate.
  - Follow-up Imaging if ultrasound findings are indeterminate (See **AB-2.1: General Information**)

- Subcutaneous mass: Abdominal and/or Pelvic ultrasound (CPT®76700 and/or CPT®76856) is appropriate.

**References**


AB-14: Lower Extremity Edema

See PVD-7.5: Lower Extremity, Deep Venous Thrombosis (DVT) and/or Lower Extremity Edema in the Peripheral Vascular Disease Imaging Guidelines.
AB-15.1: Zollinger-Ellison Syndrome (ZES)

For known ZES, CT Abdomen with contrast (CPT® 74160) or MRI Abdomen without and with contrast (CPT® 74183).

Practice Notes
Zollinger-Ellison Syndrome is a complex condition in which one or more tumors form in the pancreas or upper part of the small intestine (duodenum).

Imaging is sometimes combined with Somatostatin Receptor Scintigraphy in the evaluation of suspected gastrinoma (elevated serum gastrin (normal value is <100 pg/ml) and/or abnormal gastric acid secretory test).\(^{1,2,3}\)

References
## AB-16: Adrenal Cortical Lesions

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<table>
<thead>
<tr>
<th>CPT® Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>74150</td>
<td>CT Abdomen without contrast</td>
</tr>
<tr>
<td>74160</td>
<td>CT Abdomen with contrast</td>
</tr>
<tr>
<td>74170</td>
<td>CT Abdomen without and with contrast</td>
</tr>
<tr>
<td>74181</td>
<td>MRI Abdomen without contrast</td>
</tr>
<tr>
<td>74183</td>
<td>MRI Abdomen without &amp; with contrast</td>
</tr>
<tr>
<td>78812</td>
<td>PET, Skull Base to Mid-Thigh</td>
</tr>
<tr>
<td>78815</td>
<td>PET/CT, Skull Base to Mid-Thigh</td>
</tr>
</tbody>
</table>
## AB-16.1: Adrenal Cortical Lesions

The initial imaging study for adrenal masses incidentally detected on ultrasound is CT abdomen without contrast (CPT® 74150).

<table>
<thead>
<tr>
<th>Imaging Decision Tree: Incidentally Discovered Adrenal Mass</th>
<th>Mass Details</th>
<th>Primary Study</th>
<th>Additional Studies</th>
</tr>
</thead>
</table>
| | Asymptomatic adrenal mass ≥ 1 cm | Incidentally detected on any CT or MRI exam | No further imaging, regardless of size, if imaging is diagnostic for benign findings, including any of the following:  
- Myelolipoma (macroscopic fat) or  
- Calcified mass or  
- ≤ 10 HU on CT or decreased signal on Chemical Shift MRI (CS-MRI, CPT® 74181) consistent with benign adenoma, or  
- If imaging was completed with and without contrast and no enhancement (defined as < 10 HU change between unenhanced and enhanced/contrasted CT scan e.g. cyst, hemorrhage)* |
| | 1 cm to <4 cm | Indeterminate imaging on any CT or MRI | 1 cm to 2 cm:  
- 12 month CT Abdomen without and with contrast (adrenal protocol), or may consider CS-MRI (chemical shift MRI, CPT® 74181), especially if CT contraindicated  
  - If stable ≥ 1 year, no further imaging-likely benign  
  - If enlarging (or new lesion present):  
    - biochemical evaluation;  
    - consider resection for possible primary adrenocortical carcinoma;  
    - exclude pheochromocytoma prior to resection. |
| | >2 cm to <4 cm | | CT Abdomen without and with contrast (adrenal protocol); may consider CS-MRI (chemical shift MRI, CPT® 74181), especially if CT contraindicated  
- No further follow up imaging if:  
  - Absolute Percentage Washout/Relative Percentage Washout (APW/RPW) ≥ 60/40%; Benign adenoma;  
  - No enhancement (defined as change in pre- and post-contrast imaging of <10 HU Cyst or hemorrhage) |
<table>
<thead>
<tr>
<th>≥4 cm</th>
<th>No history of cancer</th>
<th>Indeterminate imaging features on any CT or MRI</th>
<th>Biochemical assays to determine functional status to exclude pheochromocytoma prior to resection</th>
</tr>
</thead>
<tbody>
<tr>
<td>No prior imaging for comparison</td>
<td>&gt; 1 cm to &lt;4 cm</td>
<td>History of cancer</td>
<td>CT abdomen without and with contrast (adrenal protocol); or</td>
</tr>
<tr>
<td>&gt; 10 HU on NCCT</td>
<td>No prior imaging for comparison</td>
<td>Indeterminate imaging features on any CT or MRI</td>
<td>May consider CS-MRI (chemical shift MRI, CPT® 74181), especially if CT contraindicated</td>
</tr>
<tr>
<td></td>
<td>No further follow up imaging if;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>APW/RPW &gt; 60/40%: Benign adenoma; or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No enhancement (defined as change in pre- and postcontrast imaging of &lt;10 HU e.g. cyst or hemorrhage);</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>APW/RPW &lt;60/40%:</td>
<td>PET CT; consider biopsy;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biochemical evaluation to determine functional status and exclude pheochromocytoma prior to biopsy/resection.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If enlarging or new lesion:</td>
<td>PET/CT or biopsy;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biochemical evaluation to determine functional status and exclude pheochromocytoma prior to biopsy/resection</td>
<td></td>
</tr>
<tr>
<td>&gt;4 cm</td>
<td>History of cancer</td>
<td>Indeterminate imaging features on any CT or MRI</td>
<td>PET/CT or biopsy;</td>
</tr>
<tr>
<td>&gt; 10 HU on NCCT</td>
<td>History of cancer</td>
<td></td>
<td>Consider biochemical assays to determine functional status and exclude pheochromocytoma prior to biopsy/resection</td>
</tr>
<tr>
<td>Suspected Condition</td>
<td>Initial Imaging</td>
<td>Additional Information</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------</td>
<td>---------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Suspected Cushing’s Syndrome, or virilizing adrenal</td>
<td>CT Abdomen without contrast*</td>
<td><strong>Laboratory:</strong> dexamethasone suppression, serum ACTH level, virilizing hormone levels, and/or 24 hour urine for adrenal hormones confirm adrenal cortical endocrine syndrome</td>
<td></td>
</tr>
<tr>
<td>tumors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspected Pheochromocytoma</td>
<td>MRI Abdomen or CT Abdomen</td>
<td>Chemical shift MRI (CPT® 74181) is the preferred imaging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(contrast as requested)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conn’s Syndrome (hyperaldosteronism)</td>
<td>CT abdomen without contrast</td>
<td>If PAC (plasma aldosterone concentration) &gt; 20ng/dl plus undetectable PRA (plasma renin activity), plus spontaneously low potassium level (e.g. not diuretic-induced): proceed with advanced imaging.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>If PAC 15-19ng/dl plus low PRA plus PAC/PRA ratio &gt; 20: Confirmatory testing demonstrating lack of aldosterone suppression needed prior to advanced imaging (See Practice Note).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>If adrenal vein sampling (AVS) is planned once primary aldosteronism is confirmed on biochemical and/or suppression testing: CT abdomen with contrast is indicated.</td>
<td></td>
</tr>
</tbody>
</table>

**Practice Note**

- Above imaging can be applied to patients with bilateral adrenal masses, with each lesion addressed separately.
- Incidental adrenal mass < 1 cm in short axis need not be pursued with further imaging, as it is uncertain as to whether subcentimeter nodularity or adrenal thickening qualifies as an adrenal mass on radiology reports.
- Benign calcified mass, such as and old hematoma or calcification from prior granulomatous infection needs no further imaging.
- Both benign and malignant adrenal masses may enlarge over time; there is not a known growth-rate threshold to differentiate benign from malignant adrenal masses.
*If an adrenal mass does not demonstrate enhancement (defined as <10 HU change between unenhanced and enhanced/contrasted CT scan), mass represents a cyst or hemorrhage and no further imaging is needed. Conversely, when an adrenal mass shows avid enhancement (>110 – 120 HU), a pheochromocytoma should be considered and biochemical evaluation with serum catecholamines is recommended.

The most commonly used Confirmatory Aldosterone Suppression tests include: Sodium loading testing (oral or IV), Fludrocortisone Suppression Test (FST) and Captopril Challenge Test.

The laboratory’s reference range performing renin (PRA) and serum potassium levels should be used for determining abnormalities of these levels.

**AB-16.2: Normal Laboratory Values**

<table>
<thead>
<tr>
<th>Normal Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cortisol</strong></td>
</tr>
<tr>
<td>at 8am</td>
</tr>
<tr>
<td>at 4pm</td>
</tr>
<tr>
<td>at 10pm</td>
</tr>
</tbody>
</table>

**AB-16.3: Adrenal Insufficiency**

CT Abdomen without contrast (CPT®74150) or MRI Abdomen without contrast (CPT®74181) is supported to determine the cause of primary adrenal insufficiency. Imaging is necessary if testing has confirmed adrenal insufficiency or adrenomyeloneuropathy.¹ ²

**AB-16.4: Additional Adrenal Imaging**

Additional adrenal imaging considerations include the following:
- Adrenal Nuclear Imaging of the cortex and/or medulla (CPT®78075) is indicated for the following:
  - Distinguishing adrenal adenoma from adrenal hyperplasia.
  - Evaluation of suspected pheochromocytoma or paraganglioma.
    - MIBG preferred (one of the following codes: CPT®78800, CPT®78801, CPT®78802, CPT®78803, or CPT®78804).
    - For known pheochromocytoma or paraganglioma, See **ONC-15: Neuroendocrine Cancers and Adrenal Tumors** for imaging guidelines.
  - Evaluation of suspected neuroblastoma, ganglioneuroblastoma, or ganglioneuroma.
    - MIBG preferred (one of the following codes: CPT®78800, CPT®78801, CPT®78802, CPT®78803, or CPT®78804), See **PEDONC-6: Neuroblastoma** for imaging guidelines.
History of multiple endocrine neoplasia syndromes: See PEDONC-2.8: Multiple Endocrine Neoplasias (MEN) for imaging guidelines.

History of neurofibromatosis: See PEDONC-2.3: Neurofibromatosis 1 and 2 (NF1 and NF2) for imaging guidelines.


Practice Notes
The majority of “incidentalomas” are benign adenomas. Primary Adrenal Carcinoma is a very rare disease and usually seen with adrenal masses greater than 5 cm in diameter. Metastases with history of malignancy are 25-75%. Routine screening for endocrine function is recommended since 5%-23% will be hormone secreting.

Resection or biopsy is often considered for mass lesions larger than 4 cm or hormone-secreting tumors.*

Biopsy is often considered if pheochromocytoma is excluded.

Signs and symptoms of pheochromocytoma:
- Flushing spells and/or poorly controlled hypertension.
- Elevated plasma or urine metanephrines support the diagnosis of pheochromocytoma with sensitivity for diagnosis at 99.7%
- If plasma metanephrines are not elevated, a 24-hour urine for catecholamine and metanephrine levels should be obtained prior to considering advanced imaging.
- If catecholamine and metanephrine levels are not elevated in a 24- hour urine test, then no advanced imaging is indicated unless unexplained symptoms suggestive of pheochromocytoma persist.
- Endocrine guidelines recommend biochemical evaluation in all incidental adrenal lesions with the exception of myelolipomas and cysts.

Adenoma imaging characteristics:

<table>
<thead>
<tr>
<th>Findings consistent with Adenoma</th>
<th>Indeterminate for Adenoma</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CT Abdomen without contrast</strong></td>
<td>≤10 Hounsfield Units</td>
</tr>
<tr>
<td><strong>CT with contrast with washout (calculated)</strong></td>
<td>&gt;60% absolute washout or ≥40% relative washout</td>
</tr>
<tr>
<td><strong>Chemical Shift MRI</strong></td>
<td>Signal drop out</td>
</tr>
</tbody>
</table>

*Size >4 cm or growth of a lesion are concerning for malignancy (though occasionally adenomas can demonstrate very slight growth on 6 to 12 month follow up imaging).
References


### AB-17: Abdominal Aortic Aneurysm (AAA), Iliac Artery Aneurysm (IAA), and Visceral Artery Aneurysms Follow-Up of Known Aneurysms and Pre-Op Evaluation

| AB-17.1: Abdominal Aortic Aneurysm (AAA) | 59 |
| AB-17.2: Iliac Artery Aneurysm (IAA)    | 59 |
| AB-17.3: Visceral Artery Aneurysm       | 59 |
AB-17.1: Abdominal Aortic Aneurysm (AAA)

- See PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms in the Peripheral Vascular Disease Imaging Guidelines.

AB-17.2: Iliac Artery Aneurysm (IAA)

- See PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms in the Peripheral Vascular Disease Imaging Guidelines.

AB-17.3: Visceral Artery Aneurysm

- See PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms in the Peripheral Vascular Disease Imaging Guidelines.
AB-18: Abdominal Aortic Aneurysm (AAA) and Iliac Artery Aneurysm (IAA)-Post Endovascular or Open Aortic Repair

AB-18.1: AAA, IAA, Post Endovascular or Open Aortic Repair
AB-18.1: AAA, IAA, Post Endovascular or Open Aortic Repair

- See PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms in the Peripheral Vascular Disease Imaging Guidelines.
AB-19: Aortic Dissection and Imaging for Other Aortic Conditions

| AB-19.1: Aortic Dissection and Other Aortic Conditions | 63 |
| AB-19.2: Imaging for Other Aortic Conditions          | 63 |
AB-19.1: Aortic Dissection and Other Aortic Conditions

- See PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms in the Peripheral Vascular Disease Imaging Guidelines

AB-19.2: Imaging for Other Aortic Conditions

- See PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms in the Peripheral Vascular Disease Imaging Guidelines
AB-20: Bowel Obstruction and Gastroparesis

AB-20.1: Bowel Obstruction  65
AB-20.2: Gastroparesis  65
**AB-20.1: Bowel Obstruction**

- Plain X-rays of the abdomen should be obtained as the initial study in individuals with suspected bowel obstruction.
- CT of the Abdomen and Pelvis with contrast (CPT® 74177) may be used for:
  - Plain X-rays that are abnormal or equivocal.
  - High index of suspicion for bowel obstruction (abdominal pain, vomiting, constipation, abdominal distention, failure to pass flatus), especially in individuals with prior history of abdominal surgery, history of malignancy, or individuals with current hernias.
- For bariatric surgery individuals, See **AB-9.1: Bariatric Surgery**

**AB-20.2: Gastroparesis**

- Gastric Emptying Study (CPT®78264) with delayed gastric emptying and one of the following:
  - Nausea, or vomiting of old food ingested several hours earlier
  - Bloating
  - Early satiety, or Postprandial fullness
  - Nausea, vomiting or recurrent aspiration
  - Unexplained poor glucose control in diabetes
  - Gastroesophageal reflux refractory to medical management
  - Non-ulcer dyspepsia
  - Retained gastric contents on endoscopy
- Gastric emptying study with small bowel transit (CPT®78265) can be used in the evaluation of suspected abnormalities in both total and regional times for gastrointestinal transit in small bowel.
- Gastric emptying study with small bowel and colon transit (CPT®78266) can be used in the evaluation of suspected abnormalities in both total and regional time for gastrointestinal transit to the colon.
References


AB-21: Diarrhea, Constipation, and Irritable Bowel

<table>
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<th>AB-21.1: Acute and Persistent Diarrhea (up to 30 days)</th>
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<td>AB-21.2: Chronic Diarrhea (more than 30 days)</td>
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<td>AB-21.3: Constipation</td>
<td>68</td>
</tr>
<tr>
<td>AB-21.4: Bloating and/or Irritable Bowel Syndrome</td>
<td>69</td>
</tr>
</tbody>
</table>
AB-21.1: Acute and Persistent Diarrhea (up to 30 days)

- Routine advanced imaging is not supported for acute, or persistent (up to 30 days) uncomplicated, including infectious diarrhea.
- Travel and dysenteric (including bloody) diarrhea should undergo biological assessment and antimicrobial treatment.9,10,11 (See AB-2.1: General Information)
- CT of the Abdomen and Pelvis with contrast (CPT® 74177) can be used if:
  - Red Flags (See AB-2.1: General Information)
  - Suspected ischemia (See AB-6: Mesenteric/Colonic Ischemia)
  - Older (over 50) individuals with significant abdominal pain
  - Previous gastric bypass
  - Immunosuppressed
  - Obstruction, toxic megacolon, or perforation suspected

AB-21.2: Chronic Diarrhea (more than 30 days)

- Basic lab work including routine CBC, chemistries, as well as stool tests for pathogens should be done prior to advanced imaging.
  - If diarrhea is watery – a secretory or osmotic etiology should be identified.
  - If diarrhea is bloody, it is inflammatory – requiring colonoscopy.
- CT Abdomen with contrast (CPT® 74160), CT Abdomen and Pelvis with contrast (CPT® 74177), CT Enterography (CPT® 74177), or MR Enterography (CPT® 74183 or CPT® 74183 and CPT® 72197), can be considered if both basic lab work and colonoscopy are negative.

AB-21.3: Constipation

- The workup and treatment of constipation usually proceeds with a history and physical followed by empiric medication or dietary trials.
  - In general, a colonoscopy is performed prior to advanced imaging in a patient presenting with chronic constipation if the alarm symptoms of blood in the stool, anemia, or weight loss are present.
- Advanced imaging in the evaluation of constipation is appropriate as follows:
  - CT Abdomen/Pelvis with contrast (CPT® 74177) if:
    - Red flags (See AB-2.1: General Information)
    - Concern for obstruction
  - Defecography for the evaluation of constipation:
    - MRI Defecography (CPT® 72195 MRI Pelvis without contrast) can be approved if the following conditions are met:
      - Patient has undergone ano-rectal manometry and a balloon-expulsion test, and the results confirm a defecatory disorder or are inconclusive, and the patient has failed a trial of biofeedback or other conservative therapy.
      - or
      - Balloon expulsion test is normal and there is a need to identify structural lesions
or

- To guide planned surgical therapy for rectoceles, cystoceles, or uterine prolapse.

**Practice Note**
Defecography can be used in the evaluation of constipation to obtain information regarding the structural causes of outlet dysfunction (e.g. rectal prolapse, rectocele, or enterocele).

Defecography can be performed either as a barium study with fluoroscopy (conventional defecography or CD), or with MRI (D-MRI). In a comparative study, D-MRI was found to be less diagnostic than CD for diagnosing rectocele and enterocele, but superior in identifying intussusception. Arnold Wald, the lead author of the American College of Gastroenterology’s clinical guidelines for the management of ano-rectal disorders concludes (UpToDate, last update May 12, 2016) that while pelvic MR or dynamic MRI can evaluate “global pelvic floor anatomy and sphincter morphology and assess dynamic motion”, thus providing “more valuable information without radiation”, he concludes that MR and dynamic MR defecography “have uncertain added value compared to standard defecography”.

**AB-21.4: Bloating and/or Irritable Bowel Syndrome**

- Irritable bowel syndrome is characterized by abdominal pain associated with altered bowel habits, abdominal distention, and bloating. Subtypes include IBS-C (constipation-predominant), IBS-D (diarrhea-predominant) and IBS-M (mixed). Rome IV Criteria for the diagnosis of irritable bowel syndrome are:
  - Recurrent abdominal pain, on average ≥1 d/wk in the past 3 months, related to ≥2 of the following:
    - Defecation
    - Change in stool frequency
    - Change in stool appearance (form)

- In patients with IBS-D, colonoscopy should be performed prior to advanced imaging to rule out microscopic colitis or inflammatory bowel disease.

- Advanced imaging in the absence of alarm symptoms has a very low yield, but can be considered in the following circumstances (The ACG Task Force recommends against the routine use of abdominal imaging in patients with IBS symptoms and no alarm features):
  - CT abdomen (CPT® 74160) or CT abdomen and pelvis (CPT® 74177) can be considered in the following circumstances:
    - Presence of alarm symptoms
      - Weight loss
      - Frequent nocturnal awakenings due to gastrointestinal symptoms
      - Fever
      - Blood in the stool (See **AB-22: GI Bleeding**)
    - New onset and progressive symptoms
    - Onset of symptoms after age 50
- Recent antibiotic use
- Family history of colon cancer or inflammatory bowel disease
- Findings of an abdominal mass
- Presence of lymphadenopathy

- Positive findings on blood work including CBC (elevated WBC count), elevated CRP (a CRP < or = 0.5 essentially excludes inflammatory bowel disease in patients with IBS symptoms), and celiac testing
- Positive fecal calprotectin (Note: a fecal calprotectin level <40mcg/g virtually excludes inflammatory bowel disease in patients with IBS) (See Practice Note in AB-23.1: IBD Rule out Crohn’s Disease or Ulcerative Colitis)
References


## AB-22: GI Bleeding

| AB-22.1: GI Bleeding | 73  |
| AB-22.2: Small Bowel Bleeding Suspected | 73  |
**AB-22.1: GI Bleeding**

- Endoscopy for upper GI bleeding as initial evaluation
- Colonoscopy for lower GI bleeding as initial evaluation
- CTA Abdomen (CPT® 74175) or CTA Abdomen and Pelvis (CPT® 74174) or CT Abdomen and Pelvis with contrast (CPT® 74177):
  - Active bleeding and if endoscopy is negative
  - If conventional angiography is being considered
  - If surgery is being considered
  - If colonoscopy cannot be performed in a patient with GI bleeding
    - CT Abdomen/Pelvis (CPT® 74177) with contrast can performed instead of CTA
  - GI bleeding and severe abdominal pain
  - GI bleeding and hemodynamic instability (shock)
  - If there is concern for an aorto-enteric fistula (known or suspected aortic aneurysm, history of any type of aortic aneurysm repair).
- Meckel’s scan (CPT® 78290) can be approved if bleeding is suspected from a Meckel’s diverticulum.
- Gastrointestinal Bleeding Scintigraphy (CPT® 78278) can be considered if there is brisk active bleeding with negative endoscopy
- For TIPS placement, See **AB-26.3: Portal Hypertension**

**AB-22.2: Small Bowel Bleeding Suspected**

- If small bowel bleeding is suspected as the source of bleeding, and if upper and lower endoscopies are negative:
  - Video capsule endoscopy (VCE) is performed prior to advanced imaging.
    - VCE is not required prior to advanced imaging if small bowel obstruction or stricture is suspected.
  - CT Enterography (CPT® 74177) if upper and lower endoscopy are negative and if VCE is negative. If there is a contraindication to CTE, MRE (CPT® 74183 or CPT® 74183 and CPT® 72197) may be performed.
- Iron Deficient Anemia
  - If the bleeding is determined to be non-gastrointestinal (e.g. hematuria or vaginal bleeding), refer to the appropriate guideline for these conditions.
  - If the source is determined to be gastrointestinal:
    - Upper endoscopy and colonoscopy should be performed, unless contraindicated.
    - Small bowel video capsule endoscopy is next, if endoscopies are negative (unless contraindicated).
CT Abdomen and Pelvis with contrast (CPT® 74177), CT Enterography (CPT® 74177), or MR Enterography (CPT® 74183 or CPT® 74183 and CPT® 72197) (if CT Enterography is contraindicated) can be performed, if small bowel video capsule endoscopy is negative, or for further evaluation of abnormal video capsule findings. CT Enterography should be considered the test of choice given the lack of motion artifact and its superior spatial resolution.

References

| AB-23: Inflammatory Bowel Disease Rule Out Crohn’s Disease or Ulcerative Colitis |
|-------------------------------------------------|---|
| AB-23.1: IBD Rule Out Crohn’s Disease or Ulcerative Colitis | 77 |
| AB-23.2: Known IBD | 77 |
| AB-23.3: Rectal Disease | 78 |
| AB-23.4: Primary Sclerosing Cholangitis (PSC) | 78 |
| AB-23.5: Special Considerations | 78 |
AB-23.1: IBD Rule out Crohn’s Disease or Ulcerative Colitis

- Suspected Crohn’s Disease or Ulcerative Colitis
  - Chronic diarrhea without “Red Flags” (See AB-2.1: General Information and AB-21: Diarrhea, Constipation, and Irritable Bowel)
  - Any “Red Flag” (See AB-2.1: General Information) can undergo:
    - CT Abdomen and Pelvis with contrast (CPT® 74177) or CT Enterography (CPT® 74177) or MR Enterography (CPT® 74183 or CPT® 74183 and CPT® 72197).
  - If no red flag is present, and the request is for CT or MR Enterography for the evaluation of chronic abdominal pain associated with diarrhea due to a concern for inflammatory bowel disease, a CTE (CPT® 74177) or MRE (CPT® 74183 or CPT® 74183 and CPT® 72197) can be approved if:
    - There is a positive family history of inflammatory bowel disease, or
    - There are endoscopy or colonoscopy findings suggestive of inflammatory bowel disease, or
    - There is a CRP> or = 0.5 mg/dl, or a fecal calprotectin >40 mcg/g. (See Practice Note)

Practice Notes
Studies have demonstrated the negative predictive value of a low fecal calprotectin and CRP with regards to inflammatory bowel disease. Chey, et. al. in a meta-analysis demonstrated that a fecal calprotectin < 40mcg/g or a CRP < or = 0.5 mg/dl effectively excludes inflammatory bowel disease in patients with IBS. Katsinelos, et. a. reviewed wireless capsule endoscopy results in patients with abdominal pain and diarrhea, The diagnostic yield of capsule endoscopy in patients with abdominal pain and diarrhea with positive inflammatory markers was 90.1%, and 0% in patients with abdominal pain and diarrhea with negative inflammatory markers. This led the Canadian Association of Gastroenterology to recommend against the use of capsule endoscopy in persons with chronic abdominal pain or diarrhea as their only symptoms and no evidence of biomarkers associated with Crohn’s Disease, stating “CE (capsule endoscopy) is not warranted in most patients who present with chronic abdominal pain in the absence of positive tests for inflammatory markers or abnormal findings on endoscopy or imaging.

AB-23.2: Known IBD

- Known Crohn’s Disease or Ulcerative Colitis with suspected complications including abscess, perforation, fistula or obstruction, or monitoring response to therapy:
  - CT Abdomen/Pelvis (CPT® 74177), CT Enterography (CPT® 74177), or MR Enterography (CPT® 74183 or CPT® 74183 and CPT® 72197)
  - MRI Enterography is the test of choice for the follow up of young patients with IBD given the lack of ionizing radiation and the need for lifetime follow up in many patients.
**AB-23.3: Rectal Disease**

- Rectal/Peri-Rectal evaluation for fistula.
  - Endoscopic ultrasound, rectal ultrasound (CPT® 76872), MRI Pelvis without and with contrast (CPT® 72197), or CT Pelvis with contrast (CPT® 72193).

**AB-23.4: Primary Sclerosing Cholangitis (PSC)**

- Primary Sclerosing Cholangitis
  - MRCP should be considered after an ultrasound excludes biliary obstruction in those:
    - With IBD and elevated liver enzymes (any above normal).
    - Without IBD persistent cholestatic liver tests.
  - Surveillance for cholangiocarcinoma in individuals with PSC can be done with US or MRI/MRCP every 6 months.

**Practice Notes**

Primary sclerosing cholangitis (PSC) is a chronic liver and biliary tract disease that can result in stricturing and fibrosis of the intra- and extra-hepatic biliary ducts, as well as end-stage liver disease. It is most often associated with inflammatory bowel disease. Biliary obstruction can occur anywhere along the biliary tree, resulting in cholangitis, and there is a high risk of the development of cholangiocarcinoma, which must be strongly considered in individuals with PSC and a dominant stricture, as well as an increased risk of gallbladder polyps and other malignancies. As such, imaging plays an important role in the diagnosis and follow-up of PSC.

**AB-23.5: Special Considerations**

- CT Abdomen and Pelvis either with or without contrast (CPT® 74177 or CPT® 74176) can be performed prior to endoscopy if requested by the physician who will be performing the endoscopy, especially if there is suspected inflammatory bowel disease.
References


AB-24.1: Celiac Disease

Diagnosis is made by blood testing\(^1\):

- Anti-tissue transglutaminase antibody [anti-tTG], anti-endomysium antibody (EMA), total IgA count, CBC to detect anemia, ESR, C-reactive protein, complete metabolic panel, vitamin D, E, B12 levels.

Endoscopy and biopsy of the small bowel is performed to confirm the diagnosis if the anti-tTG and EMA tests are positive.

CT Abdomen and Pelvis with contrast (CPT\(^®\) 74177) or CT Enteroclysis (CPT\(^®\) 74176 or CPT\(^®\) 74177) is appropriate for:

- One time study after initial, confirmed diagnosis of Celiac Disease.
- Confirmed Celiac disease and despite adherence to a gluten free diet the individual is experiencing new or continued weight loss, diarrhea, abdominal distention, or anemia.

Practice Notes
Celiac is an autoimmune disease in which the villi of the small intestine are damaged from eating gluten (found in wheat, barley, and rye).

Reference
**AB-25.1: CTC**

Certain payers (e.g. Medicare) consider CTC investigational and their coverage policies will take precedence over eviCore guidelines with either requested CTC (CPT® 74263 or CPT® 74261).

- Screening CTC (CPT® 74263) every 5 years for colorectal cancer\(^1,2,3\) can be performed as follows, unless one of the following has been completed:
  - FIT-DNA (multi-targeted stool DNA test) within the last 3 years. See Lab Management Guidelines: [ColoGuard Screening for Colorectal Cancer](https://www.cologuard.com).
  - Colonoscopy within the last 10 years.
  - This coverage may vary according to health plan/payer policies.
  - In average-risk non-African American individuals ages 50 to 75 (average risk is defined as no previously diagnosed colorectal cancer, colonic adenomas, or inflammatory bowel disease involving the colon)
  - Screening CTC can be performed in individuals between 76 to 85 if there is no history of a previously negative colonoscopy or CTC
  - Screening CTC can be performed in African-Americans beginning at age 45
  - Individuals with a SINGLE first-degree relative diagnosed at age >60 years with colorectal cancer or an advanced adenoma can be screened with CTC beginning at age 40. (If there are 2 or more first degree relatives at any age with CRC or an advanced adenoma, or a first degree relative <60, the patient should be screened via colonoscopy, not CTC).

- Diagnostic CTC (CPT® 74261, without contrast or CPT® 74262, with contrast, including non-contrast images if performed) can be used in:
  - Failed conventional colonoscopy (e.g. due to a known colonic lesion, structural abnormality, or technical difficulty), and/or
  - Conventional colonoscopy is medically contraindicated. Contraindications may include:\(^4\)
    - Coagulopathy
    - Intolerance to sedation
    - Elderly greater than or equal to 80 years of age
    - Recent (within the last 60 days) myocardial infarction (MI)

**References**

### AB-26: Cirrhosis and Liver Screening for Hepatocellular Carcinoma (HCC); Ascites and Portal Hypertension

| AB-26.1: Cirrhosis and Liver Screening for HCC | 85 |
| AB-26.2: Ascites | 86 |
| AB-26.3: Portal Hypertension | 86 |
AB-26.1: Chronic Liver Disease, Cirrhosis and Screening for HCC

- US (CPT® 76700 or CPT® 76705) every 6 months in the presence of chronic liver
disease, regardless of etiology
  - If liver nodule identified:
    - Less than 1 cm
      - Repeat US in 3 months, then every 3 to 6 months.
      - If stable for 2 years, then return to US every 6 months screening.
    - Greater than or equal to 1 cm
      - Multiphase CT(either CPT®74160 or CPT®74170) or MRI (CPT®74183) should be performed
      - If not characteristic of HCC, repeat CT or MRI or consider biopsy.
      - If second advanced imaging is not diagnostic – then consider biopsy.
  - Advanced imaging may be appropriate if the US is technically limited by such factors
    as obesity (BMI >35), intestinal gas, or chest wall deformity.
    - MRI abdomen (CPT®74183) or Multiphase CT abdomen (either CPT®74160 or
      CPT®74170).
  - For negative US with AFP >20 AND a > 2X increase in AFP from the previous low
    point within the past year:
    - MRI abdomen (CPT®74183) or CT abdomen (CPT®74170) can be approved, and
      if negative for a hepatic lesion, follow-up imaging resumes with US, unless
      further increases in AFP are documented.
  - Ultrasound with contrast (CEUS, CPT®76978,CPT®76979) is only considered when
    MRI or CT cannot be performed, and the clinical situation requires ultrasound
    contrast to further delineate the nature of the lesion. CEUS of the liver is otherwise
    considered investigational or experimental at this time.

Practice Note
When performed for liver lesion evaluation, a multiphase CT protocol may include non-
contrast imaging as well as arterial, portal venous, and delayed-phase post-contrast
imaging. However, these protocols do not always require non-contrast imaging which
may not provide additional information in many scenarios. Therefore, a multiphase CT
for liver lesion evaluation can be requested as CPT®74160 (abdominal CT with
contrast) or CPT®74170 (abdominal CT without and with contrast).

The American Association for the Study of Liver Diseases (AASLD) revised its
guidelines with respect to surveillance for HCC in patients with cirrhosis in 2017. The
recommended algorithm now includes either US alone or US with serum AFP every 6
months. It should be noted that “modification of this surveillance strategy based on the
etiology of liver diseases or risk stratification models cannot be recommended at this
time.”

While AFP can be used in conjunction with US, its significance is controversial, and it is
unclear that the use of US and AFP, as opposed to US alone improves survival. No
specific cut-off value for AFP is endorsed by the AASLD as an indication for more
advanced imaging, which are based solely on US findings. However, many specialists
continue to use AFP as part of surveillance. In an effort to address this question, Cheng,
et al performed a retrospective analysis of 1597 patient to compare US alone with US and AFP. Their findings suggest that an AFP cut-off of 20ng/ml accompanied with a >2X increase in the AFP level from its nadir (low point) within the previous year produced a significant increase in sensitivity (with a very small decrease in specificity). The sequential increase in AFP value is important, since absolute values in cirrhosis may vary depending on the degree of inflammation.

**AB-26.2: Ascites**

- All initial evaluations require Abdominal Ultrasound (CPT® 76700 or CPT® 76705) with diagnostic paracentesis to determine the need for advanced imaging.

**AB-26.3: Portal Hypertension**

- Most cases of portal hypertension are caused by cirrhosis, and the most feared complication is that of esophageal variceal hemorrhage. Causes of portal hypertension can be divided into prehepatic (e.g. portal vein thrombosis, extrinsic compression from a tumor), intrahepatic (e.g. cirrhosis) and post-hepatic (e.g. hepatic vein thrombosis) causes. The differentiation of some of these causes may require workup which includes measurement of the hepatic venous pressure gradient (HVPG) which is considered the gold standard for the evaluation of portal hypertension.

- The gold standard for the assessment for portal hypertension is the Hepatic Venous Pressure Gradient (HPVG [pressure gradient between portal vein and the inferior vena cava]), which is an invasive test.

- For noninvasive abdominal imaging:
  - Initial evaluation: abdominal US (CPT® 76700 or CPT® 76705) (including Duplex Doppler US [CPT® 93975] of the liver and upper abdomen) to assist in determining the cause (pre-hepatic [e.g. portal vein thrombosis, extrinsic compression from a tumor], intrahepatic [e.g. cirrhosis], and post-hepatic [e.g. hepatic vein thrombosis]). US is very accurate for detecting portal vein or hepatic vein thrombosis.

- For inconclusive US or further evaluation of US findings:
  - Multiphase CT Abdomen (CPT® 74160 or CPT® 74170), multiphase CTA Abdomen (CPT® 74175), multiphase MRA Abdomen (CPT® 74185), or MRI Abdomen liver protocol (CPT® 74183)

- TIPS (transjugular intrahepatic portosystemic shunt)
  - Pre-procedure evaluation:
    - Abdominal US, including Doppler (CPT® 76700 and/or CPT® 93975), Multiphase CT Abdomen (CPT® 74160 or CPT® 74170), multiphase CTA Abdomen (CPT® 74175), multiphase MRA Abdomen (CPT® 74185), or MRI Abdomen liver protocol (CPT® 74183) See **AB-43.1: Hepatic Arteries and Veins**
  - For routine follow-up to monitor stent patency:
US with Doppler (CPT® 93975) 7-14 days after shunt creation, and then at 3 months, 6 months, and then every 6 months thereafter.

(Note: If requested earlier than the above intervals because of a clinical deterioration or suspicion of stent occlusion, the Doppler can be approved).

If Doppler imaging is indeterminate or if there is a negative Doppler with clinical signs of worsening portal hypertension:

- Multiphase CT Abdomen (CPT® 74160 or CPT® 74170), multiphase CTA Abdomen (CPT® 74175), multiphase MRA Abdomen (CPT® 74185), or MRI Abdomen liver protocol (CPT® 74183)

Certain requests are made for advanced imaging to evaluate an individual with cirrhosis for the presence of esophageal varices. In general, and in the absence of a contraindication, endoscopy should be performed in individuals to assess for the presence of varices.

References
AB-27: MR Cholangiopancreatography (MRCP)

AB-27.1: MRCP
AB-27: MR Cholangiopancreatography (MRCP) - General

MRCP is an alternative to endoscopic retrograde cholangiopancreatography (ERCP) for evaluating the biliary system and pancreatic ducts.

AB-27.1: MRCP

- Rule out pathology in the biliary system or pancreatic duct.
  - Examples include:
    - Suspected or known gallstone pancreatitis
    - Suspected biliary pain
    - Pancreatic pseudocyst (for preoperative cyst drainage and/or pancreatic trauma with suspected duct injury)
    - Pancreatic trauma
    - Recurrent acute pancreatitis with no known cause
- Preoperative planning
- Evaluation of congenital anomaly of pancreaticobiliary tract.
- Altered biliary anatomy that precludes ERCP (e.g. post-surgical distorted anatomy).
- Failed ERCP in an individual who needs further investigation.
- Evaluation of pancreaticobiliary anatomy proximal to a biliary obstruction that cannot be opened by ERCP.
- ERCP is indicated but is not available, is contraindicated, or is expected to be difficult.
  - Examples include: coagulopathy, severe cardiopulmonary disease, allergy to iodinated contrast, distorted anatomy, and pregnant individuals.
- Requests for 3D rendering do not need to be sent to MD for review when criteria are met for MRCP as indicated above.

Coding Notes

Code assignment for MRCP
- There is no CPT® code that specifically describes MRCP.
- To report an MRCP, select one of these codes: CPT®74181 or CPT®74183. The specific MRI code should be selected based on whether or not intravenous contrast was administered.
- There is a Level II HCPCS code for MRCP, S8037 (Magnetic resonance cholangiopancreatography).
  - S8037 (and any other code beginning with the letter “S”) is not payable by Medicare. Some other payers may accept this code.
- Reporting/billing a second MRI code, to represent the “MRCP portion” of the study is not supported.
References
## AB-28: Biliary Tract Disease Jaundice

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**AB-28.1: Jaundice**

- Ultrasound¹ (CPT® 76700 or CPT® 76705) is the preferred initial imaging study to visualize the biliary ductal system when pain is present. Ultrasound often demonstrates the level and cause of any obstruction.

- Abdomen CT² without and with contrast (CPT® 74170) or Abdomen CT with contrast (CPT® 74160) should be considered in the following scenarios:
  - If non-diagnostic or equivocal ultrasound
    - e.g. large amounts of intestinal gas
  - Individual is obese (BMI >35).
  - Painless jaundice
  - Acute abdominal pain and one of the following: fever, previous biliary surgery, or known cholelithiasis.
  - If there is high pretest probability of obstruction due to malignancy.¹

- MR Cholangiopancreatography (MRCP) (See AB-27: MR Cholangiopancreatography (MRCP)) may be used to assess the extent and cause of intrahepatic bile duct obstruction:
  - Suggested by either ultrasound or CT if further characterization is warranted.
  - Contraindications to the use of IV contrast for CT imaging.

**AB 28.2: Gallbladder Polyps**

- Incidentally identified polyps less than 6mm in size do not require further follow-up³,⁴

- Polyps 6 to 9mm:
  - Ultrasound (CPT® 76700 or CPT® 76705) can be repeated in 6 months, and if no change in size or morphology, repeat US in another 12 months. If no changes, no additional imaging.

- Polyps of any size associated with primary sclerosing cholangitis:
  - Surgical consultation is appropriate
  - In this setting, CT (CPT® 74170) may be approved for further characterization of the lesion and for surgical planning.

- Advanced imaging for the evaluation of gallbladder polyps can be considered in the following circumstances:
  - CT abdomen (CPT® 74160 or CPT® 74170) if:
    - Age >60
    - Polyp noted to have a sessile morphology or is suspicious for malignancy in the radiology report.
    - Polyps >10mm
  - Follow-up imaging with CT Abdomen (CPT® 74160 or CPT® 74170) can be done at 6 months, and then at another 12 months.
References
### AB-29.1: Liver Lesion Characterization

- No further diagnostic imaging is needed if:
  - Simple cyst
  - Fatty liver (steatosis) without findings suspicious for a focal liver lesion(s)\(^7,8\)

- Ultrasound\(^1\) (CPT\(^\circledR\) 76700 or CPT\(^\circledR\) 76705) should be considered:
  - For suspected hepatomegaly
  - For suspected simple cyst
  - For initial study if suspect liver lesion without history of malignancy

- Ultrasound with contrast (CEUS, CPT\(^\circledR\) 76978, CPT\(^\circledR\) 76979) is only considered when MRI or CT cannot be performed, and the clinical situation requires ultrasound contrast to further delineate the nature of the lesion. CEUS of the liver is otherwise considered investigational or experimental at this time.

- See **AB-26: Cirrhosis and Liver Screening for Hepatocellular Carcinoma (HCC); Ascites and Portal Hypertension**

- Abdominal MRI or CT are the best studies to evaluate an indeterminate liver lesion (ACR 2014)\(^11,12\)

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<td>Lesion with Chronic Liver Disease (see Cirrhosis)(^9)</td>
<td>See Cirrhosis <strong>(AB-26)</strong></td>
<td>See Cirrhosis <strong>(AB-26)</strong></td>
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<td>Liver lesion with significant risk factors such as a history of malignancy, elevated tumor markers, or unintentional weight loss(^9)</td>
<td>Multiphase CT (CPT(^\circledR) 74160 or CPT(^\circledR) 74170) or Liver MRI (MRI Abdomen [CPT(^\circledR) 74183])</td>
<td>If indeterminate, follow-up CT or MRI every 6 months for 2 years, and then annually, to establish any growth patterns and assess for malignant transformation.</td>
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<td>Incidental lesions on US or CT without a dedicated liver protocol(^9)</td>
<td>Multiphase CT (CPT(^\circledR) 74160 or CPT(^\circledR) 74170) or Liver MRI (MRI Abdomen [CPT(^\circledR) 74183])</td>
<td>If indeterminate, follow-up CT or MRI every 6 months for 2 years, and then annually, to establish any growth patterns and assess for malignant transformation.</td>
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<tr>
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<tr>
<td>Suspected Hepatic Adenoma</td>
<td>MRI Abdomen (CPT® 74183) is considered the best technique for characterization.</td>
<td>Follow-up CT or MRI every 6 months for 2 years, and then annually, to establish any growth patterns and assess for malignant transformation.</td>
<td>Risks include spontaneous rupture, and rarely, malignant transformation. Almost all cases of rupture occur in lesions &gt; 5 cm in size. HCAs &lt; 5 cm are generally managed conservatively, with discontinuation of OCPs or anabolic steroids.</td>
</tr>
<tr>
<td>Hepatic Hemangioma (HH)</td>
<td>Multiphase CT (CPT® 74160 or CPT® 74170) or Liver MRI (MRI Abdomen [CPT® 74183]) are reliable in establishing the diagnosis.</td>
<td>Follow-up imaging is not required if the advanced imaging study demonstrates classic features of hemangioma. The exception is giant hemangiomas (&gt; 4 cm) in which follow up ultrasound can be done in 6 to 12 months, and if there is no change in size, no further follow up is indicated, unless it becomes symptomatic.</td>
<td>Most common benign hepatic tumor.</td>
</tr>
<tr>
<td>Focal Nodular Hyperplasia (FNH)</td>
<td>MRI (CPT® 74183) or Multiphase CT (CPT® 74160 or CPT® 74170) to confirm a diagnosis of FNH. The use of Eovist contrast is often diagnostic in differentiating FNH from other lesions seen on MRI or CT</td>
<td>FNH based on prior imaging characteristics or biopsy, and are not using oral contraceptives, do not require follow-up imaging. Follow-up annual US for 2 to 3 years is appropriate in women diagnosed with FNH who are continuing to use OCPs. Follow-up with CT (CPT® 74160 or CPT® 74170) or MRI (CPT® 74183) can be done if the lesion is not adequately visualized on US.</td>
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<td>Hepatic cysts</td>
<td>US shows internal septations, fenestrations, calcifications, irregular walls, as well as the presence of daughter cysts should be evaluated with CT or MRI for features of biliary cystadenoma or a hydatid cyst.</td>
<td>Asymptomatic, simple cysts do not require additional follow-up.</td>
<td>Simple hepatic cysts are not felt to be precursors to biliary cystadenomas or cystadenocarcinomas. The vast majority of cysts are benign.</td>
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Other indications for MRI Abdomen without and with contrast (CPT® 74183), CT Abdomen without and with contrast (CPT® 74170), or CT with contrast (CPT® 74160):
- Percutaneous liver biopsy is to be considered if imaging is atypical or inconclusive.⁴
- Diagnosis for HCC is done with imaging, biopsy is not needed for diagnosis.⁵
- Suspected liver metastases; See ONC-31.2: Liver Metastases.
- Fatty liver on US with a focal liver lesion(s).⁷

Further evaluation
- MRI Abdomen without and with contrast (CPT® 74183) can be considered if an initially performed CT Abdomen without and with contrast (CPT® 74170) or CT with contrast (CPT® 74160) is equivocal.
- MRA Abdomen (CPT® 74185) or CTA Abdomen (CPT® 74175) for preoperative study in individuals with large hemangiomas or adenomas considered for resection.
- Nuclear medicine imaging of the liver (CPT® 78201, CPT® 78202, CPT® 78205, CPT® 78206, CPT® 78215, CPT® 78216) are rarely performed, but can be considered when ultrasound, CT, and MRI are unavailable or contraindicated with:¹⁰⁻¹¹
  - Evaluation of liver mass, trauma, or suspected focal nodular hyperplasia (FNH).
  - Differentiation of hepatic hemangioma from FNH.
  - Diffuse hepatic disease or elevated liver function tests.

**Practice Notes**
If fatty infiltration is demonstrated by US, neither CT nor MRI can distinguish between steatosis and steatohepatitis. Clinically, additional workup of fatty liver is biochemical, serologic, and may include a liver biopsy as potential etiologies are sought.⁷⁸

**References**


AB-30.1: Elevated Liver Function Levels

- The standard laboratory tests commonly referred to as “LFTs” include bilirubin, alkaline phosphatase (alkphos or ALKP), aspartate transaminase (AST), alanine transaminase (ALT), and gamma-glutamyl transferase (GGT). There are 4 major patterns of elevation which affect workup:
  - Hepatocellular (AST and ALT disproportionately elevated to ALKP.)
  - Cholestatic (ALKP elevated disproportionately to AST and ALT)
  - Mixed pattern (ALKP, AST, and ALT all elevated)
  - Isolated hyperbilirubinemia (elevated bilirubin and normal ALKP, ALT and AST)

- For elevated AST and/or ALT (>33 IU/l for males, >25 IU/l for females) and other LFTs are normal:
  - <2X normal:
    - Repeat lab after 3 weeks and discontinuation of medications associated with elevated LFTs (such as statins, niacin, sulfa, rifampin, tetracycline, estrogen) if applicable.
    - If LFTs remain elevated: Abdominal US (CPT® 76700 or CPT® 76705)
  - 2 to 15X normal:
    - Abdominal US (CPT® 76700 or CPT® 76705)
  - >15X normal:
    - Abdominal US with Doppler (CPT® 76700 or CPT® 76705 and CPT® 93975)

- Elevated alkaline phosphatase level, and other LFTs are normal
  - Etiology of elevated ALKP should be determined prior to imaging.
    - If isolated ALKP elevation, GGT should be obtained for confirmation of hepatic etiology, prior to imaging. If ALKP is elevated with other LFTs, no confirmatory test is necessary.
    - For confirmed hepatic etiology of elevated ALKP, RUQ ultrasound (CPT® 76705)
      - If dilated biliary ducts on US: MRCP
      - If no dilated biliary ducts: anti-mitochondrial antibody (AMA) should be checked prior to advanced imaging.
        - if AMA is negative, and ALKP >2X ULN: MRCP
        - if AMA is negative, and ALKP 1 to 2X ULN: observe for 6 months, If ALKP remains elevated: MRCP

- Isolated elevated bilirubin (no other LFTs elevated).
  - An isolated elevated bilirubin should be fractionated into direct (conjugated) and indirect (unconjugated) levels.
    - If elevation is unconjugated, and no other LFT elevations: No advanced imaging.
    - If elevation is conjugated: RUQ ultrasound
      - If biliary ducts dilated: MRCP
      - If biliary ducts not dilated: check AMA prior to advanced imaging.
        - If negative and elevation persists or is unexplained, MRCP or liver biopsy can be considered.
For patients with elevated LFTs and suspicion of sclerosing cholangitis, such as those with IBD, See AB-23.4: Primary Sclerosing Cholangitis (PSC).

For patients with elevated LFTs and history of underlying malignancy, please refer to the specific oncology guidelines, when appropriate.

Requests for additional advanced imaging (CT, MRI, etc.) are based on the US or MRCP results, as appropriate to the finding (for example, if a lesion is identified that needs further characterization, refer to liver lesion imaging as per AB-29.1: Liver Lesion Characterization).

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AB-31.1: Pancreatic Cystic Lesions

Screening studies for pancreatic cancer can be considered in those who are considered high risk in the following guideline: **ONC-13: Pancreatic Cancer** in the Oncology Imaging Guidelines.

- **Note:**
  - Patients who are not medically fit for surgery should not undergo further surveillance of incidentally found pancreatic cysts, irrespective of size.
  - Surveillance should be discontinued if a patient is no longer a surgical candidate. However, follow-up imaging can be performed if requested for a symptomatic cyst (such as the development of jaundice secondary to cyst), in which palliative treatment might be available.

- This guideline applies to the following pancreatic cystic lesions:
  - Intraductal papillary mucinous neoplasms (IPMN)
  - Mucinous cystic neoplasms (MCN)
  - Serous Cystadenomas (SCA)
  - Solid-pseudopapillary neoplasms (SPN)

- **Pancreatic Cyst seen on Imaging-Initial Management:**
  - MRI Abdomen (CPT® 74183) and/or MRCP are the tests of choice for initial evaluation.
  - Pancreatic protocol CT (CPT® 74170) or EUS are alternatives in patients who are unable to undergo MRI.
  - Indeterminate cysts may benefit from a second imaging modality or EUS prior to proceeding with surveillance. If a previous US or CT Abdomen has been performed, a request for an MRI/MRCP can be approved to better characterize the lesion, without reference to the timeframe for follow-up imaging.
  - Radiographic diagnosis of a non-neoplastic cyst or classic features of a serous cystadenoma
    - No further imaging
  - If any of the following are present the patient should proceed to EUS + FNA and depending on findings, surgical consultation:
    - Main duct >5mm
    - Cyst > 3cm
    - Change in main duct caliber with upstream atrophy
  - If EUS does not reveal findings of main duct involvement, patulous ampulla, cytology with high-grade dysplasia or pancreatic malignancy, or a mural nodule, then follow up MRI should performed in 6 months.

- **Pancreatic Cyst Follow up Imaging**
  - If high risk features are not present, then the next follow-up imaging proceeds as follows:
    - Cyst <1cm: MRI in 2 years
    - Cyst 1-2cm: MRI in 1 year
    - Cyst 2-3cm: if cyst is not clearly an IPMN or MCN then proceed with EUS. If it is an IPMN or MCN, then MRI at 6-12 months.
If the cyst is determined to be a serous cystadenoma, then no further evaluation unless symptomatic.

Additional Surveillance for a presumed IPMN or MCN (imaging from time of presentation):

(Note: MRCP or MRI/MRCP is the preferred modality for surveillance due to non-invasiveness, lack of radiation, and improved delineation of the main pancreatic duct)

- **Cyst <1cm**
  - MRI every 2 years for 4 years.
  - If stable after 4 years consider lengthening of interval imaging.
  - If increase in cyst size, then MRI or EUS in 6 months.
  - If stable, repeat again in 1 year and if stable return to MRI every 2 years.

- **Cyst 1-2cm**
  - MRI yearly for 3 years
  - If stable for 3 years, then change to MRI every 2 years for 4 years
  - If stable after the additional 4 years, consider lengthening of interval for surveillance.
  - If increase in cyst size, repeat MRI in 6 months. If stable, repeat MRI in 1 year and if remains stable, resume original surveillance schedule.

- **Cyst 2-3cm**
  - MRI every 6-12 months for 3 years
  - If stable after 3 years, change to MRI every year for 4 years
  - If remains stable, consider lengthening of surveillance interval

- **Cyst >3cm**
  - MRI alternating with EUS every 6 months for 3 years
  - If stable for 3 years, increase interval to MRI alternating with EUS yearly for 4 years.
  - If remains stable, consider lengthening of surveillance interval.
  - If increase in cyst size, EUS + FNA

**Additional considerations**

- Patients with asymptomatic cysts that are diagnosed as pseudocysts on initial imaging and clinical history, or are determined to be serous cystadenomas, do not require further evaluation.

- Patients with IPMNs or MCNs with new onset or worsening diabetes, or a rapid increase in cyst size (>3mm/year) during surveillance may have an increased risk of malignancy and should undergo a short-interval MRI or EUS. Additional features which may prompt early evaluation are:
  - Jaundice secondary to the cyst, acute pancreatitis secondary to the cyst, significantly elevated CA 19-9
  - The presence of a mural nodule or solid component either within the cyst or in the pancreatic parenchyma, dilation of the main pancreatic duct >5mm, a focal dilation of the pancreatic duct concerning for main duct IPMN or an obstructing lesion, IPMNs or MCNs measuring ≥3cm in diameter
The presence of high-grade dysplasia or pancreatic cancer on cytology. In these circumstances, imaging should be at the discretion of the provider.

Post-op surveillance

- Surgically resected serous cystadenomas, pseudocyst, or other benign cyst:
  - No additional imaging after resection
- Surgically resected mucinous cystic neoplasms (MCNs) without an associated pancreatic malignancy (can have low, intermediate, or high-grade dysplasia):
  - No additional post-op surveillance
- Surgically resected MCNs with invasive cancer:
  - Standard surveillance-based pancreatic cancer guidelines (See ONC-13.5: Surveillance/Follow Up) for 5 years. No surveillance required after 5 years.
- Surgically resected IPMNs
  - IPMN with cancer
    - Pancreatic cancer surveillance guidelines (See ONC-13.5: Surveillance/Follow Up)
  - IPMN with high-grade dysplasia
    - MRI abdomen (CPT® 74183) or EUS every 6 months
  - IPMN with low- or intermediate-grade dysplasia
    - MRI abdomen (CPT® 74183) every 2 years
- Surgically resected solid-pseudopapillary neoplasm with negative margins:
  - MRI abdomen (CPT® 74183) yearly for 5 years.

See AB-27: MR Cholangiopancreatography (MRCP) for coding guidelines for MRCP.

AB-31.2: Incidental Pancreatic Mass or Suspected Metastatic Disease to Pancreas

- CT Abdomen with contrast with dual phase imaging (CPT® 74160), or CT Abdomen without and with contrast (CPT® 74170) (dedicated pancreatic protocol) since the majority of pancreatic tumors will enhance following IV contrast).²

References
**AB-32.1: Pancreatic Pseudocysts**

- CT Abdomen with contrast (CPT® 74160), or without and with contrast (CPT® 74170),\(^1\) or MRI Abdomen without and with contrast (CPT® 74183)
  - Minimal symptoms - every two weeks, up to six weeks total. Thereafter, every 4 weeks.
  - Anytime symptoms worsen, including development of ascites or pleural effusion, increasing serum amylase, or if drainage of the cyst is planned.

- MRCP for preoperative planning cyst drainage:
  - See **AB-27: MR Cholangiopancreatography (MRCP)** for coding guidelines for MRCP

- MRCP for pancreatic trauma with suspected duct injury or pseudocyst.

**Practice Notes**

Endoscopic ultrasound has increasingly become an important imaging modality in evaluating pseudocysts.

**Reference**

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AB-33.1: Pancreatitis

- Ultrasound\(^2\) (CPT\(^\circledast\) 76700 or CPT\(^\circledast\) 76705) is the first study to evaluate:
  - Mild and uncomplicated symptoms of epigastric pain described as uncomfortable without guarding to rule out gallstone disease.
  - If ultrasound suggests uncomplicated pancreatitis, then advanced imaging is not necessary. For complicated pancreatitis, see below.

- CT Abdomen\(^2\) with contrast (CPT\(^\circledast\) 74160), without contrast (CPT\(^\circledast\) 74150) or without and with contrast (CPT\(^\circledast\) 74170).
  - Suspected complications including peripancreatic effusions, pseudocysts, abscess, and pancreatic necrosis.
  - Lipase and/or amylase greater than or equal to three times the upper limit of normal and any one of the following:
    - Fever (101 degrees or greater)
    - Elevated WBC as per the testing laboratory’s range
    - Mass
    - No improvement with medical therapy
  - If the initial presentation is atypical, with equivocal amylase or lipase, and if other etiologies for the abdominal pain, such as bowel perforation or ischemia are being considered.
  - Suspected pancreatitis and ultrasound findings do not explain symptoms (gallstones, common duct, etc.).
  - Plain abdominal X-ray (KUB) and ultrasound (CPT\(^\circledast\) 76700 or CPT\(^\circledast\) 76705) are not characteristic and diagnostic in known chronic pancreatitis.

- MRI Abdomen without and with contrast\(^2\) (CPT\(^\circledast\) 74183) is considered if:
  - The clinical indications for CT are met or equivocal, but there are contraindications for its use.

- MR Cholangiopancreatography\(^1,2\) can be considered if:
  - Suspected gallstone pancreatitis to screen for those individuals who would benefit from ERCP.
  - Recurrent, acute pancreatitis with no known cause.
  - Evaluation of individuals with suspicion of pancreatic ductal anomalies that may predispose them to pancreatitis.
  - Plain abdominal X-ray (KUB) and ultrasound (CPT\(^\circledast\)76700 or CPT\(^\circledast\)76705) are not characteristic and diagnostic in known chronic pancreatitis and the MRI findings will affect management decisions.
  - MRCP – See AB-27: MR Cholangiopancreatography (MRCP) for coding guidelines for MRCP
**Practice Notes**

The diagnosis of acute pancreatitis is often made by fulfilling two of the following three (3) conditions:

1. Typical pain (acute onset of epigastric pain radiating to the back that is persistent without relief, frequently associated with nausea and vomiting, and associated with severe epigastric tenderness and/or guarding, and/or fever).
2. Lipase and/or amylase greater than or equal to three times the upper limit of normal.
3. Typical characteristics of pancreatitis on CT Abdomen.

Chronic pancreatitis that is suspected as evidenced by recurrent characteristic pancreatic pain, symptoms of maldigestion/malabsorption that improve with digestive enzymes, does not require the use of advanced imaging. For known chronic pancreatitis including hereditary pancreatitis, there is no evidence-based data supporting screening. Acute pancreatitis is divided clinically into non-severe (previously called mild) and severe pancreatitis.

- Non-severe pancreatitis represents interstitial edematous pancreatitis, and severe pancreatitis manifests as necrotizing pancreatitis or as pancreatitis associated with organ failure.
- Serum enzyme levels do not correlate with the severity of the disease
- Clinical scoring systems and imaging tests have been advocated to classify individuals in terms of severity.
- The diagnosis may be overlooked in the absence of typical enzyme elevation; in some individuals, acute pancreatitis may be present in the absence of enzyme abnormalities.

**References**

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**AB-34.1: Spleen**

- **Incidental splenic findings on US:**
  - CT abdomen (CPT® 74170) or MRI abdomen (CPT® 74183) can be obtained.

- **Incidental splenic findings on CT or MRI:**
  - Imaging is diagnostic of a benign lesion (simple cyst, hemangioma) or characteristics are benign-appearing (homogenous, low attenuation, no enhancement, smooth margins):
    - No follow-up imaging.
  - Imaging characteristics are not diagnostic:
    - Prior imaging available:
      - One year stability: no follow-up imaging
      - Lack of stability: consider MRI if not done, biopsy, or PET/CT (CPT® 78815).
    - No prior imaging:
      - Suspicious imaging features: (suggesting possible malignancy)
        - MRI abdomen (CPT® 74183) if not already done or biopsy
        - If MRI still inconclusive and biopsy is not feasible then PET/CT (CPT® 78815) can be considered
      - Indeterminate imaging features: (equivocal but not suspicious for malignancy)
        - Follow up MRI abdomen (CPT® 74183) in 6 and 12 months.
    - Known malignancy:
      - < 1 cm: follow up MRI abdomen (CPT® 74183) in 6 and 12 months.
      - > 1 cm: consider MRI abdomen (CPT® 74183) if not done, biopsy
        - If MRI still inconclusive and biopsy is not feasible then PET/CT (CPT® 78815) can be considered
      - (See diagnosis-specific in **Oncology Imaging Guideline**).

- **Clinically detected splenomegaly**
  - Abdominal US (CPT® 76700 or CPT® 76705) should be the first imaging study to evaluate splenic size.
  - If splenomegaly is confirmed, the following evaluation is indicated prior to advanced imaging:
    - CBC, evaluation of the peripheral blood smear, LFTs, UA, CXR, HIV testing.
      - If the etiology of the splenomegaly remains unexplained, CT Abdomen without and with contrast or with (CPT® 74170 or CPT® 74160) can be performed.
    - MRI Abdomen (CPT® 74183) can be considered for pregnant patients, or individuals with iodinated contrast allergy.
  - Nuclear medicine imaging of the liver/spleen (CPT® 78201, CPT® 78202, CPT® 78205, CPT® 78206, CPT® 78215 and CPT® 78216) is rarely performed, but can be considered if CT and MRI are contraindicated, as well as for evaluation of an accessory spleen.
AB-34.2: Trauma - Spleen

- Ultrasound Abdomen (CPT® 76700 or CPT® 76705) and Pelvis (CPT® 76856 or CPT® 76857) or CT³,⁴,⁵ Abdomen and Pelvis without and with contrast (CPT® 74178) or with contrast (CPT® 74177) are indicated in individuals with blunt abdominal trauma with suspected splenic rupture or in individuals with penetrating trauma to the left upper quadrant. See **AB-10: Blunt Abdominal Trauma**

**Practice Notes**

Splenomegaly is usually the result of systemic disease, and diagnostic studies are directed toward identifying the causative disease. Complete blood count with differential, LFT’s, and peripheral blood smear examination are often performed prior to considering advanced imaging. There is no evidence-based data to support performing serial CT or MRI to follow individuals with incidental splenic lesions.

**References**


AB-35: Indeterminate Renal Lesion—General Information

For acute flank pain, rule out renal stone, See AB-4: Flank Pain, Rule Out or Known Renal/Ureteral Stone

AB-35.1: Indeterminate Renal Lesion

- Incidental Renal Mass on Non-Contrast CT
  - If characterized as heterogeneous (thick or irregular wall, mural nodule, septa or calcification):
    - Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) or CT abdomen without and with contrast (CPT® 74170)
  - If characterized as homogenous (thin or imperceptible wall, NO mural nodule, septa or calcification):
    - 10 to 20 HU (Hounsfield units)
      - Likely benign, not fully characterized: no further workup
    - 21 to 69 HU
      - Indeterminate: MRI or CT abdomen without and with contrast (CPT® 74183 or CPT® 74170)
    - >70 HU
      - Hemorrhagic or proteinaceous cyst, unlikely to be neoplastic: no further workup
  - If characterized as TSTC (too small to characterize) and homogenous:
    - If labelled likely benign cyst, not fully characterized:
      - No further workup
    - If labelled inconclusive based on subjective evaluation:
      - Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) (preferred) or CT abdomen without and with contrast (CPT® 74170) within 6-12 months

- Incidental Renal Mass on Contrast-Enhanced CT
  - If characterized as heterogeneous: thick or irregular wall, mural nodule, septa or calcification:
    - Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) or CT abdomen without and with contrast (CPT® 74170)
  - If characterized as homogenous: thin or imperceptible wall, NO mural nodule, septa or calcification:
    - 10 to 20 HU
      - No further workup
    - >20 HU (solid or complicated cystic mass)
      - Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) or CT abdomen without and with contrast (CPT® 74170)
  - If characterized as TSTC, homogenous:
    - If labelled likely benign cyst, not fully characterized:
      - No further workup
    - If labelled inconclusive based on subjective evaluation:
Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) (preferred), or CT abdomen without and with contrast (CPT® 74170) within 6-12 months

- Incidental cystic renal mass on CT or MRI without and with contrast (completely characterized, and does NOT contain fat)
  - Bosniak I (benign simple) or II (minimally complicated)
    - No further workup
  - Bosniak IIF
    - CT abdomen without and with contrast (CPT® 74170) or MRI abdomen without and with contrast (CPT® 74183) at 6 and 12 months, then yearly for 5 years
    - If no changes for 5 years, cyst is considered benign and of no clinical significance
  - Bosniak III or IV should be referred for additional management or if chosen, active surveillance (See Active Surveillance guideline)

- Incidental solid renal mass or incidental mass too small to characterize evaluated on CT or MRI without and with contrast and does NOT contain fat
  - TSTC
    - If labelled likely benign cyst:
      - No further workup
    - If labelled inconclusive based on subjective evaluation:
      - MRI abdomen without and with contrast (CPT® 74183) (preferred), or CT abdomen without and with contrast (CPT® 74170) within 6-12 months
  - If solid mass <1.0cm
    - MRI abdomen without and with contrast (CPT® 74183) (preferred), or CT abdomen without and with contrast (CPT® 74170) beginning at 6-12 months, then yearly for 5 years
    - If stable at 5 years (average growth ≤3mm per year): No further workup
    - If mass shows growth (>4mm per year) or morphologic change: refer for management, consider renal biopsy. If biopsy is technically challenging or relatively contraindicated, a T2 weighted image MRI abdomen without and with contrast (CPT® 74183) can be performed
  - Solid mass 1.0-4.0cm:
    - Considered a small renal neoplasm: refer for management, consider biopsy. If biopsy is technically challenging or relatively contraindicated, a T2 weighted imaging MRI abdomen without and with contrast (CPT® 74183) can be performed. If active surveillance chosen due to limited life expectancy or co-morbidities, See Active Surveillance guideline.
  - Solid renal mass >4.0cm
    - Considered a renal neoplasm: refer for management, or biopsy. If biopsy is technically challenging or relatively contraindicated, a T2 weighted image MRI abdomen without and with contrast (CPT® 74183) can be performed. If active surveillance chosen due to limited life expectancy or co-morbidities, See Active Surveillance guideline
Incidental renal mass containing fat (contains a region of interest measuring < -10 HU)
- No calcification angiomyolipoma (AML)
  - Solitary and without documentation of growth:
    - <4cm: no further workup
    - >4cm, and considered an AML with potential for clinical symptoms: refer for management.
  - Multiple lesions or growth documented based on old studies:
    - Refer for management. If active surveillance chosen due to limited life expectancy or co-morbidities, See Active Surveillance guideline.
- With calcification (suspected renal cell carcinoma):
  - CT abdomen without and with contrast (CPT® 74170) or MRI abdomen without and with contrast (CPT® 74183) if only a non-contrast CT has been performed. If active surveillance chosen due to limited life expectancy or co-morbidities, See Active Surveillance guideline.

Active Surveillance
- If active surveillance is chosen for a suspected or confirmed RCC in a patient with limited life expectancy or high surgical risk due to co-morbidities the schedule is as follows:
  - CT abdomen without and with contrast (CPT® 74170) or MRI abdomen without and with contrast (CPT® 74183) every 3 months for the first year, every 6 months for the second and third years, and then annually

NOTE: PET-CT or PET-MRI are not recommended because their role evaluating the incidental renal mass is limited.¹

Bosniak Classification:
I- Benign simple cyst with a hairline thin wall without septa, calcification, or solid component. Homogeneous near-water attenuation density (10 to 20 HU) without enhancement.

II- Benign minimally complicated cyst that may contain a few hairline thin septa that may have “perceived” but not measurable enhancement. Fine calcification or a segment of slightly thickened calcification may be present in the wall or septa. Also, a well-margined nonenhancing homogeneous mass <3cm with density above simple fluid attenuation (hyperdense cyst).

IIF- Usually benign complicated renal cyst with multiple hairline thin septa or minimal smooth thickening of the wall or septa. Wall or septa may contain thick and nodular calcification and may have “perceived” but not measurable enhancement. Also, a well-margined intrarenal nonenhancing mass >3cm with density above simple fluid.

III -Indeterminate complicated cystic renal mass with thickened irregular walls or septa that have measurable enhancement.
IV-Malignant cystic renal mass with enhancing soft tissue components (cystic renal cell carcinoma).
From the Journal of the American College of Radiology¹

References
AB-36.1: Renal Failure

- Ultrasound (CPT® 76770 or CPT® 76775) of the kidney and bladder, preferably with Doppler (CPT® 93975 or CPT® 93976), is the preferred imaging study for the evaluation of acute or chronic renal failure.

- MRA Abdomen (CPT® 74185) can be utilized when there is suspected:
  - Renal vein/caval thrombosis
  - Renal artery stenosis as cause of renal failure
  - MRA with contrast may be contraindicated in severe renal failure or patients on dialysis due to the risk of gadolinium agents in causing nephrogenic systemic sclerosis.

- CT Abdomen without contrast (CPT® 74150) is not needed except to rule out ureteral obstruction or retroperitoneal mass.¹

- Nuclear renal imaging (CPT® 78701, CPT® 78707, CPT® 78708, CPT® 78709) can be considered for any of the following:³,⁴
  - Renal transplant follow-up
  - Kidney salvage vs. nephrectomy surgical decisions
  - Acute renal failure with no evidence of obstruction on recent ultrasound.
  - Chronic renal failure to estimate prognosis for recovery.

- Nuclear medicine studies of the kidney (CPT® 78700 or CPT® 78701) can be considered for evaluation of the following anatomic renal anomalies:³
  - Suspected horseshoe kidney
  - Suspected solitary or ectopic kidney

- Peritoneal-venous shunt patency study (CPT® 78291) is considered for evaluation of shunt patency and function in an individual with ascites.

References


AB-37.1: Renovascular Hypertension

See PVD-6.5: Renovascular Hypertension
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AB-38.1: Polycystic Kidney Disease

- Ultrasound\(^1\) (CPT\(^\circledR\)76770 or CPT\(^\circledR\)76775) can be performed for:
  - Suspected polycystic kidney disease
  - Screening individuals at risk for autosomal dominant polycystic disease (ADPKD)

**Reference**

## AB-39: Hematuria and Hydronephrosis

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**AB-39.1: Hematuria with Urinary Tract Infection (UTI)**

Signs and symptoms of UTI: urinary frequency, burning on urination, positive urine leukocyte esterase, presence of WBCs in the urine, fever, elevated WBC as per the testing laboratory’s range

- Females ≤40 years of age should receive at least a 3-day regimen of antibiotics followed by repeat dipstick urinalysis or complete urinalysis with microscopic exam. If the hematuria resolves, advanced imaging is not indicated. If symptoms persist, may receive CT Urogram (CPT® 74178).
- Females >40 years of age, may undergo CT Urogram¹ (CPT® 74178)
- Males with UTI should be imaged, See **AB-40: Urinary Tract Infection (UTI)**
- NOTE: 3-D Reconstruction enhances a CT Urogram. Requests for 3-D reconstruction (CPT® 76377) for a CT Urogram can be approved.

**AB-39.2: Hematuria, not Related to Urinary Tract Infection (UTI) or Flank Pain (Asymptomatic Hematuria)**

- Multiphasic CT Urogram (CPT® 74178)
- If CT contraindicated (renal insufficiency, contrast allergy):
  - MR urography without and with contrast (CPT® 74183 and CPT® 72197) or without contrast
    - if pregnant or contrast contraindicated CPT® 74181 and CPT® 72195
    - If both multiphase CT and MRI are contraindicated:
      - CT urography without contrast (CPT® 74176) or renal US (CPT® 76775 or CPT® 76770) can be approved
- If persistent or recurrent asymptomatic hematuria with an initial negative urologic workup, repeat imaging within 3 to 5 years should be considered.
- NOTE: 3-D Reconstruction enhances a CT Urogram. Requests for 3-D reconstruction (CPT® 76377) for a CT Urogram can be approved.

**AB-39.3: Hematuria and Flank Pain (suspicion for renal/urethral stones)**

- CT Abdomen and Pelvis without contrast (CPT® 74176) or CT Urogram (CPT® 74178)
- NOTE: 3-D Reconstruction enhances a CT Urogram. Requests for 3-D reconstruction (CPT® 76377) for a CT Urogram can be approved.
AB-39.4: Hydronephrosis of unexplained or indeterminate cause

- CT Urogram (CPT® 74178)
- NOTE: 3-D Reconstruction enhances a CT Urogram. Requests for 3-D reconstruction (CPT® 76377) for a CT Urogram can be approved.
- Patients with known uncomplicated hydronephrosis, neurogenic bladder, myelomeningocele (open spinal dysraphism), or spina bifida can have follow-up/surveillance imaging with retroperitoneal ultrasound (CPT® 76770) every 6 to 12 months

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**AB-40: Urinary Tract Infection**

These guidelines refer to UTI without Hematuria. For UTI with Hematuria, see **AB-39: Hematuria and Hydronephrosis**

**AB-40.1: Upper (Pyelonephritis)**

- CT Abdomen and Pelvis without and with contrast (CPT® 74178) or CT Abdomen and Pelvis with contrast (CPT® 74177) if¹:
  - Suspected complicated: diabetes, immune-compromised, history of stones, prior renal surgery, elevated creatinine, or fever ≥101 F (≥38.5 C).
  - Not responding to therapy after 3 days.
  - Recurrent pyelonephritis (at least 1 prior pyelonephritis).
  - Males with first time UTI, or recurrent UTI without etiology.

- Pregnant women should be evaluated initially by renal ultrasound² (CPT® 76770 or CPT® 76775) and if further imaging is necessary, MRI Abdomen and Pelvis³ (contrast as requested).

**AB-40.2: Lower**

- CT Abdomen and Pelvis without and with contrast (CPT® 74178) if³:
  - Suspected complicated: diabetes or immunocompromised or history of stones or prior renal surgery, elevated creatinine or fever ≥101 F (≥38.5 C).
  - Not responding to therapy after 3 days.
  - Males with first time UTI or recurrent UTI without etiology.
  - Recurrent UTI >3 per year.
  - Recommendation by urologist or specialists.


**References**

AB-41.1: Patent Urachus

See PV-23.1: Patent Urachus in the Pelvis Guideline
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AB-42.1: Liver Transplant, Pre-Transplant

See CD-1.6: Transplant Patients in the Cardiac Imaging Guidelines for guidelines on cardiac stress testing.

Individuals on the liver transplant waiting list can undergo advanced imaging per the participating institution’s protocol, as long as the studies do not exceed the following:

- If no known Hepatocellular Carcinoma:
  - Liver ultrasound (CPT® 76705) with Doppler (CPT® 93975) every six months.
  - CT or MRI Abdomen (CPT® 74170 or CPT® 74183) every year.
  - CT chest (CPT® 71260) for initial placement on the transplant list, but repeat chest CT is not required.
  - MRI Bone Marrow Blood Supply (CPT® 77084) or bone-scan one time.
- If known Hepatocellular Carcinoma:
  - Liver ultrasound (CPT® 76705) with Doppler (CPT® 93975) every six months.
  - CT or MRI Abdomen (CPT® 74170 or CPT® 74183) every three months.
  - CT Chest (CPT® 71260) every six months.
  - Bone scan every six months.
- If known Primary Sclerosing Cholangitis (PSC):
  - MRCP (See AB-27: MR Cholangiopancreatography (MRCP) for correct reporting/coding)

Pre-operative studies immediately prior to liver transplant:
- CT or MRI Abdomen (CPT® 74170 or CPT® 74183)
  - If CT Abdomen was most recently done while on the transplant waiting list, then MRI Abdomen should be done immediately prior to transplant and vice versa.
- CT Pelvis (CPT® 72193)
- CTA Abdomen (CPT® 74175) or MRA Abdomen (CPT® 74185)
- CT Chest (CPT® 71260)
- MRI Bone Marrow Blood Supply (CPT® 77084) or bone scan

AB-42.2: Liver Transplant, Partial Liver Transplant Donors

Donors for partial liver transplant can be evaluated with CT of the Abdomen without and with contrast (CPT® 74170) or MRI of Abdomen without and with contrast (CPT® 74183) prior to transplant.

AB-42.3: Liver Transplant, Post-transplant

See CD-1.6: Transplant Individuals in the Cardiac Imaging Guidelines for guidelines on stress testing.

- If known hepatocellular carcinoma (i.e. transplant performed for treatment of HCC, or if a de novo HCC is discovered in the explant liver):
  - CT Abdomen (CPT® 74160 or CPT® 74170) every 6 months for 3 years.
  - CT chest (CPT® 71260) every 6 months for 3 years.
- If no history of hepatocellular carcinoma, but cirrhosis develops in the explant liver:
See **AB-26: Cirrhosis and Liver Screening for Hepatocellular Carcinoma (HCC); Ascites and Portal Hypertension** for HCC screening guidelines

- For fibrosis assessment post-liver transplant:
  - Transient Elastography (CPT® 91200) (this is the most studied modality in this setting)

- If known cholangiocarcinoma:
  - Liver US (CPT® 76705) or MRI Abdomen and MRCP (CPT® 74183) every 6 months for 5 years post-transplantation.
  - CT chest (CPT® 71260) every 6 months for 5 years post-transplantation

- All other post-transplant individuals:
  - Routine screening of the chest or abdomen is not supported in the absence of HCC.
  - Bone mineral density yearly for individuals with known osteopenia and every 2 to 3 years in individuals with a normal bone mineral density.
  - Advanced imaging as indicated for suspected post-operative complications

**Practice Note**
Consensus guidelines regarding post-transplant surveillance imaging have not yet been established. Guidelines are based on a reasonable approach and are in accordance with suggestions by the American Association for the Study of Liver Diseases (AASLD) and others.

**AB-42.4: Liver Transplant, Post-Transplant Lymphoproliferative Disease (PTLD)**

- Most cases of PTLD are observed in the first year following transplant. Frequency of developing PTLD:
  - Small bowel transplant—20% of individuals are at risk of developing PTLD
  - Lung transplant—10% risk
  - Heart transplant—6% risk
  - Liver transplant—1%-3% risk
  - Kidney transplant—1%-3% risk


- Chest/Abdomen/Pelvis CT with contrast (CPT® 71260 and CPT® 74177) can be performed. Biopsy of the involved organ should be performed if PTLD is suspected.

- There is insufficient evidence-based data to support the routine use of imaging to screen for PTLD.⁴
**AB-42.5: Kidney Transplant, Pre-Transplant Imaging Studies**

See [CD-1.6: Transplant Individuals](#) in the Cardiac Imaging Guidelines for guidelines on cardiac stress testing.

- Individuals on the kidney transplant waiting list can undergo advanced imaging per that institution’s protocol as long as the studies do not exceed the following:
  - If stress test is positive for reversible ischemia, or if duration of diabetes is >25 years and individual has additional cardiac risk factors, then diagnostic left heart catheterization can be performed.
  - Carotid duplex study (CPT® 93880 bilateral study or CPT® 93882 unilateral study) if there is history of stroke, TIA, or if carotid bruit is present on exam.
  - Abdomen and Pelvis CT (CPT® 74176 or CPT® 74177) or CTA Abdomen (CPT® 74175) one time.

**AB-42.6: Kidney Transplant, Post-transplant**

- Ultrasound of transplanted kidney:
  - Current ultrasound imaging protocols of the transplanted kidney commonly include a Doppler study and are coded as CPT® 76776.
    - Do not report non-invasive vascular codes CPT® 93975 and CPT® 93976 in conjunction with CPT® 76776.
  - Ultrasound of the transplanted kidney performed without duplex Doppler should be reported as a limited retroperitoneal ultrasound (CPT® 76775).

**AB-42.7: Heart Transplant**

See [CD-1.6: Transplant Individuals](#) in the Cardiac Imaging Guidelines

**References**

## AB-43: Hepatic and Abdominal Arteries

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AB 43.1: Hepatic Arteries and Veins

For the evaluation of the hepatic arteries and veins (including portal vein), CTA Abdomen and Pelvis (CPT® 74174), or CTA Abdomen (CPT® 74175) or MRA Abdomen (CPT® 74185) may be considered if one of the following:

- Evaluation of portal and hepatic veins prior to or following TIPS (transjugular intrahepatic portosystemic shunt)
- Evaluation of portal and hepatic veins prior to or following surgical intervention for portal hypertension
- Evaluation of hepatic vasculature prior to and following embolization procedure
- Evaluation of hepatic vasculature prior to planned hepatectomy
- Evaluation of liver donor
- Suspected hepatic vein thrombosis or Budd Chiari syndrome, one of the following:
  - Ascites
  - Hepatomegaly
  - Inadequate Doppler ultrasound of hepatic veins
- Possible portal vein thrombosis with negative or inadequate Doppler study of the portal vein, one of the following:
  - Hypercoagulable state
  - Abdominal malignancy
- Preoperative evaluation for pancreatic cancer

AB 43.2: Abdominal Veins other than Hepatic and Portal Veins

For the evaluation of abdominal veins other than hepatic and portal veins CTA Abdomen and Pelvis (CPT® 74174), or CTA Abdomen (CPT® 74175) or MRA Abdomen (CPT® 74185) may be considered if one of the following:

- Nephrotic syndrome
- Suspicion of iliac vein thrombus
- Suspicion of inferior vena cava thrombus
- Renal vein thrombosis
- Mesenteric vein thrombosis

AB 43.3: Renal Vein Thrombosis

For suspected renal vein thrombosis MRA Abdomen (CPT® 74185) may be considered if one of the following:

- Nephrotic syndrome
- Proteinuria – 3 grams or more in 24 hours
- Lupus nephritis
- Hypercoagulable state, one of the following:
  - Antiphospholipid antibodies
  - Behçet’s syndrome
  - Protein C deficiency
  - Protein S deficiency
References
AB-44: Suspected Neuroendocrine Tumors of the Abdomen

For the evaluation of a suspected neuroendocrine tumor of the abdomen, please refer to section **ONC-15.2: Gastrointestinal/Pancreatic Neuroendocrine Cancers - Suspected/Diagnosis**
Vibration-Controlled Transient Elastography (VCTE) (e.g. Fibroscan, CPT®91200) maybe considered appropriate to assess for advanced fibrosis and cirrhosis in the following conditions:
- Hepatitis C
- Hepatitis B
- Chronic alcoholic liver disease
- All other chronic liver diseases

If requested, Magnetic Resonance Elastography of the liver (MRE, CPT®76391) can be approved for
- Non-alcoholic fatty liver disease (NAFLD) in high risk (for cirrhosis) populations:
  - Advanced age (65 years old or greater)
  - Obesity (BMI 30 or higher)
  - Diabetes
  - ALT >2X upper limit of normal
- For NAFLD in low risk populations (e.g. signs of fatty liver found on imaging only, without the above-noted risk factors) MRE would be considered investigational.

The use of VCTE and MRE are considered experimental and investigational for all other indications with regards to liver disease

The use of other ultrasound elastographic techniques (CPT® 76981, CPT®76982, and CPT®76983), including but not limited to acoustic radiation force impulse imaging or real-time tissue elastography for any indication is considered experimental or investigational at this time

**Practice Note**
For the assessment of cirrhosis in patients with hepatitis C, the AGA noted that MRE has little to no increase in identifying cirrhosis, but had poorer specificity and thus higher false-positive rates than VCTE. In view of this, the AGA concluded that MRE has a poorer diagnostic performance in this setting, compared to VCTE. In their recommendations for the assessment of fibrosis in chronic liver disease, VCTE was recommended over MRE with the exception of NAFLD in high risk populations, in which MRE resulted in a lower rate of false positives compared to VCTE. In low risk populations with NAFLD, both MRE and VCTE performed poorly, and their role is as yet, undefined.

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# Abbreviations for Breast Guidelines

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<tr>
<td>AAA</td>
<td>abdominal aortic aneurysm</td>
</tr>
<tr>
<td>ACE</td>
<td>angiotensin-converting enzyme</td>
</tr>
<tr>
<td>AVM</td>
<td>arteriovenous malformation</td>
</tr>
<tr>
<td>BI-RADS</td>
<td>Breast Imaging Reporting and Database System</td>
</tr>
<tr>
<td>BP</td>
<td>blood pressure</td>
</tr>
<tr>
<td>BRCA</td>
<td>tumor suppressor gene</td>
</tr>
<tr>
<td>CAD</td>
<td>computer-aided detection</td>
</tr>
<tr>
<td>CBC</td>
<td>Complete blood count</td>
</tr>
<tr>
<td>COPD</td>
<td>chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>CTA</td>
<td>computed tomography angiography</td>
</tr>
<tr>
<td>CTV</td>
<td>computed tomography venography</td>
</tr>
<tr>
<td>DCIS</td>
<td>ductal carcinoma in situ</td>
</tr>
<tr>
<td>DVT</td>
<td>deep venous thrombosis</td>
</tr>
<tr>
<td>ECG</td>
<td>electrocardiogram</td>
</tr>
<tr>
<td>EM</td>
<td>electromagnetic</td>
</tr>
<tr>
<td>EMG</td>
<td>electromyogram</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and Drug Administration</td>
</tr>
<tr>
<td>FDG</td>
<td>fluorodeoxyglucose</td>
</tr>
<tr>
<td>FNA</td>
<td>fine needle aspiration</td>
</tr>
<tr>
<td>GERD</td>
<td>gastroesophageal reflux disease</td>
</tr>
<tr>
<td>GI</td>
<td>gastrointestinal</td>
</tr>
<tr>
<td>HRCT</td>
<td>high resolution computed tomography</td>
</tr>
<tr>
<td>IPF</td>
<td>idiopathic pulmonary fibrosis</td>
</tr>
<tr>
<td>LCIS</td>
<td>lobular carcinoma in situ</td>
</tr>
<tr>
<td>LFTP</td>
<td>localized fibrous tumor of the pleura</td>
</tr>
<tr>
<td>MRA</td>
<td>magnetic resonance angiography</td>
</tr>
<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
</tr>
<tr>
<td>MRV</td>
<td>magnetic resonance venography</td>
</tr>
<tr>
<td>NCV</td>
<td>nerve conduction velocity</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>PE</td>
<td>pulmonary embolus</td>
</tr>
<tr>
<td>PEM</td>
<td>positron-emission mammography</td>
</tr>
<tr>
<td>PET</td>
<td>positron emission tomography</td>
</tr>
<tr>
<td>PFT</td>
<td>pulmonary function tests</td>
</tr>
<tr>
<td>PPD</td>
<td>purified protein derivative of tuberculin</td>
</tr>
<tr>
<td>RODEO</td>
<td>Rotating Delivery of Excitation Off-resonance MRI</td>
</tr>
<tr>
<td>SPN</td>
<td>solitary pulmonary nodule</td>
</tr>
<tr>
<td>SVC</td>
<td>superior vena cava</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
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<tr>
<td>----------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>0: Incomplete</td>
<td>Need additional imaging evaluation or prior mammograms for comparison.</td>
</tr>
<tr>
<td>1: Negative</td>
<td>There is nothing to comment on. The breasts are symmetrical and no masses,</td>
</tr>
<tr>
<td></td>
<td>architectural disturbances, or suspicious calcifications are present.</td>
</tr>
<tr>
<td>2: Benign</td>
<td>This is also a negative mammogram, but the interpreter may wish to describe</td>
</tr>
<tr>
<td></td>
<td>a finding. Involuting, calcified fibroadenomas, multiple secretory calcifications,</td>
</tr>
<tr>
<td></td>
<td>fat containing lesions (such as oil cysts, lipomas, galactocele, and mixed density</td>
</tr>
<tr>
<td></td>
<td>hamartomas) all have characteristic appearances, and may be labeled with</td>
</tr>
<tr>
<td></td>
<td>confidence. The interpreter might wish to describe intramammary lymph nodes,</td>
</tr>
<tr>
<td></td>
<td>implants, etc. while still concluding that there is no mammographic evidence of</td>
</tr>
<tr>
<td></td>
<td>malignancy.</td>
</tr>
<tr>
<td>3: Probably Benign</td>
<td>A finding placed in this category should have a very high probability of being benign.</td>
</tr>
<tr>
<td></td>
<td>It is not expected to change over the follow-up interval, but the radiologist would</td>
</tr>
<tr>
<td></td>
<td>prefer to establish its stability. Data is becoming available that sheds light on the</td>
</tr>
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<td></td>
<td>efficacy of short interval follow-up. At the present time, most approaches are</td>
</tr>
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<td>intuitive. These will likely undergo future modification as more data accrue as to the</td>
</tr>
<tr>
<td></td>
<td>validity of an approach, the interval required, and the type of findings that should be</td>
</tr>
<tr>
<td></td>
<td>followed.</td>
</tr>
<tr>
<td>4: Suspicious Abnormality</td>
<td>There are lesions that do not have the characteristic morphologies of breast cancer</td>
</tr>
<tr>
<td></td>
<td>but have a definite probability of being malignant. The radiologist has sufficient</td>
</tr>
<tr>
<td></td>
<td>concern to urge a biopsy. If possible, the relevant possibilities should be cited so that</td>
</tr>
<tr>
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<td>the patient and her physician can make the decision on the ultimate course of action.</td>
</tr>
<tr>
<td>5: Highly Suggestive of Malignancy</td>
<td>These lesions have a high probability of being cancer and should be biopsied or treated surgically.</td>
</tr>
<tr>
<td>6: Known Biopsy-Proven Malignancy</td>
<td>These lesions have been biopsied and are known to be malignant.</td>
</tr>
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</table>
BR-1: Breast Ultrasound

- Routine performance of breast ultrasound as stand-alone screening or with screening mammography is inappropriate.¹,²,³
  - Ultrasound screening for women whose only indication is dense breast tissue is not indicated.¹,²,³
  - Equivocal or Occult Findings:
    - Radiologist Report recommendation for Breast ultrasound (CPT® 76441 or CPT® 76442) and inconclusive or conflicting findings on mammography or Breast MRI

- Breast ultrasound (CPT® 76641: unilateral, complete OR CPT® 76642: unilateral, limited) can be used to further evaluate abnormalities found on mammogram, especially in differentiating cysts from solid lesions.¹
  - A clinical office visit is not necessary prior to breast ultrasound when an abnormality has been identified on recent (within the last 60 days) mammogram.

- BI-RADS Cat 3 ultrasound follow up imaging for stable findings is appropriate at 6, 12, 18 and 24 months from the original study.⁴

- Palpable breast masses should be evaluated with mammography and breast ultrasound, in any order, regardless of age. Ultrasound can enhance biopsy.³

- Axilla ultrasound (CPT® 76882)
  - For women with clinically suspicious lymph nodes, preoperative axillary ultrasound with a FNA or biopsy can help identify patients who have positive nodes.³
    - See CH-2.2: Axillary Lymphadenopathy
  - Bilateral should be coded CPT® 76882 x 2

- State Specific Density Reporting and Imaging Mandate Laws
  - Breast density notification laws have been put into effect by many states. Breast density notification laws vary, but some also contain mandates for additional imaging, which may include MRI and/or ultrasound. For applicable requests involving members in these states, their legislative mandates should be followed. The pertinent language in these mandates is provided via the link below.
    - Link: State Specific Mandates
BR-2: Breast MRI

- The use of gadolinium contrast is required for the evaluation of breast parenchyma.
- The use of gadolinium contrast is not necessary for the evaluation of implant integrity in asymptomatic, average-risk patients.
- Magnetic resonance imaging, breast, without and with contrast material(s), including computer-aided detection (CAD real-time lesion detection, characterization and pharmacokinetic analysis), when performed; bilateral (CPT® 77049) is preferred in most individuals for the evaluation of breast parenchyma.
- Magnetic resonance imaging, breast, without and with contrast material(s), including computer-aided detection (CAD real-time lesion detection, characterization and pharmacokinetic analysis), when performed; unilateral (CPT® 77048) may be preferred in some individuals after mastectomy, per physician request.
- Magnetic resonance imaging, breast, without contrast material; bilateral (CPT® 77047) or Magnetic resonance imaging, breast, without contrast material; unilateral (CPT® 77046) may be performed if there are clinical reasons or concerns regarding the use of gadolinium contrast.
- MRI guided breast biopsy (CPT® 19085) includes the imaging component. Additional lesions should be billed using CPT® 19086.
  - MRI Breast can be repeated at least 6 months after an MRI directed breast biopsy to document successful lesion sampling if histology is benign and nonspecific, equivocal or uncertain.\(^5\)

**Breast MRI – Practice Notes**

- Although breast MRI has superior sensitivity in identifying new unknown malignancies, it carries a significant false positive risk when compared to mammogram and ultrasound. Incidental lesions are seen on 15% of breast MRI’s and increase with younger age. The percentage of incidental lesions that turn out to be malignant varies from 3% to 20% depending on the patient population. Cancer is identified by breast MRI in only 0.7% of those with “inconclusive mammographic lesions.”\(^6,7\)
BR-3: Breast Reconstruction

- CTA or MRA of the body part from which the free tissue transfer flap is being taken, can be performed for breast reconstruction preoperative planning.\(^2\,^3\)
  - For example, CTA abdomen and pelvis (CPT\(^\circledast\) 74175 or CPT\(^\circledast\) 72191 or CPT\(^\circledast\) 74174) or MRA (CPT\(^\circledast\) 74185 and CPT\(^\circledast\) 72198) of the abdomen and pelvis for Deep Inferior Epigastric Perforators (DIEP) flap.\(^8\)

There is currently insufficient evidence-based data to support the need for routine advanced imaging for TRAM flaps or other flaps performed on a vascular pedicle.\(^8\)
BR-4: This section intentionally left blank


**BR-5: Breast MRI is NOT Indicated**

- Breast MRI should not be used to determine biopsy recommendations for suspicious or indeterminate lesion(s) that can be readily biopsied, either using imaging guidance or physical exam, such as palpable masses and microcalcifications.\(^3,6\)

- Patients with dense breasts as determined by mammogram
  - To date, evidence does not suggest improved outcomes for women whose only risk factor is breast density [see heading “Equivocal or Occult Findings” (Radiologist Report) in *BR-6: Breast MRI Indications*].\(^{13,14,15}\)

- Low risk, probably benign (BI-RADS™3) lesions
  - Repeat the original type study (mammogram, US, or MRI) in 6 months, with repeat at 12, 18 months, and 24 months from the original study. After 2 years of stability, the finding should be assessed as benign (Cat 2).\(^{16}\)

- Suspicious (BI-RADS™ 4 or 5) lesion on mammogram and/or ultrasound.
  - A lesion categorized as have BI-RADS 4 or 5 should be biopsied.\(^{16}\)

- Surveillance MRI for silent/asymptomatic rupture of silicone implants is considered investigational, as there is no evidence basis that surveillance reduces morbidity and/or mortality. However, certain payers may cover this surveillance and those coverage policies take precedence over eviCore guidelines.\(^{17,18}\)
  - Certain payers do not include breast implants in their coverage policies if the breast implants were placed as part of purely cosmetic surgery. Thus, surveillance MRI in these patients would also not be included in the coverage policy. Their coverage policies will take precedence over eviCore’ guidelines.
Breast MRI Indications

Breast MRI is indicated for breast augmentation, breast implants (saline or silicone), breast reconstruction, free injection, and capsular contracture to:
- Evaluate or confirm breast implant rupture when mammography or ultrasound is uninterpretable.¹

Phyllodes Tumor (Cystosarcoma Phyllodes)
- Breast MRI is indicated preoperatively to establish extent of disease where a diagnosis of malignant phyllodes tumor has previously been established by tissue diagnosis.¹⁸,¹⁹,²⁰ (See Practice Note)

Annual breast MRI is indicated for high risk histologies or characteristics:
- Atypical ductal hyperplasia (ADH)
- Atypical lobular hyperplasia (ALH)
- Lobular carcinoma in situ (LCIS)²¹

Equivocal or Occult Findings
- Radiologist Report Recommendation for Breast MRI and inconclusive or conflicting findings on mammography or ultrasound of a finding that is not a palpable mass.
- A probably benign lesion on MRI (MRI BI-RADS™ 3) should undergo repeat MRI in 6 months, with repeat at 12, 18 months and 24 months from the original study. After 2 years of stability, the finding should be assessed as benign (Cat 2).

Newly Diagnosed Breast Cancer⁴ (including DCIS).¹,⁶,²⁴,²⁵,²⁶
Newly Diagnosed Paget’s Disease⁵ (thereafter treat as DCIS according to these guidelines).²⁶,²⁸

Residual or Recurrent Malignancy
- Assessment of residual tumor in patients who have undergone lumpectomy and have close or positive margins, when the findings may indicate a significant change in surgical management.²⁹
- Evaluate clinical suspicion of recurrence, following evaluations with mammography and/or ultrasound, if those evaluations are inconclusive or conflict with physical examination or other clinical indicators. This applies to intact breasts, reconstructed breasts, and possible chest wall recurrences following mastectomy.²⁹
### High Risk Indications

**For 1 and 2 below, begin MRI screening at age 25.**

1. BRCA 1 or BRCA 2 mutation
2. Presence of Cowden (PTEN), Bannayan-Riley-Ruvalcaba.
   Genetic factors also associated with > 20% risk of breast cancer, include ATM, CDH1, CHEK2, PALB2, PTEN, STK11.

**For 3 through 8 below, MRI screening begins at age 40, or 10 years before the age of relative when first diagnosed with breast cancer, whichever is earlier. The screening MRI not to begin prior to the age of 25.**

3. First-degree relative (parent, sibling, child) with BRCA 1 or BRCA 2, even if patient has not been tested for BRCA mutation.
4. Two or more first-degree relatives with breast or ovarian cancer.
5. One first-degree relative with breast cancer or ovarian cancer that was diagnosed <=age 50.
6. One first-degree relative with bilateral breast cancer, or both breast and ovarian cancer.
7. A first or second-degree male relative (father, brother, uncle) diagnosed with breast cancer.
8. Clinical lifetime risk estimated at greater than or equal to 20% using genetic risk or clinical risk estimator such as the Gail, Claus, Tyrer-Cuzick or BRCAPRO models.

### Additional Risks:

9. Women with history of radiation to the chest between ages 10 and 30; breast screening should start 8 to 10 years post-therapy, or at age 25, whichever comes first.
10. Li-Fraumeni Syndrome (TP53 mutation) should start annual breast screening MRI starting at age 20 or at the age of the earliest diagnosed breast cancer in the family, if below age 20 years of age.

### Personal History of Breast Cancer

11. Breast MRI surveillance (annual) is indicated for patients with a personal history of breast cancer who had a clinical lifetime risk estimated at greater than or equal to 20% using genetic risk or clinical risk estimator such as the Gail, Claus, Tyrer-Cuzick or BRCAPRO models prior to initial diagnosis of breast cancer.
12. Breast MRI surveillance (annual) is indicated for patients with a personal history of breast cancer and extremely dense breast tissue (Category D) on mammography.
13. Breast MRI surveillance (annual) is indicated for patients with a personal history of breast cancer diagnosed before age 50.
Breast MRI Indications - Practice Notes

- MRI should not be used in lieu of mammographically, clinically, and/or sonographically suspicious findings (ACR Practice Guidelines).

- State Specific Density Reporting and Imaging Mandate Laws (Link to State Specific Mandates)
  - Breast density notification laws have been put into effect by many states. Breast density notification laws vary, but some also contain mandates for additional imaging, which may include MRI and/or ultrasound. For applicable requests involving members in these states, their legislative mandates should be followed. The pertinent language in these mandates is provided via the link below.

- Phyllodes Tumor (Cystosarcoma Phyllodes)
  - Phyllodes tumor is usually benign and has clinical characteristics of fibroadenoma, although they may exhibit rapid growth. Breast MRI has not been shown to be of value in distinguishing fibroadenoma from phyllodes tumor.
  - Diagnosis is made by tissue diagnosis (percutaneous core biopsy or excisional biopsy). FNA biopsy is inaccurate in phyllodes tumor diagnosis and is not recommended.
  - Treatment is wide local excision. Axillary lymph node dissection is not necessary. It has a predilection for local recurrence following local excision.
  - If biopsy establishes a diagnosis of malignant phyllodes (cystosarcoma phyllodes), it should be treated as a soft tissue sarcoma (See ONC-12: Sarcomas – Bone, Soft Tissue and GIST)\(^\text{18,19,20}\).
**BR-7: Nipple Discharge/Galactorrhea**

- Pathologic nipple discharge is defined as unilateral, bloody or serous, arising from a single duct, persistent, and spontaneous.
  - If the nipple discharge is pathologic, ductography should be attempted.
  - If mammogram and ultrasound are negative, and ductography is unavailable or technically limited, breast MRI can be performed.\(^{31,32,33,34}\)

- Physiologic nipple discharge is predominantly bilateral, but may be unilateral. It is commonly multi-duct. It is predominantly milky, but may be white or a variety of colors including serous, yellow, green, brown, or gray. Evaluation for hyperprolactinemia can be considered (See **Practice Note**).\(^{31,32,33,34}\)

- Mammogram and ultrasound (CPT® 76641: unilateral, complete or CPT® 76642: unilateral, limited) should be obtained as initial imaging, with clinical pathway determined by results.\(^{31,32,33,34}\)

- If nipple discharge is physiologic, there are no suspicious findings on clinical exam, and mammogram and ultrasound are negative, no additional imaging is necessary, and the patient can be reassured.\(^{31,32,33,34}\)

**Nipple Discharge/Galactorrhea - Practice Notes**

- For milky discharge, prolactin and TSH levels are recommended to diagnose prolactinoma; pituitary imaging is not needed if normal serum Prolactin.
BR-8: Breast Pain (Mastodynia)

- Mammogram and ultrasound are the initial imaging for breast pain.\textsuperscript{39}
- Advanced imaging is NOT routinely indicated in patients with breast pain and negative evaluation (evaluation includes patient history and physical exam, pregnancy test, mammogram and ultrasound (CPT\textsuperscript{®} 76641: unilateral, complete or CPT\textsuperscript{®} 76642: unilateral, limited).\textsuperscript{39}
  - If evaluation is not negative, See BR-6: Breast MRI Indications

Breast Pain – Practice Notes

- The risk of malignancy following a negative examination has been estimated to be only 0.5\%.\textsuperscript{39}
New and/or alternative breast imaging techniques include:

- Nuclear breast imaging, including:
  - Scintimammography
  - Molecular breast imaging (MBI)
  - Breast specific gamma imaging (BSGI)
- PET Mammography (PEM)
- Thermography
- Impedance Mammography
- Other techniques to detect oxygen consumption, light absorption, microwave transmission, nitrous oxide production

While alternative breast imaging techniques may have FDA approval, they remain investigational with respect to both screening and diagnosis of breast cancer.

**Alternative Breast Imaging Approaches - Practice Notes**

- Positron Emission Mammography
  - There is currently insufficient data available to generate appropriateness criteria for this modality, and this procedure should be considered investigational at this time
    - High-resolution positron-emission mammography (PEM) by Naviscan™ PET Systems, also referred to as Naviscan™ or PET mammography, performs high-resolution metabolic imaging for breast cancer using an FDG tracer. The PEM detectors are integrated into a conventional mammography system, allowing acquisition of the emission images immediately after the mammogram.
    - Requesting providers often ask for PEM as CPT® 78811 or “PET scan of the breast.”
    - The spatial resolution of this technique is at the individual duct level (1.5 mm) and allows visualization of intraductal as well as invasive breast cancers. This technique is especially adept at detecting ductal carcinoma in situ.
    - Early clinical trials have shown high clinical accuracy in characterizing lesions identified as suspicious on conventional imaging or physical examination, as well as in detecting incidental breast cancers not seen on other imaging modalities
    - A prospective multi-center clinical trial for women with newly diagnosed breast cancer anticipating breast-conservation surgery was performed. These women underwent both high-resolution PEM imaging and breast MRI. Results showed that PEM and MRI had comparable breast-level sensitivity, although MRI had greater lesion-level sensitivity and more accurately depicted the need for mastectomy. PEM had greater specificity at the breast and lesion levels. Of these, 3.6% of the women had tumors seen only with PEM.
    - The radiation exposure from a PEM study is 23 times higher than for digital mammography.
BR-10: Suspected Breast Cancer in Males

- Breast cancer in men presents as a mass, skin/nipple change, or pathologic nipple discharge.
- For men <25 years of age with an indeterminate palpable mass, ultrasound is recommended as initial imaging followed by mammography if ultrasound is inconclusive or suspicious.
- For men >25 years of age with an indeterminate palpable mass or with a concerning physical examination, mammography is recommended initially followed by ultrasound if mammography is inconclusive or suspicious.
- There is limited evidence on the use of MRI in the evaluation of male breast disease.
- Further diagnostic pathway for suspicious clinical or imaging findings usually requires tissue diagnosis.
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## Abbreviations for Cardiac Imaging Guidelines

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<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>ACC</td>
<td>American College of Cardiology</td>
</tr>
<tr>
<td>ACS</td>
<td>acute coronary syndrome</td>
</tr>
<tr>
<td>AHA</td>
<td>American Heart Association</td>
</tr>
<tr>
<td>ASCOT</td>
<td>Anglo-Scandinavian Cardiac Outcomes Trial</td>
</tr>
<tr>
<td>ASD</td>
<td>atrial septal defect</td>
</tr>
<tr>
<td>BMI</td>
<td>body mass index</td>
</tr>
<tr>
<td>CABG</td>
<td>coronary artery bypass grafting</td>
</tr>
<tr>
<td>CAD</td>
<td>coronary artery disease</td>
</tr>
<tr>
<td>CHF</td>
<td>congestive heart failure</td>
</tr>
<tr>
<td>COPD</td>
<td>chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>CCTA</td>
<td>coronary computed tomography angiography</td>
</tr>
<tr>
<td>CTA</td>
<td>computed tomography angiography</td>
</tr>
<tr>
<td>EBCT</td>
<td>electron beam computed tomography</td>
</tr>
<tr>
<td>ECP</td>
<td>external counterpulsation (also known as EECP)</td>
</tr>
<tr>
<td>ECG</td>
<td>electrocardiogram</td>
</tr>
<tr>
<td>ETT</td>
<td>exercise treadmill stress test</td>
</tr>
<tr>
<td>FDG</td>
<td>Fluorodeoxyglucose, a radiopharmaceutical used to measure myocardial metabolism</td>
</tr>
<tr>
<td>HCM</td>
<td>hypertrophic cardiomyopathy</td>
</tr>
<tr>
<td>IV</td>
<td>intravenous</td>
</tr>
<tr>
<td>LAD</td>
<td>left anterior descending coronary artery</td>
</tr>
<tr>
<td>LDL-C</td>
<td>low density lipoprotein cholesterol</td>
</tr>
<tr>
<td>LHC</td>
<td>left heart catheterization</td>
</tr>
<tr>
<td>LV</td>
<td>left ventricle</td>
</tr>
<tr>
<td>LVEF</td>
<td>left ventricular ejection fraction</td>
</tr>
<tr>
<td>MI</td>
<td>myocardial infarction</td>
</tr>
<tr>
<td>MPI</td>
<td>myocardial perfusion imaging (SPECT study, nuclear cardiac study)</td>
</tr>
<tr>
<td>MRA</td>
<td>magnetic resonance angiography</td>
</tr>
<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
</tr>
<tr>
<td>mSv</td>
<td>millisievert (a unit of radiation exposure) equal to an effective dose of a joule of energy per kilogram of recipient mass</td>
</tr>
<tr>
<td>MUGA</td>
<td>multi gated acquisition scan of the cardiac blood pool</td>
</tr>
<tr>
<td>PCI</td>
<td>percutaneous coronary intervention (includes percutaneous coronary angioplasty (PTCA) and coronary artery stenting)</td>
</tr>
<tr>
<td>PET</td>
<td>positron emission tomography</td>
</tr>
<tr>
<td>PTCA</td>
<td>percutaneous coronary angioplasty</td>
</tr>
<tr>
<td>RHC</td>
<td>right heart catheterization</td>
</tr>
<tr>
<td>SPECT</td>
<td>single photon emission computed tomography</td>
</tr>
<tr>
<td>TEE</td>
<td>transesophageal echocardiogram</td>
</tr>
<tr>
<td>TIA</td>
<td>Transient Ischemic Attack</td>
</tr>
<tr>
<td>VSD</td>
<td>ventricular septal defect</td>
</tr>
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</table>
## Glossary

<table>
<thead>
<tr>
<th><strong>Agatston Score:</strong></th>
<th>A nationally recognized calcium score for the coronary arteries based on Hounsfield units and size (area) of the coronary calcium</th>
</tr>
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<tr>
<td><strong>Angina:</strong></td>
<td>Principally chest discomfort, exertional (or with emotional stress) and relieved by rest or nitroglycerine</td>
</tr>
<tr>
<td><strong>Anginal variants or equivalents:</strong></td>
<td>A manifestation of myocardial ischemia which is perceived by patients to be (otherwise unexplained) dyspnea, unusual fatigue, more often seen in women and may be unassociated with chest pain</td>
</tr>
<tr>
<td><strong>ARVD/ARVC – Arrhythmogenic Right Ventricular Dysplasia/Cardiomyopathy:</strong></td>
<td>A potentially lethal inherited disease with syncope and rhythm disturbances, including sudden death, as presenting manifestations</td>
</tr>
<tr>
<td><strong>BNP:</strong></td>
<td>B-type natriuretic peptide, blood test used to diagnose and track heart failure (n-T-pro-BNP is a variant of this test)</td>
</tr>
<tr>
<td><strong>Brugada Syndrome:</strong></td>
<td>An electrocardiographic pattern that is unique and might be a marker for significant life-threatening dysrhythmias</td>
</tr>
<tr>
<td><strong>Double Product (Rate Pressure Product):</strong></td>
<td>An index of cardiac oxygen consumption, is the systolic blood pressure times heart rate, generally calculated at peak exercise; over 25000 means an adequate stress load was performed</td>
</tr>
<tr>
<td><strong>Fabry’s Disease:</strong></td>
<td>An infiltrative cardiomyopathy, can cause heart failure and arrhythmias</td>
</tr>
<tr>
<td><strong>Hibernating myocardium:</strong></td>
<td>Viable but poorly functioning or non-functioning myocardium which likely could benefit from intervention to improve myocardial blood supply</td>
</tr>
<tr>
<td><strong>Optimized Medical Therapy:</strong></td>
<td>Should include (where tolerated): antiplatelet agents, calcium channel antagonists, partial fatty acid oxidase inhibitors (e.g. ranolazine), statins, short-acting nitrates as needed, long-acting nitrates up to 6 months after an acute coronary syndrome episode, beta blocker drugs (optional), angiotensin-converting enzyme (ACE) inhibitors/angiotensin receptor blocking (ARB) agents (optional)</td>
</tr>
<tr>
<td><strong>Platypnea:</strong></td>
<td>Shortness of breath when upright or seated (the opposite of orthopnea) and can indicate cardiac malformations, shunt or tumor</td>
</tr>
<tr>
<td><strong>Silent ischemia:</strong></td>
<td>Cardiac ischemia discovered by testing only and not presenting as a syndrome or symptoms</td>
</tr>
<tr>
<td><strong>Syncope:</strong></td>
<td>Loss of consciousness; near-syncope is not syncope</td>
</tr>
<tr>
<td><strong>Takotsubo cardiomyopathy:</strong></td>
<td>Apical dyskinesis oftentimes associated with extreme stress and usually thought to be reversible</td>
</tr>
<tr>
<td><strong>Troponin:</strong></td>
<td>A marker for ischemic injury, primarily cardiac</td>
</tr>
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<td>----------------------------------------------</td>
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Practice Estimate of Effective Radiation Dose chart for Selected Imaging Studies

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<th>Imaging Study</th>
<th>Estimate of Effective Radiation Dose</th>
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<tr>
<td>Sestamibi myocardial perfusion study (MPI)</td>
<td>9-12 mSv</td>
</tr>
<tr>
<td>PET myocardial perfusion study:</td>
<td></td>
</tr>
<tr>
<td>Rubidium-82 NH3</td>
<td>3 mSv</td>
</tr>
<tr>
<td></td>
<td>2 mSv</td>
</tr>
<tr>
<td>Thallium myocardial perfusion study (MPI)</td>
<td>22-31 mSv</td>
</tr>
<tr>
<td>Diagnostic conventional coronary angiogram (cath)</td>
<td>5-10 mSv</td>
</tr>
<tr>
<td>Computed tomography coronary angiography (CTCA) (with prospective gating)</td>
<td>5-15 mSv</td>
</tr>
<tr>
<td></td>
<td>Less than 5 mSv</td>
</tr>
<tr>
<td>CT of Abdomen and pelvis</td>
<td>8-14 mSv</td>
</tr>
<tr>
<td>Chest x-ray</td>
<td>&lt;0.1 mSv</td>
</tr>
</tbody>
</table>

**CD-1.1: General Issues – Cardiac**

- Cardiac imaging is not indicated if the results will not affect patient management decisions. If a decision to perform cardiac catheterization or other angiography has already been made, there is often no need for imaging stress testing.
- A current clinical evaluation (within 60 days) is required prior to considering advanced imaging, which includes:
  - Relevant history and physical examination and appropriate laboratory studies and non-advanced imaging modalities, such as recent ECG (within 60 days), chest x-ray or ECHO/ultrasound, after symptoms started or worsened.
    - Effort should be made to obtain copies of reported “abnormal” ECG studies in order to determine whether the ECG is uninterpretable for ischemia on ETT
    - Most recent previous stress testing and its findings should be obtained
    - Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation.
  - Vital signs, height, and weight or BMI or description of general habitus is needed.
  - Advanced imaging should answer a clinical question which will affect management of the patient’s clinical condition.
  - Assessment of coronary artery disease can be determined by the following:
    - Typical angina (definite):
      - Substernal chest discomfort (generally described as pressure, heaviness, burning, or tightness)
      - Generally brought on by exertion or emotional stress and relieved by rest
      - May radiate to the left arm or jaw
      - When clinical information is received indicating that a patient is experiencing chest pain that is "exertional" or "due to emotional stress", this meets the typical angina definition under the Pre-Test Probability Grid. No further description of the chest pain is required (location within the chest is not required).
      - The Pre-Test Probability Grid (Table 1) is based on age, gender, and symptoms. All factors must be considered in order to approve for stress testing with imaging using the Pre-Test Probability Grid.
- **Atypical angina (probable):** Chest pain or discomfort (arm or jaw pain) that lacks one of the characteristics of definite or typical angina.
- **Non-anginal chest pain:** Chest pain or discomfort that meets one or none of the typical angina characteristics.
- **Anginal variants or equivalents:** A manifestation of myocardial ischemia which is perceived by patients to be (otherwise unexplained) dyspnea, nausea, diaphoresis, more often seen in women and may be unassociated with chest pain.

### Table-1

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Gender</th>
<th>Typical / Definite Angina Pectoris</th>
<th>Atypical / Probable Angina Pectoris</th>
<th>Non-anginal Chest Pain</th>
<th>Asymptomatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>39 and younger</td>
<td>Men</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
<td>Very low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>Intermediate</td>
<td>Very low</td>
<td>Very low</td>
<td>Very low</td>
</tr>
<tr>
<td>40 - 49</td>
<td>Men</td>
<td>High</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>Intermediate</td>
<td>Low</td>
<td>Very low</td>
<td>Very low</td>
</tr>
<tr>
<td>50 - 59</td>
<td>Men</td>
<td>High</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
<td>Very low</td>
</tr>
<tr>
<td>60 and over</td>
<td>Men</td>
<td>High</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>High</td>
<td>Intermediate</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
</tbody>
</table>

- **High:** Greater than 90% pre-test probability
- **Intermediate:** Between 10% and 90% pre-test probability
- **Low:** Between 5% and 10% pre-test probability
- **Very Low:** Less than 5% pre-test probability
**CD-1.2: Stress Testing without Imaging – Procedures**

**The Exercise Treadmill Test (ETT) is without imaging.**

- Necessary components of an ETT include:
  - ECG that can be interpreted for ischemia.
  - Patient capable of exercise on a treadmill or similar device (generally at 4 METs or greater; see functional capacity below).

- An abnormal ETT (exercise treadmill test) includes any one of the following:
  - ST segment depression (usually described as horizontal or downsloping, greater or equal to 1.0 mm below baseline)
  - Development of chest pain
  - Significant arrhythmia (especially ventricular arrhythmia)
  - Hypotension during exercise

- Functional capacity greater than or equal to 4 METs equates to the following:
  - Can walk four blocks without stopping
  - Can walk up a hill
  - Can climb one flight of stairs without stopping
  - Can perform heavy work around the house

**Practice Note**

An observational study found that, compared with the Duke Activity Status Index, subjective assessment by clinicians generally underestimated exercise capacity see reference 25.

**CD-1.3: Stress Testing with Imaging – Procedures**

- Imaging Stress Tests include any one of the following:
  - Stress Echocardiography see **CD-2.6: Stress Echocardiography (Stress Echo) – Coding**
  - MPI see **CD-3.1: Myocardial Perfusion Imaging (MPI) – Coding**
  - Stress perfusion MRI see **CD-5.3: Cardiac MRI – Indications for Stress MRI**

- Stress testing with imaging can be performed with maximal exercise or chemical stress (adenosine, dipyridamole, dobutamine, or regadenoson) and does not alter the CPT® codes used to report these studies.

**CD-1.4: Stress Testing with Imaging – Indications**

- Stress echo, MPI or stress MRI, can be considered if there are new, recurrent, or worsening cardiac symptoms and **any** of the following:
  - High pretest probability (greater than 90% probability of CAD) per Table 1
  - A history of CAD based on:
    - A prior anatomic evaluation of the coronaries OR
    - A history of CABG or PCI
  - Evidence or high suspicion of ventricular tachycardia
  - Age 40 years or greater and known diabetes mellitus
  - Coronary calcium score ≥ 100
Poorly controlled hypertension defined as systolic BP greater than or equal to 180mmhg, if provider feels strongly that CAD needs evaluation prior to BP being controlled.

ECG is uninterpretable for ischemia due to any one of the following:
- Complete Left Bundle Branch Block (bifasicular block involving right bundle branch and left anterior hemiblock does not render ECG uninterpretable for ischemia)
- Ventricular paced rhythm
- Pre-excitation pattern such as Wolff-Parkinson-White
- Greater or equal to 1.0 mm ST segment depression (NOT nonspecific ST/T wave changes)
- LVH with repolarization abnormalities, also called LVH with strain (NOT without repolarization abnormalities or by voltage criteria)
- T wave inversion in the inferior and/or lateral leads. This includes leads II, AVF, V5 or V6. (T wave inversion isolated in lead III or T wave inversion in lead V1 and V2 are not included).
- Patient on digitalis preparation

Continuing symptoms in a patient who had a normal or submaximal exercise treadmill test and there is suspicion of a false negative result.

Patients with recent equivocal, borderline, or abnormal stress testing where ischemia remains a concern, regardless of symptoms.

Heart rate less than 50 bpm in patients, including those on beta blocker, calcium channel blocker, or amiodarone, where it is felt that the patient may not achieve an adequate workload for a diagnostic exercise study.

Inadequate ETT:
- Physical inability to achieve target heart rate (85% MPHR or 220-age. Target heart rate is calculated as 85% of the maximum age predicted heart rate (MPHR). MPHR is estimated as 220 minus the patient’s age.
- History of false positive exercise treadmill test: a false positive ETT is one that is abnormal however the abnormality does not appear to be due to macrovascular CAD.

Stress echo, MPI or stress MRI, can be considered regardless of symptoms for any of the following:
- Within 3 months of an acute coronary syndrome (e.g. ST segment elevation MI [STEMI], unstable angina, non-ST segment elevation MI [NSTEMI]), one MPI can be performed to evaluate for inducible ischemia if all of the following related to the most recent acute coronary event apply:
  - Individual is hemodynamically stable
  - No recurrent chest pain symptoms and no signs of heart failure
  - No prior coronary angiography or imaging stress test since the current episode of symptoms
- Assessing myocardial viability in patients with significant ischemic ventricular dysfunction (suspected hibernating myocardium) and persistent symptoms or heart failure such that revascularization would be considered.
  - Note: MRI, cardiac PET, MPI, or Dobutamine stress echo can be used to assess myocardial viability depending on physician preference.
- PET and MPI perfusion studies are usually accompanied by PET metabolic examinations (CPT® 78459). TI-201 MPI perfusion studies may assess viability without accompanying PET metabolism information.
  - Unheralded syncope (not near syncope)
  - Asymptomatic patient with an uninterpretable ECG that:
    - Has never been evaluated or
    - Is a new uninterpretable change.
  - Patient with an elevated cardiac troponin.
  - One routine study 2 years or more after a stent
    - Except with a left main stent where it can be done at 1 year.
  - One routine study at 5 years or more after CABG, without cardiac symptoms.
  - Every 2 years if there was documentation of previous “silent ischemia” on the imaging portion of a stress test but not on the ECG portion.
  - To assess for CAD prior to starting a Class IC antiarrhythmic agent (flecainide or propafenone) and annually while taking the medication.
  - Prior anatomic imaging study (coronary angiogram or CCTA) demonstrating coronary stenosis in a major coronary branch, which is of uncertain functional significance, can have one stress test with imaging.

- Evaluating new, recurrent, or worsening left ventricular dysfunction/CHF see CD-9.1: CHF– Imaging for additional indications.

**CD-1.5: Stress Testing with Imaging - Preoperative**

- There are 2 steps that determine the need for imaging stress testing in (stable) pre-operative patients:
  - Would the patient qualify for imaging stress testing independent of planned surgery?
    - If yes, proceed to stress testing guidelines;
    - If no, go to step 2
  - Is the surgery considered high, moderate or low risk? (see Table 2) If high or moderate-risk, proceed below. If low-risk, there is no evidence to determine a need for preoperative cardiac testing.
    - **High Risk Surgery**: All patients in this category should receive an imaging stress test if there has not been an imaging stress test within 1 year* unless the patient has developed new cardiac symptoms or a new change in the EKG since the last stress test.
    - **Intermediate Surgery**: One or more risk factors and unable to perform an ETT per guidelines if there has not been an imaging stress test within 1 year* unless the patient has developed new cardiac symptoms or a new change in the EKG since the last stress test.
    - **Low Risk**: Preoperative imaging stress testing is not supported.
  - Clinical Risk Factors (for cardiac death & non-fatal MI at time of non-cardiac surgery)
    - Planned high-risk surgery (open surgery on the aorta or open peripheral vascular surgery)
    - History of ischemic heart disease (previous MI, previous positive stress test, use of nitroglycerin, typical angina, ECG Q waves, previous PCI or CABG)
- History of compensated previous congestive heart failure (history of heart failure, previous pulmonary edema, third heart sound, bilateral rales, chest x-ray showing heart failure)
- History of previous TIA or stroke
- Diabetes Mellitus
- Creatinine level > 2 mg/dL

*Time interval is based on consensus of eviCore executive cardiology panel.

**Table 2**

<table>
<thead>
<tr>
<th>Cardiac Risk Stratification List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Risk (&gt; 5%)</strong></td>
</tr>
<tr>
<td>Open aortic and other major open vascular surgery</td>
</tr>
<tr>
<td>Open peripheral vascular surgery</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>

**CD-1.6: Transplant Patients**

- Stress Testing in patients for Non-Cardiac Transplant
  - Individuals who are candidates for any type of organ, bone marrow, or stem cell transplant can undergo imaging stress testing every year (usually stress echo or MPI) prior to transplant.
  - Individuals who have undergone organ transplant are at increased risk for ischemic heart disease secondary to their medication. Risk of vasculopathy is 7% at one year, 32% at five years and 53% at ten years. An imaging stress test can be repeated annually after transplant for at least two years or within one year of a prior cardiac imaging study if there is evidence of progressive vasculopathy.
  - After two consecutive normal imaging stress tests, repeated testing is not supported more often than every other year without evidence for progressive vasculopathy or new symptoms.
  - Stress testing after five years may proceed according to normal patterns of consideration.

- Post-Cardiac transplant assessment of transplant CAD:
  - One of the following imaging studies may be performed annually:
    - MPI
    - Stress ECHO
    - Stress MRI
    - Cardiac PET perfusion **with** coronary flow quantitation (CPT® 78491 or CPT® 78492)
CD-1.7: Non-imaging Heart Function and Cardiac Shunt Imaging

- Procedures reported with CPT® 78414 and CPT® 78428 are essentially obsolete and should not be performed in lieu of other preferred modalities.
- Echocardiogram is the preferred method for cardiac shunt detection, rather than the cardiac shunt imaging study described by CPT® 78428.
- Ejection fraction can be obtained by echocardiogram, MPI, MUGA study, cardiac MRI, cardiac CT, or cardiac PET depending on the clinical situation, rather than by the non-imaging heart function study described by CPT® 78414.

CD-1.8: Genetic lab testing in the evaluation of CAD

- Corus® CAD genetic expression score – refer to lab management program guidelines

References


<table>
<thead>
<tr>
<th>CD-2: Echocardiography (ECHO)</th>
</tr>
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</tbody>
</table>
### CD-2.1: Transthoracic Echocardiography (TTE) - Coding

<table>
<thead>
<tr>
<th>TTE CODES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transthoracic Echocardiography</td>
<td></td>
</tr>
<tr>
<td>TTE for congenital cardiac anomalies, complete</td>
<td>93303</td>
</tr>
<tr>
<td>TTE for congenital cardiac anomalies, follow-up or limited</td>
<td>93304</td>
</tr>
<tr>
<td>TTE with 2-D, M-mode, Doppler and color flow, complete</td>
<td>93306</td>
</tr>
<tr>
<td>TTE with 2-D, M-mode, without Doppler or color flow</td>
<td>93307</td>
</tr>
<tr>
<td>TTE with 2-D, M-mode, follow-up or limited</td>
<td>93308</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Doppler Echocardiography</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Doppler echo, pulsed wave and/or spectral display</td>
<td>+93320*</td>
</tr>
<tr>
<td>Doppler echo, pulsed wave and/or spectral display, follow-up or limited study</td>
<td>+93321*</td>
</tr>
<tr>
<td>Doppler echo, color flow velocity mapping</td>
<td>+93325</td>
</tr>
</tbody>
</table>

*CPT® 93320 and CPT® 93321 should not be requested or billed together

<table>
<thead>
<tr>
<th>Transthoracic Echocardiography</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C8921 TTE for congenital cardiac anomalies, complete</td>
<td>93303</td>
</tr>
<tr>
<td>C8922 TTE for congenital cardiac anomalies, follow-up or limited</td>
<td>93304</td>
</tr>
<tr>
<td>C8929 TTE with 2-D, M-mode, Doppler and color flow, complete</td>
<td>93306</td>
</tr>
<tr>
<td>C8923 TTE with 2-D, M-mode, without Doppler or color flow</td>
<td>93307</td>
</tr>
<tr>
<td>C8924 TTE with 2-D, M-mode, follow-up or limited</td>
<td>93308</td>
</tr>
</tbody>
</table>

C codes are unique temporary codes established by CMS. C codes were established for contrast echocardiography. Each echocardiography C code corresponds to a standard echo code (Class I CPT code) The C code and the matching CPT code should not both be approved.

<table>
<thead>
<tr>
<th>Investigational Codes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0399T Myocardial strain imaging (quantitative assessment of myocardial mechanics using image-based analysis of local myocardial dynamics) (List separately in addition to code for primary procedure)</td>
<td>Investigational</td>
</tr>
<tr>
<td>0439T Myocardial contrast perfusion echocardiography, at rest or with stress, for assessment of myocardial ischemia or viability</td>
<td>Investigational</td>
</tr>
</tbody>
</table>

- The most commonly performed study is a complete transthoracic echocardiogram with spectral and color flow Doppler (CPT® 93306).
  - CPT® 93306 includes the Doppler exams, so CPT® codes 93320-93325 should not be assigned together with CPT® 93306.
  - Doppler codes (CPT® 93320, CPT® 93321, and CPT® 93325) are ‘add-on codes’ (as denoted by the + sign) and are assigned in addition to code for the primary procedure.
- For a 2D transthoracic echocardiogram without Doppler, report CPT® 93307.
Limited transthoracic echocardiogram should be billed if the report does not "evaluate or document the attempt to evaluate" all of the required structures.

- A limited transthoracic echocardiogram is reported with CPT® 93308.
- CPT® 93321 (not CPT® 93320) should be reported with CPT® 93308 if Doppler is included in the study. CPT® 93325 can be reported with CPT® 93308 if color flow Doppler is included in the study.
- A limited congenital transthoracic echocardiogram is reported with CPT® 93304.

Doppler echo may be used for evaluation of the following:
- Shortness of breath
- Known or suspected valvular disease
- Known or suspected hypertrophic obstructive cardiomyopathy
- Shunt detection

**Practice Note**

Providers performing echo on a pediatric patient, may not know what procedure codes they will be reporting until the initial study is completed.

- If a congenital issue is found on the initial echo, a complete echo is reported with codes CPT® 93303, CPT® 93320, and CPT® 93325 because CPT® 93303 does NOT include Doppler and color flow mapping.
- If no congenital issue is discovered, then CPT® 93306 is reported alone and includes 2-D, Doppler, and color flow mapping.
- Since providers may not know the appropriate code/s that will be reported at the time of the pre-authorization request, they may request all 4 codes (CPT® 93303, CPT® 93320, CPT® 93325, and CPT® 93306).
- Depending upon individual health plan payer contracts, post-service audits may be completed to ensure proper claims submission.

**Practice Note**

CPT® 76376 and CPT® 76377 are not unique to 3D Echo. These codes also apply to 3D rendering of MRI and CT studies. see [CD-2.8: 3D Echocardiography – Coding](#)

CPT® 93325 may also be used with fetal echocardiography.

**CD-2.2: Transthoracic Echocardiography (TTE) – Indications**

TTE can be performed for the following:
- New or worsening cardiac signs or symptoms, including, but not limited to:
  - Dyspnea
  - Chest pain
  - Palpitations
  - Syncope
  - Heart failure
  - Murmur
- Hypertension – can be done once with initial evaluation
- New signs or symptoms of cerebral ischemia or peripheral embolic event
- Valve function and structure:
- History and/or physical examination suggesting significant valvular disorder
- Valve Surgery
  - If valve surgery is being considered can have TTE twice a year
  - Post surgery at 6 weeks to establish baseline, then one routine study (surveillance) 3 years or more after valve surgery (repair or prostatic valve implantation).
  - TAVR follow-up may be approved at 1 month, and at one year post-procedure and annually thereafter.
    - A baseline post-op TTE is usually performed within one week after surgery. This baseline study may also be approved as an outpatient if not performed in the hospital prior to discharge
    - See: **CD 4.8: Transcatheter Aortic Valve Replacement (TAVR)**
  - Mitral valve clip follow-up may be approved at 1 month, at 6 months, and at one year post-procedure

- Ventricular function assessment including, but not limited to the following:
  - Chemotherapy induced cardiomyopathy see: **CD-12.1 Oncologic Indications for Cancer Therapeutics-Related Cardiac Dysfunction (CTRCD)**
  - Post myocardial infarction can be done once in follow-up. This should not be done less than 6 weeks post MI
  - Evaluation prior to ICD/CRT placement, if baseline has not been established

- Cardiac structure: an echocardiogram can be done to assess cardiac structure when there are new or worsening cardiac signs or symptoms, suggesting disorders such as, but not limited to:
  - Infiltrative diseases (e.g. sarcoid, amyloid)
  - Ventricular septal defect (VSD)
  - Papillary muscle rupture/dysfunction
  - Hypertrophy including:
    - asymmetric septal hypertrophy
    - spade heart
    - hypertensive concentric hypertrophy
    - infiltrative hypertrophy
    - pacemaker insertion complication
    - pericardial effusion
    - cardiac injury due to blunt chest trauma

- Cardiac Defects or Masses
  - Embolic source in patients with recent Transient Ischemic Attack (TIA), stroke, or peripheral vascular emboli as an initial study before TEE.
  - ASD repair or VSD repair:
    - Within the first year of surgery
    - Incomplete septal defect repair may be followed yearly
  - Tumor evaluation including myxomas
  - Clot detection
  - Evaluation of adult congenital heart disease see also: **PEDCD-2 Congenital Heart Disease**
Routine yearly surveillance of adult congenital heart disease is allowed following incomplete or palliative repair, with residual abnormality and without a change in clinical status.

Screening for the presence of bicuspid aortic valve is recommended for first-degree relatives of patients with bicuspid aortic valve.

Screening of the ascending aorta in known or suspected connective tissue disease that predisposes to an aortic aneurysm or dissection (e.g., Marfan syndrome, hereditary forms of ascending aortopathy)

Also see CH-29: Thoracic Aorta

- Inflammatory
  - Pericardial effusion/pericardial disease including pericardial cysts
  - Congenital heart disease
  - Endocarditis including:
    - Fever
    - Positive blood cultures indicating bacteremia or
    - A new murmur

- Pacemaker insertion complication

- Screening for first-degree relatives of patients with hypertrophic cardiomyopathy (HCM)
  - First-degree relatives who are 12 to 18 years old should be screened yearly for HCM by 2D-echocardiography, and ECG.
  - First-degree relatives who are older than age 18 should have 2D-echo and ECG every five years to screen for delayed adult-onset LVH.
  - Systematic screening is usually not indicated for first-degree relatives who are younger than age 12 unless there is a high-risk family history or the child is involved in particularly intense competitive sports.
  - Affected individuals identified through family screening or otherwise should be evaluated every 12 to 18 months with 2D-echo, Holter monitor, and blood pressure response during maximal upright exercise.

- New abnormality on an EKG that has not been evaluated

- Thoracic aortic aneurysm/dissection see CH-29: Thoracic Aorta

- Patients with BAVs and no demonstrable aortopathy may be followed every 3 years with TTE for the development of aortic enlargement

**CD-2.3: Frequency of Echocardiography Testing**

- Repeat routine echocardiograms are not supported (annually or otherwise) for evaluation of clinically stable syndromes

- Every three years, when there is a history of:
  - Bicuspid aortic valve
  - Mild aortic or mitral stenosis
  - Prosthetic heart valve

- Once a year (when no change in clinical status), when there a history of:
  - Significant valve dysfunction, including moderate or severe regurgitation or stenosis
✿ Significant valve deformity, such as thickened myxomatous valve or bileaflet prolapse, regardless of extent of regurgitation or stenosis
✿ Hypertrophic cardiomyopathy see CD-2.2: Transthoracic Echocardiography (TTE) – Indications, CD-2.7: Stress Echocardiography – Indications, other than ruling out CAD
✿ Chronic pericardial effusions
✿ Left ventricular contractility/diastolic function prior to planned medical therapy for heart failure or to evaluate the effectiveness of on-going therapy
✿ Pre-operative aortic root dilatation (see CH 29.2 for postoperative frequency)
✿ Pulmonary hypertension (can be done more frequently with change in therapy)
✿ Systemic Scleroderma
✿ Prior TAVR

▷ Anytime, without regard for the number or timing of previous ECHO studies, if there is a change in clinical status or new signs or symptoms such as:
✿ Cardiac murmurs
✿ Myocardial infarction or acute coronary syndrome
✿ Congestive heart failure (new or worsening)
  ▪ New symptoms of dyspnea
  ▪ Orthopnea
  ▪ Paroxysmal nocturnal dyspnea
  ▪ Edema
  ▪ Elevated BNP
✿ Pericardial disease
✿ Stroke/transient ischemic attack
✿ Decompression illness
✿ Prosthetic valve dysfunction or thrombosis
✿ A history of prior cardiac transplant, per transplant center protocol

Practice note:
▷ Decisions regarding routine echocardiographic follow-up should not be based on the degree of regurgitation alone, but should take into account associated structural valvular and cardiac abnormalities. For example: a structurally normal mitral valve with moderate mitral regurgitation by color flow Doppler and normal left atrial size, does not generally require routine echocardiographic follow-up. However, a thickened, myxomatous appearing mitral valve with bi-leaflet prolapse and only trivial or mild mitral regurgitation, should be followed echocardiographically at routine intervals.
# CD-2.4: Transesophageal Echocardiography (TEE) – Coding

<table>
<thead>
<tr>
<th>Transesophageal Echocardiography</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEE with 2-D, M-mode, probe placement, image acquisition, interpretation and report</td>
<td>93312</td>
</tr>
<tr>
<td>TEE probe placement only</td>
<td>93313</td>
</tr>
<tr>
<td>TEE image acquisition, interpretation, and report only</td>
<td>93314</td>
</tr>
<tr>
<td>TEE for congenital anomalies with 2-D, M-mode, probe placement, image acquisition, interpretation and report</td>
<td>93315</td>
</tr>
<tr>
<td>TEE for congenital anomalies, probe placement only</td>
<td>93316</td>
</tr>
<tr>
<td>TEE for congenital anomalies, image acquisition, interpretation and report only</td>
<td>93317</td>
</tr>
<tr>
<td>TEE for monitoring purposes, ongoing assessment of cardiac pumping function on an immediate time basis</td>
<td>93318</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Doppler Echocardiography*:</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doppler echo, pulsed wave and/or spectral display</td>
<td>+93320</td>
</tr>
<tr>
<td>Doppler echo, pulsed wave and/or spectral display, follow-up or limited study</td>
<td>+93321</td>
</tr>
<tr>
<td>Doppler echo, color flow velocity mapping</td>
<td>+93325</td>
</tr>
</tbody>
</table>

* Doppler echo, if performed, may be reported separately in addition to the primary TEE codes: CPT® 93312, CPT® 93314, CPT® 93315, and CPT® 93317.

<table>
<thead>
<tr>
<th>CPT®</th>
<th>Transesophageal Echocardiography</th>
</tr>
</thead>
<tbody>
<tr>
<td>93312</td>
<td>TEE with 2-D, M-mode, probe placement, image acquisition, interpretation and report</td>
</tr>
<tr>
<td>93315</td>
<td>TEE for congenital anomalies with 2-D, M-mode, probe placement, image acquisition, interpretation and report</td>
</tr>
<tr>
<td>93318</td>
<td>TEE for monitoring purposes, ongoing assessment of cardiac pumping function on an immediate time basis</td>
</tr>
</tbody>
</table>

- **The complete transesophageal echocardiogram** service, including both (1) probe (transducer) placement and (2) image acquisition/interpretation, is reported with CPT® 93312.
  - Probe placement only is reported with CPT® 93313.
  - The image acquisition/interpretation only is reported with CPT® 93314.

- Physicians assign codes CPT® 93312, CPT® 93313, and/or CPT® 93314 to report professional services if the test is performed in a hospital or other facility where the physician cannot bill globally.
  - Modifier -26 (professional component) is appended to the appropriate code
  - CPT® 93313 and CPT® 93314 should never be used together. If both services are provided, CPT® 93312 is reported.

- Hospitals should report TEE procedures using CPT® 93312 (the complete service). CPT® 93313 and CPT® 93314 are not used for hospital billing.

- Monitoring of patients undergoing cardiac surgery is CPT® 93318.
CD-2.5: Transesophageal Echocardiography (TEE) – Indications

- Limited transthoracic echo window
- Assessing valvular dysfunction, especially mitral regurgitation, when TTE is inadequate
- Pre-operative planning for cardiac surgery
- Embolic source or intracardiac shunting when TTE is inconclusive
  - **Examples**: atrial septal defect, ventricular septal defect, patent foramen ovale, aortic cholesterol plaques, thrombus in cardiac chambers, valve vegetations, tumor
- Embolic events when there is an abnormal TTE or a history of atrial fibrillation
  - Clarify atria/atrial appendage, aorta, mitral/aortic valve beyond the information that other imaging studies have provided
  - Cardiac valve dysfunction
    - Differentiation of tricuspid from bicuspid aortic valve
    - Congenital abnormalities
- Assessing for left atrial thrombus prior to cardioversion of atrial fibrillation.
- Prior to planned atrial fibrillation ablation/pulmonary vein isolation procedure.
- Repeat TEE studies are based upon findings in the original study and documentation of the way in which repeat studies will affect patient management
**CD-2.6: Stress Echocardiography (Stress Echo) - Coding**

<table>
<thead>
<tr>
<th>Stress Echocardiography</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echo, transthoracic, with (2D), includes M-mode, during rest and exercise stress test and/or pharmacologically induced stress, with report;*</td>
<td>93350</td>
</tr>
<tr>
<td>Echo, transthoracic, with (2D), includes M-mode, during rest and exercise stress test and/or pharmacologically induced stress, with report: <em>including performance of continuous electrocardiographic monitoring, with physician supervision</em></td>
<td>93351</td>
</tr>
</tbody>
</table>

**Doppler Echocardiography:**

<table>
<thead>
<tr>
<th>Doppler Echocardiography</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doppler echo, pulsed wave and/or spectral display**</td>
<td>+93320</td>
</tr>
<tr>
<td>Doppler echo, pulsed wave and/or spectral display, follow-up/limited study</td>
<td>+93321</td>
</tr>
<tr>
<td>Doppler echo, color flow velocity mapping**</td>
<td>+93325</td>
</tr>
</tbody>
</table>

*CPT® 93350 and CPT® 93351 do not include Doppler studies

*Doppler echo (CPT® +93320 and CPT® +93325, if performed, may be reported separately in addition to the primary SE codes: CPT® 93350 or CPT® 93351.*

<table>
<thead>
<tr>
<th>CPT®</th>
<th>Stress Echocardiography</th>
</tr>
</thead>
<tbody>
<tr>
<td>93350</td>
<td>Echo, transthoracic, with (2D), includes M-mode, during rest and exercise stress test and/or pharmacologically induced stress, with report;*</td>
</tr>
<tr>
<td>93351</td>
<td>Echo, transthoracic, with (2D), includes M-mode, during rest and exercise stress test and/or pharmacologically induced stress, with report: <em>including performance of continuous electrocardiographic monitoring, with physician supervision</em></td>
</tr>
</tbody>
</table>

**CD-2.7: Stress Echocardiography–Indications, other than ruling out CAD**

See: **CD-1.4: Stress Testing with Imaging – Indications**

- In addition to the evaluation of CAD, stress echo can be used to evaluate the following conditions:
  - Dyspnea on exertion (specifically to evaluate pulmonary hypertension)
  - Right heart dysfunction
  - Valvular heart disease, especially when the outcome would affect a therapeutic or interventional decision
  - Pulmonary hypertension, when the outcome will measure response to therapy and/or prognostic information
  - Hypertrophic cardiomyopathy
    - In a patient with a history of hypertrophic cardiomyopathy who has been previously evaluated with a stress echo, another stress echo may be appropriate if there are worsening symptoms or if there has been a therapeutic change (for example: change in medication, surgical procedure performed).
- In general spectral Doppler (CPT® 93320 or 93321) and color-flow Doppler (CPT® 93325) are necessary in the evaluation of the above conditions and can be added to the stress echo code.
CD-2.8: 3D Echocardiography – Coding

- The procedure codes used to report 3D rendering for echocardiography are not unique to echocardiography and are the same codes used to report the 3D post-processing work for CT, MRI, ultrasound, and other tomographic modalities.
  - **CPT® 76376**, not requiring image post-processing on an independent workstation, is the most common code used for 3D rendering done with echocardiography
  - **CPT® 76377** requires the use of an independent workstation

CD-2.9: 3D Echocardiography – Indications

- 3D Echo Indications
  - Echocardiography with 3-dimensional (3D) rendering is becoming universally available, yet its utility remains limited based on the current literature. Current indications include:
    - Left ventricular volume and ejection fraction assessment
    - Mitral valve anatomy specifically related to mitral valve stenosis
    - Guidance of transcatheter procedures

CD-2.10: Myocardial strain imaging (CPT® 0399T)

- Investigational see **CD-2.1: Transthoracic Echocardiography (TTE) – Coding**

CD-2.11: Myocardial contrast perfusion echocardiography (CPT® 0439T)

- Investigational see **CD-2.1: Transthoracic Echocardiography (TTE) – Coding**

References


http://www.onlinejacc.org/content/70/13/1647.


<table>
<thead>
<tr>
<th>CD-3: Nuclear Cardiac Imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CD-3.1:</strong> Myocardial Perfusion Imaging (MPI) – Coding</td>
</tr>
<tr>
<td><strong>CD-3.2:</strong> MPI – Indications</td>
</tr>
<tr>
<td><strong>CD-3.3:</strong> MUGA - Coding</td>
</tr>
<tr>
<td><strong>CD-3.4:</strong> MUGA Study – Cardiac Indications</td>
</tr>
<tr>
<td><strong>CD-3.5:</strong> MUGA Study - Oncologic Indications for Cancer Therapeutics-Related Cardiac Dysfunction (CTRCD)</td>
</tr>
<tr>
<td><strong>CD-3.6:</strong> Myocardial Sympathetic Innervation Imaging in Heart Failure</td>
</tr>
<tr>
<td><strong>CD-3.7:</strong> Myocardial Tc-99m Pyrophosphate Imaging</td>
</tr>
<tr>
<td><strong>CD-3.8:</strong> Cardiac Amyloidosis</td>
</tr>
</tbody>
</table>
### CD-3.1: Myocardial Perfusion Imaging (MPI) – Coding

<table>
<thead>
<tr>
<th>Myocardial Perfusion Imaging (MPI)</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPI, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic)</td>
<td>78451</td>
</tr>
<tr>
<td>MPI, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); multiple studies, at rest and/or stress (exercise or pharmacologic) and/or redistribution and/or rest reinjection</td>
<td>78452</td>
</tr>
</tbody>
</table>

- The most commonly performed myocardial perfusion imaging are single (at rest or stress, CPT® 78451) and multiple (at rest and stress, CPT® 78452) SPECT studies.
  - Evaluation of the individual’s left ventricular wall motion and ejection fraction are routinely performed during MPI and are included in the code’s definition.
  - First pass studies, (CPT® 78481 and CPT® 78483), MUGA, (CPT® 78472 and CPT® 78473) and SPECT MUGA (CPT® 78494) should not be reported in conjunction with MPI codes.
  - Attenuation correction, when performed, is included in the MPI service by code definition. No additional code should be assigned for the billing of attenuation correction.

- **Multi-day Studies:** In the absence of written payer guidelines to the contrary, it is not appropriate to bill separately for the rest and stress segments of MPI even if performed on separate calendar dates. A single code is assigned to define the entire procedure on the date all portions of the study are completed.

- 3D rendering, (CPT® 76376/CPT® 76377), should not be billed in conjunction with MPI.

- Separate codes for such related services as treadmill testing (CPT® 93015 • CPT® 93018) and radiopharmaceuticals should be assigned in addition to MPI. These services are reimbursed according to each individual payer policy.

### CD-3.2: MPI – Indications

- See: **CD-1.4: Stress Testing with Imaging-Indications**
CD-3.3: MUGA - Coding

<table>
<thead>
<tr>
<th>Nuclear Cardiac Imaging Procedure Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUGA (Multi Gated Acquisition) – Blood Pool Imaging</td>
</tr>
<tr>
<td>Cardiac blood pool imaging, gated equilibrium; planar, single study at rest or stress, wall motion study plus ejection fraction, with or without quantitative processing</td>
</tr>
<tr>
<td>Cardiac blood pool imaging, gated equilibrium; planar, multiple studies, wall motion study plus ejection fraction, at rest and stress, with or without additional quantification</td>
</tr>
<tr>
<td>Cardiac blood pool imaging, gated equilibrium, SPECT, at rest, wall motion study plus ejection fraction, with or without quantitative processing</td>
</tr>
<tr>
<td>Cardiac blood pool imaging, gated equilibrium, single study, at rest, with right ventricular ejection fraction by first pass technique (List separately in addition to code for primary procedure) [Use in conjunction with CPT® 78472]</td>
</tr>
</tbody>
</table>

- The technique employed for a MUGA service guides the code assignment. CPT® 78472 is used for a planar MUGA scan at rest or stress, and CPT® 78473 for planar MUGA scans, multiple studies at rest and stress.
- The two most commonly performed MUGA scans are the studies defined by CPT® 78472 and SPECT MUGA, CPT® 78494.
- Planar MUGA studies (CPT® 78472 and CPT® 78473) should not be reported in conjunction with:
  - MPI (CPT® 78451 - CPT® 78454)
  - First pass studies (CPT® 78481- CPT® 78483), and/or
  - SPECT MUGA (CPT® 78494).
- CPT® +78496 is assigned only in conjunction with CPT® 78472.
  - See: CD-3.4: MUGA Study – Cardiac Indications
  - This add-on code should not be performed as a routine protocol.
**CD-3.4: MUGA Study – Cardiac Indications**

**MUGA (Multi Gated Acquisition) – Blood Pool Imaging Indications**

- Echocardiography is the preferred method of following left ventricular systolic function. Indications below refer to scenarios in which MUGA may be performed rather than ECHO:
  - Prior ECHO demonstrates impaired systolic function (EF < 50%).
  - Pre-existing left ventricular wall motion abnormalities from ischemic heart disease or ischemic or non-ischemic cardiomyopathies.
  - ECHO is technically limited and prevents accurate assessment of LV function.
  - AICD placement:
    - MUGA to assess LV ejection fraction when there are conflicting results between other forms of testing and the issue is clinically relevant, eg. MPI LVEF is 80% and an echo EF is 30%, the MUGA would be appropriate.
    - However, if the MPI LVEF is 80% and the echo EF is 50%, this would **not** be appropriate even though the difference is significant since the echo EF is still normal.
  - Congestive heart failure:
    - MUGA to measure response to cardiac medications for CHF if echocardiogram was performed and was technically difficult
  - Previous low LV ejection fraction determination was < 50% and receiving potentially cardiotoxic chemotherapy
  - Documentation of other need for information given by MUGA that cannot be obtained by ECHO

**MUGA is NOT indicated for the following:**

- A prior MUGA is not a reason to approve another MUGA (it is not necessary to compare LVEF by the same modality)
- To resolve differences in ejection fraction measurements between ECHO and MPI **unless** there is clear documentation as to how quantitative measurement of LVEF will affect patient management (e.g. implantation of an AICD).

**Note:**

- LV ejection fraction measurement is variable and can vary by +/-5-10% without any accompanying change in clinical status. Normal physiologic changes in intravascular volume, catecholamine levels, fever, and medications are among the many factors which cause variation in LVEF in the absence of myocardial pathology.
- Right ventricular first pass study, (CPT® +78496), may be indicated if there is clear documentation of a concern regarding right ventricular dysfunction or overload.

**CD-3.5: MUGA Study - Oncologic Indications for Cancer Therapeutics-Related Cardiac Dysfunction (CTRCD)**

- See **CD 12.1: Oncologic Indications for Cancer Therapeutics-Related Cardiac Dysfunction (CTRCD)**
CD-3.6: Myocardial Sympathetic Innervation Imaging in Heart Failure

- In heart failure, the sympathetic nervous system is activated in order to compensate for the decreased myocardial function. Initially, this is beneficial, however, long-term this compensatory mechanism is detrimental and causes further damage.

- Markers have been developed, using radioactive iodine, in an attempt to image this increased myocardial sympathetic activity. Currently, AdreView™ (Iodine-123 meta-iodobenzylguanidine), is the only FDA-approved imaging agent available for this purpose. eviCore currently considers AdreView to be experimental and investigational.

- The AMA has established the following set of Category III codes to report these studies:
  - 0331T - Myocardial sympathetic innervation imaging, planar qualitative and quantitative assessment
  - 0332T - Myocardial sympathetic innervation imaging, planar qualitative and quantitative assessment; with tomographic SPECT.

CD-3.7: Myocardial Tc-99m Pyrophosphate Imaging

<table>
<thead>
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<th>Myocardial Tc-99m Pyrophosphate Imaging</th>
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<tr>
<td>MUGA (Multi Gated Acquisition) – Blood Pool Imaging</td>
<td></td>
</tr>
<tr>
<td>Myocardial Imaging, infarct avid, planar, qualitative or quantitative</td>
<td>78466</td>
</tr>
<tr>
<td>Myocardial Imaging, infarct avid, planar, qualitative or quantitative with ejection fraction by first pass technique</td>
<td>78468</td>
</tr>
<tr>
<td>Myocardial Imaging, infarct avid, planar, qualitative or quantitative tomographic SPECT with or without quantification</td>
<td>78469</td>
</tr>
<tr>
<td>A single planar imaging session alone (without a SPECT study), Radiopharmaceutical localization of tumor or distribution of radiopharmaceutical agent(s); limited area</td>
<td>78800</td>
</tr>
<tr>
<td>Planar with SPECT, Radiopharmaceutical localization of tumor or distribution of radiopharmaceutical agent(s) tomographic (SPECT). Note: When reporting CPT® 78803, planar imaging of a limited area or multiple areas should be included with the SPECT</td>
<td>78803</td>
</tr>
</tbody>
</table>

- Historically this method of imaging the myocardium was used to identify recent infarction, hence, the term "infarct-avid scan." Although still available, the sensitivity and specificity for identifying infarcted myocardial tissue are variable and the current use for this indication is limited. See CD-5: Cardiac MRI.
CD-3.8: Cardiac Amyloidosis

- Tc-99m pyrophosphate imaging may be used to identify cardiac amyloidosis (CPT® 78803). Chest SPECT and planar imaging may be used, as well as whole-body imaging for identification of systemic ATTR (transthyretin) amyloidosis.

- For a single planar imaging session alone (without a SPECT study), report CPT® 78800 Radiopharmaceutical localization of tumor or distribution of radiopharmaceutical agent(s); limited area

- Indications may include:
  - Individuals with heart failure and unexplained increase in left ventricular wall thickness.
  - African-Americans over the age of 60 years with heart failure, unexplained or with increased left ventricular wall thickness (> 12 mm).
  - Individuals over the age of 60 years with unexplained heart failure and preserved ejection fraction.
  - Individuals, especially elderly males, with unexplained neuropathy, bilateral carpal tunnel syndrome or atrial arrhythmias in the absence of usual risk factors, and signs/symptoms of heart failure.
  - Evaluation of cardiac involvement in individuals with known or suspected familial amyloidosis.
  - Diagnosis of cardiac ATTR in individuals with CMR or echocardiography consistent with cardiac amyloidosis.
  - Patients with suspected cardiac ATTR amyloidosis and contraindications to CMR such as renal insufficiency or an implantable cardiac device.14

References

8. Highlights Of Prescribing Information HERCEPTIN® (trastuzumab) for injection, for intravenous use


http://www.ajconline.org/article/S0002-9149(83)80140-4/pdf

http://circimaging.ahajournals.org/content/6/2/195


### CD-4: Cardiac CT, Coronary CTA, and CT for Coronary Calcium (CAC)

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CD-4.1: Cardiac CT and CTA – General Information and Coding

- The high negative predictive value (98%-99%) of CCTA in ruling out significant coronary artery disease has been confirmed in multiple studies.

### Cardiac Imaging Procedure Codes

<table>
<thead>
<tr>
<th>Cardiac CT</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT, heart, without contrast, with quantitative evaluation of coronary calcium</td>
<td>75571</td>
</tr>
</tbody>
</table>

The code set for Cardiac CT and CCTA (CPT® 75572-CPT® 75574), include quantitative and functional assessment (for example, calcium scoring) if performed

- CPT® 75571 describes a non-contrast CT of the heart with calcium scoring and should be reported only when calcium scoring is performed as a stand-alone procedure.
  - Can be used to report a preliminary non-contrast scan which indicates an excessive amount of calcium such that the original scheduled study must be discontinued.
  - CPT® 75571 should not be reported in conjunction with any of the contrast CT/CTA codes (CPT® 75572-CPT® 75574).

<table>
<thead>
<tr>
<th>Cardiac CT and CCTA</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT, heart, with contrast, for evaluation of cardiac structure and morphology (including 3D image post-processing, assessment of cardiac function, and evaluation of venous structures, if performed).</td>
<td>75572</td>
</tr>
<tr>
<td>CT, heart, with contrast, for evaluation of cardiac structure and morphology in the setting of congenital heart disease (including 3D image post-processing, assessment of cardiac function, and evaluation of venous structures, if performed).</td>
<td>75573</td>
</tr>
<tr>
<td>CTA, heart, coronary arteries and bypass grafts (when present), with contrast, including 3D image post-processing (including 3D image post-processing, assessment of cardiac function, and evaluation of venous structures, if performed).</td>
<td>75574</td>
</tr>
<tr>
<td>Noninvasive estimated coronary fractional flow reserve (FFR) derived from coronary computed tomography angiography data using computation fluid dynamics physiologic simulation software analysis of functional data to assess the severity of coronary artery disease; data preparation and transmission, analysis of fluid dynamics and simulated maximal coronary hyperemia, generation of estimated FFR model, with anatomical data review in comparison with estimated FFR model to reconcile discordant data, interpretation and report.</td>
<td>0501T</td>
</tr>
<tr>
<td>Noninvasive estimated coronary fractional flow reserve (FFR) derived from coronary computed tomography angiography data using computation fluid dynamics physiologic simulation software analysis of functional data to assess the severity of coronary artery disease; analysis of fluid dynamics and simulated maximal coronary hyperemia, and generation of estimated FFR model</td>
<td>0502T</td>
</tr>
<tr>
<td>Noninvasive estimated coronary fractional flow reserve (FFR) derived from coronary computed tomography angiography data using computation fluid dynamics physiologic simulation software analysis of functional data to assess the severity of coronary artery disease; analysis of fluid dynamics and simulated maximal coronary hyperemia, and generation of estimated FFR model</td>
<td>0503T</td>
</tr>
<tr>
<td>Noninvasive estimated coronary fractional flow reserve (FFR) derived from coronary computed tomography angiography data using computation fluid dynamics physiologic simulation software analysis of functional data to assess the severity of coronary artery disease; anatomical data review in comparison with estimated FFR model to reconcile discordant data, interpretation and report.</td>
<td>0504T</td>
</tr>
</tbody>
</table>
3D rendering, (CPT® 76376/CPT® 76377), should not be billed in conjunction with Cardiac CT and CCTA.

Only one code from the set: CPT® 75572 - CPT® 75574 can be reported per encounter.

CPT® 75574 includes evaluation of cardiac structure and morphology when performed; therefore, additional code/s should not be assigned.

**CD-4.2: CT for Coronary Calcium Scoring (CPT® 75571)**

**CD-4.2.1: CT Calcium Scoring for CAD Screening**

- Coronary calcium scoring as a standalone test is considered investigational in asymptomatic patients with any degree of CAD risk.
- Medicare policies consider that there is insufficient evidence based data to support the performance of Coronary Calcium Scoring.
- Texas Heart Attack Preventive Screening Law (HR 1290) mandates that insurers in Texas cover either a calcium scoring study (CPT® 75571 or HCPCS S8092) or a carotid intima-media thickness study (ultrasound—Category III code 0126T) every five years for certain populations. To qualify, the following must apply:
  - Must be a Texas resident.
  - Must be a member of a fully-insured Texas health plan.
  - Must be a man age 45 to 75 or a woman age 55 to 75.
  - Must have either diabetes or a Framingham cardiac risk score of intermediate or higher.
  - Must not have had a calcium scoring study or a carotid intima-media thickness study within the past 5 years.

**CD-4.2.2: CT Calcium Scoring Indications**

- Symptomatic individuals with a ‘very low’, or ‘low’ pretest probability of CAD*, see Table 1 in CD-1.1: General Issues – Cardiac

**CD-4.3: CCTA – Indications for CCTA**

- Symptomatic individuals who have a 'low' or 'intermediate' pretest probability of CAD*, see Table 1 in CD-1.1: General Issues – Cardiac:
- 'Low' or 'intermediate' pre-test probability of coronary disease with persistent symptoms after a stress test.
- Replace performance of invasive coronary angiogram in individuals with low risk of CAD (i.e. Pre-op non-coronary surgery).
- For symptomatic individuals, evaluate post-CABG graft patency when only graft patency is a concern and imaging of the native coronary artery anatomy is not needed, such as in early graft failure.
CD-4.4: CCTA – Additional Indications

- **Re-do CABG**
  - To identify whether bypass grafts are located directly beneath the sternum, so that alternative ways to enter the chest can be planned.

- **Evaluate coronary artery anomalies and other complex congenital heart disease of cardiac chambers or great vessels.**
  - Report CPT® 75574 for evaluating coronary artery anomalies.
  - Report CPT® 75573 for congenital heart disease.
    - To evaluate the great vessels, Chest CTA (CPT® 71275) can be performed instead of CCTA or in addition to CCTA. For anomalous pulmonary venous return, can add CT abdomen and pelvis with contrast (CPT® 74177).

- **Anomalous coronary artery(ies) suspected for diagnosis or to plan treatment and less than age 40 with a history that includes one or more of the following:**
  - Persistent exertional chest pain and normal stress test,
  - Full sibling(s) with history of sudden death syndrome before age 30 or with documented anomalous coronary artery
  - Resuscitated sudden death and contraindications for conventional coronary angiography
  - Prior nondiagnostic coronary angiography in determining the course of the anomalous coronary artery in relation to the great vessels, origin of a coronary artery or bypass graft location.

- **Unexplained new onset of heart failure**

- **Evaluation of newly diagnosed congestive heart failure or cardiomyopathy.**
  - No prior history of coronary artery disease, the ejection fraction is less than 50 percent, and low or intermediate risk on the pre-test probability assessment, **and**
  - No exclusions to cardiac CT angiography.
  - No cardiac catheterization, SPECT, cardiac PET, or stress echocardiogram has been performed since the diagnosis of congestive heart failure or cardiomyopathy.

- **Ventricular tachycardia (6 beat runs or greater) if CCTA will replace conventional invasive coronary angiography.**

- **Equivocal coronary artery anatomy on conventional cardiac catheterization.**

- **Newly diagnosed dilated cardiomyopathy.**

- **Preoperative assessment of the coronary arteries in patients who are going to undergo surgery for aortic dissection, aortic aneurysm, or valvular surgery if CCTA will replace conventional invasive coronary angiography.**

- **Vasculitis/Takayasu’s/Kawasaki’s disease**

- **Cardiac Trauma:** Chest CTA (CPT® 71275) and CCTA (CPT® 75574) are useful in detecting aortic and coronary injury and can help in the evaluation of myocardial and pericardial injury see **CD-10.1: Cardiac Trauma – Imaging**
**Practice Note – relative contraindications for Coronary CT**

- Irregular heart rhythms (e.g., atrial fibrillation/flutter, frequent irregular premature ventricular contractions or premature atrial contractions, and high-grade heart block)
- Multifocal Atrial Tachycardia (MAT)
- Inability to lie flat
- Body mass index of 40 or more
- Inability to obtain a heart rate less than 65 beats per minute after beta-blockers
- Inability to hold breath for at least 8 seconds
- Renal Insufficiency
- Asymptomatic patients and routine use in the evaluation of the coronary arteries following heart transplantation
- CCTA should not be performed if there is extensive coronary calcification (calcium score >1000).
- Evaluation of coronary stent patency if the vessel is less than 3.0 mm in diameter (metal artifact limits accuracy)
- Evaluation of left ventricular function following myocardial infarction or in chronic heart failure
  - Patients with indeterminate echocardiogram should undergo MUGA (CPT® 78472 or CPT® 78494) or cardiac MRI.
- High pre-test probability for CAD – rather, these patients should undergo conventional coronary angiography, especially if an interventional procedure (e.g., PCI) is anticipated.
- Identification of plaque composition and morphology
- Myocardial perfusion and viability studies
- Preoperative assessment for non-cardiac, nonvascular surgery
- Routine follow-up of asymptomatic or stable symptoms of CAD with CCTA
- There is insufficient evidence to support routine use of Coronary Computed Tomography Angiography (CCTA) in the evaluation of the coronary arteries following heart transplantation.

**CD-4.5: Fractional Flow Reserve by Computed Tomography**

- Fractional flow reserve (FFR) is typically measured using invasive techniques. FFR can be obtained noninvasively from coronary computed tomography angiography data (FFR-CT).
- Indications for FFR-CT
  - To further assess CAD seen on a recent CCTA that is of uncertain physiologic significance
CD-4.6: CT Heart – Indications

- Cardiac vein identification for lead placement in patients needing left ventricular pacing.
- Pulmonary vein isolation procedure (ablation) for atrial fibrillation
  - Cardiac MRI (CPT® 75557 or CPT® 75561), chest MRV (CPT® 71555), chest CTV (CPT® 71275), or cardiac CT (CPT® 75572) can be performed to evaluate the anatomy of the pulmonary veins prior to an ablation procedure performed for atrial fibrillation.
  - Study may be repeated post-procedure between 3-6 months after ablation because of a 1%-2% incidence of asymptomatic pulmonary vein stenosis
  - See CD-8: Pulmonary Artery and Vein Imaging
- If echocardiogram is inconclusive for:
  - Cardiac or pericardial tumor or mass
  - Cardiac thrombus
  - Pericarditis/constrictive pericarditis
  - Complications of cardiac surgery
- Clinical suspicion of arrhythmogenic right ventricular dysplasia or arrhythmogenic cardiomyopathy (ARVD/ARVC), especially if patient has presyncope or syncope if the clinical suspicion is supported by established criteria for ARVD.
- Recurrent laryngeal nerve palsy due to cardiac chamber enlargement.
- Coronary imaging is not included in the code definition for CPT® 71275.
  - The AMA definition for CPT® 71275 reads: “CTA Chest (non-coronary), with contrast material(s), including non-contrast images, if performed, and image post-processing.”

CD-4.7: CT Heart for Congenital Heart Disease

- Coronary artery anomaly evaluation
  - A cardiac catheterization was performed, and not all coronary arteries were identified.
- Thoracic arteriovenous anomaly evaluation
  - A cardiac MRI or chest CT angiogram was performed and suggested congenital heart disease.
- Complex adult congenital heart disease evaluation
  - No cardiac CT or cardiac MRI has been performed, and there is a contraindication to cardiac MRI.
  - A cardiac CT or cardiac MRI was performed one year ago or more.
CD-4.8: Transcatheter Aortic Valve Replacement (TAVR)

Once the decision has been made for aortic valve replacement, the following may be used to determine if a patient is a candidate for TAVR:

- CTA of chest (CPT® 71275), abdomen and pelvis (combination code CPT® 74174) are considered appropriate, and
- Cardiac CT (CPT® 75572) may be considered to measure the aortic annulus or
- Coronary CTA (CCTA CPT® 75574) may be considered to both measure the aortic annulus and assess the coronary arteries in lieu of heart catheterization.

Post TAVR:
- TAVR follow-up may be approved at 1 months, at one year post-procedure, and annually thereafter.

Practice Note

A baseline post-op TTE is usually performed within one week after surgery. This baseline study may also be approved as an outpatient if not performed in the hospital prior to discharge.

References


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<td>CD-5.5: Cardiac MRI – Evaluation of Pericardial Effusion or Diagnosis of Pericardial Tamponade</td>
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</table>
CD-5.1: Cardiac MRI – Coding

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<thead>
<tr>
<th>Cardiac Imaging Procedure Codes</th>
<th>CPT®</th>
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</thead>
<tbody>
<tr>
<td>Cardiac magnetic resonance imaging for morphology and function without contrast</td>
<td>75557</td>
</tr>
<tr>
<td>Cardiac magnetic resonance imaging for morphology and function without contrast; with stress imaging</td>
<td>75559</td>
</tr>
<tr>
<td>Cardiac magnetic resonance imaging for morphology and function without and with contrast and further sequences</td>
<td>75561</td>
</tr>
<tr>
<td>Cardiac magnetic resonance imaging for morphology and function without and with contrast and further sequences; with stress imaging</td>
<td>75563</td>
</tr>
<tr>
<td>Cardiac magnetic resonance imaging for velocity flow mapping (List separately in addition to code for primary procedure)</td>
<td>+75565</td>
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</tbody>
</table>

- Only one procedure code from the set (CPT® 75557- CPT® 75563) should be reported per session.
- Only one flow velocity measurement (CPT® +75565) should be reported per session when indicated.
  - Requests for cardiac MRI that contain more than one cardiac/chest MRI CPT® Code must be forwarded for Medical Director review.

CD-5.2: Cardiac MRI – Indications (excluding Stress MRI)

- Assess myocardial viability (to differentiate hibernating myocardium from scar) when necessary to determine if revascularization should be performed (CPT® 75561)
- Assessment of global ventricular function and mass if a specific clinical question is left unanswered by a recent echocardiogram and results will affect patient management (CPT® 75557 or CPT® 75561). Particularly useful in evaluating:
  - Cardiomyopathy (ischemic, diabetic, hypertrophic, or muscular dystrophy)
  - Noncompaction
  - Amyloid heart disease
  - Post cardiac transplant
  - Hemochromatosis
  - Post transfusion hemosiderosis
  - Hypertrophic heart disease
  - Myocarditis, cardiac aneurysm, trauma, and contusions
  - Monitoring cancer chemotherapy effect on the heart (especially if an accurate assessment of right ventricular function is documented as necessary).
- Pre and postoperative congenital heart disease assessment (e.g. Tetralogy of Fallot, patent ductus arteriosus, platypnea, atrial septal defects, restrictive VSD, anomalous pulmonary arteries or veins or anomalous coronary arteries) (CPT® 75557 or CPT® 75561).
  - Chest MRA (CPT® 71555) may be added if the aorta or pulmonary artery need to be visualized beyond the root.
- Report CPT® +75565 in conjunction with CPT® 75557 or CPT® 75561, only if there is a need to clarify findings on a recent echocardiogram and cardiac Doppler study.

- Chest MRA alone (CPT® 71555) can be performed in certain situations (e.g. suspected dissection, coarctation, known or suspected aortic aneurysm).

- Coarctation of the aorta
  - Follow-up (surveillance) imaging after repair of coarctation:
    - **Adults**: chest MRA (CPT® 71555) every 2 to 3 years and before and after any intervention for re-coarctation
    - **Infants and children**: ECHO every month for several months, then ECHO every 6 months to one year thereafter

- Arrhythmogenic right ventricular dysplasia or arrhythmogenic cardiomyopathy (ARVD/ARVC) suspicion (including presyncope or syncope, established criteria for ARVD (CPT® 75557 or CPT® 75561).

- Differentiate constrictive pericarditis from restrictive cardiomyopathy (CPT® 75561).

- Evaluate cardiac tumor or mass when echocardiogram is inconclusive.

- Initial evaluation for cardiac sarcoidosis.

- Anomalous coronary arteries: Cardiac MRI (CPT® 75561) or CCTA (CPT® 75574) is much better at detecting this than conventional angiography.

- Evaluate for iron overload due to conditions requiring frequent blood transfusions (i.e. sickle cell, thalassemia, hemochromatosis, etc.) (CPT® 75557).
CD-5.3: Cardiac MRI – Indications for Stress MRI

- For indications for Stress MRI see CD-1.4: Stress Testing with Imaging - Indications
- Also, if a nuclear perfusion (MPI) stress test was performed and was equivocal, a stress MRI is appropriate.

CD-5.4: Cardiac MRI - Aortic Root and Proximal Ascending Aorta

- See CH-29: Thoracic Aorta in the Chest Imaging Guidelines

CD-5.5: Cardiac MRI - Evaluation of Pericardial Effusion or Diagnosis of Pericardial Tamponade

- Contrast-enhanced cardiac MRI (CPT® 75561) is useful for evaluating pericarditis, neoplastic and other effusion, tamponade or myocardial infiltration if a specific clinical question is left unanswered by echocardiogram or another recent imaging study.

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   http://www.jacr.org/article/S1546-1440(06)00337-1/fulltext

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<tr>
<td>CD-6.2: Cardiac PET – Perfusion - Indications (CPT® 78491 and CPT® 78492)</td>
</tr>
<tr>
<td>CD-6.3: Cardiac PET – Absolute Quantitation of Myocardial Blood Flow (CPT® 0482T)</td>
</tr>
<tr>
<td>CD-6.4: Cardiac PET – Metabolic – Indications (CPT® 78459)</td>
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</tbody>
</table>
CD-6.1: Cardiac PET – Coding

<table>
<thead>
<tr>
<th>Cardiac PET</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial imaging, PET, <em>metabolic</em> evaluation</td>
<td>78459</td>
</tr>
<tr>
<td>Myocardial imaging, PET, <em>perfusion</em>; single study at rest or stress</td>
<td>78491</td>
</tr>
<tr>
<td>Myocardial imaging, PET, <em>perfusion</em>; multiple studies at rest and/or stress</td>
<td>78492</td>
</tr>
<tr>
<td>Absolute quantitation of myocardial blood flow, PET, rest and stress</td>
<td>+0482T</td>
</tr>
</tbody>
</table>

- 3D rendering, (CPT® 76376/CPT® 76377), should not be billed in conjunction with PET.
- Separate codes for such related services as treadmill testing (CPT® 93015/CPT® 93018) and radiopharmaceuticals should be assigned in addition to perfusion PET. These services are paid according to each individual payor.
- 0482T is an add-on code for CPT® 78491 or CPT® 78492 and is considered investigational

CD-6.2: Cardiac PET – Perfusion – Indications (CPT® 78491 and CPT® 78492)

- Meets all of the criteria for an imaging stress test and additionally any one of the following:
  - Individual is obese (for example BMI >40 kg/m²) or
  - Individual has large breasts or implants
- Equivocal nuclear perfusion (MPI) stress test
  - Routine use in post heart transplant assessment of transplant CAD
- CMS (Medicare) does not cover reporting for wall motion and ejection fraction performed in conjunction with cardiac perfusion PET. There is not a separate CPT® or HCPCS code associated with these specific services. eviCore and their partner health plans adhere to the CMS policy unless explicitly stated in the health plan’s coverage policy.

CD-6.3: Cardiac PET – Absolute Quantitation of Myocardial Blood Flow (CPT® 0482T)

- Performance of quantitation of myocardial blood flow by Cardiac PET is currently non-standardized between different vendor products.
- Absolute quantitation of myocardial blood flow is considered experimental, investigational and/or unproven (EIU).

CD-6.4: Cardiac PET – Metabolic – Indications (CPT® 78459)

- To determine myocardial viability when a previous study has shown significant left ventricular dysfunction when under consideration for revascularization, or
- To identify and monitor response to therapy for established or strongly suspected cardiac sarcoid. This study may be performed in conjunction with a Cardiac PET perfusion examination, single study, CPT® 78491 or MPI SPECT CPT® 78451
References


CD-7: Diagnostic Heart Catheterization

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## CD-7.1: Diagnostic Heart Catheterization – Code Sets

<table>
<thead>
<tr>
<th>Cardiac Cath Procedures</th>
<th>CPT®</th>
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<tbody>
<tr>
<td>Congenital Heart Disease Code “Set”</td>
<td>93530-93533</td>
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<tr>
<td>Right Heart Catheterization (CHD)</td>
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</tr>
<tr>
<td>Right/Left Heart Catheterization (CHD)</td>
<td>93531</td>
</tr>
<tr>
<td>Right/Left Heart Catheterization (CHD-TS)</td>
<td>93532</td>
</tr>
<tr>
<td>Right/Left Heart Catheterization (CAD-ASD)</td>
<td>93533</td>
</tr>
<tr>
<td>Anomalous coronary arteries, patent foramen ovale, mitral valve prolapse, and bicuspid aortic valve</td>
<td>93451-93464, 93566-93568</td>
</tr>
<tr>
<td>RHC without LHC or coronaries</td>
<td>93451</td>
</tr>
<tr>
<td>LHC without RHC or coronaries</td>
<td>93452</td>
</tr>
<tr>
<td>RHC and retrograde LHC without coronaries</td>
<td>93453</td>
</tr>
<tr>
<td>Native coronary artery catheterization;</td>
<td>93454</td>
</tr>
<tr>
<td>with bypass grafts</td>
<td>93455</td>
</tr>
<tr>
<td>with RHC</td>
<td>93456</td>
</tr>
<tr>
<td>with RHC and bypass grafts</td>
<td>93457</td>
</tr>
<tr>
<td>with LHC</td>
<td>93458</td>
</tr>
<tr>
<td>with LHC and bypass grafts</td>
<td>93459</td>
</tr>
<tr>
<td>with RHC and LHC</td>
<td>93460</td>
</tr>
<tr>
<td>with RHC and LHC and bypass grafts</td>
<td>93461</td>
</tr>
<tr>
<td>LHC by transseptal or apical puncture</td>
<td>+93462</td>
</tr>
<tr>
<td>Angiography of noncoronary arteries and veins performed as a distinct service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select appropriate codes from the Radiology and Vascular Injection Procedures sections.</td>
</tr>
</tbody>
</table>
**CD-7.2: Diagnostic Heart Catheterization – Coding Notes**

<table>
<thead>
<tr>
<th>Cardiac catheterization (CPT® 93451-CPT® 93461) includes all “road mapping” angiography necessary to place the catheters, including any injections and imaging supervision, interpretation, and report.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac catheterization (CPT® 93452-CPT® 93461) (for all conditions other than congenital heart disease) includes contrast injections, imaging supervision, interpretation, and report for imaging typically performed.</td>
</tr>
<tr>
<td>Catheter placements in native coronaries or bypass grafts (CPT® 93454-CPT® 93461) include intraprocedural injections for bypass graft angiography, imaging supervision, and interpretation.</td>
</tr>
<tr>
<td>Injection codes CPT® 93563-CPT® 93565 should not be used in conjunction with CPT® 93452-CPT® 93461.</td>
</tr>
<tr>
<td>Codes CPT® 93451-CPT® 93461 do not include contrast injections and imaging supervision, interpretation, and report for imaging that is separately identified by the following specific procedure codes: CPT® 93566, CPT® 93567 and CPT® 93568.</td>
</tr>
<tr>
<td>Separate diagnostic cardiac catheterization codes should only be assigned in conjunction with interventional procedures in the following circumstances:</td>
</tr>
<tr>
<td>◆ No prior or recent diagnostic catheterization is available to guide therapy</td>
</tr>
<tr>
<td>◆ Individual’s condition has significantly changed since the last diagnostic cath</td>
</tr>
<tr>
<td>◆ The treatment plan may be affected</td>
</tr>
<tr>
<td>◆ Other vessels may be identified for treatment</td>
</tr>
<tr>
<td>◆ Further establishment of a diagnosis from a non-invasive study is necessary</td>
</tr>
</tbody>
</table>

**CD-7.3: Diagnostic Left Heart Catheterization (LHC)**

- These guidelines apply to individuals with stable conditions and who are not in the acute setting (acute coronary syndrome) or patients with unstable angina. Individuals in acute settings or with unstable angina should be handled as medical emergencies.
- Incidental angiography can be performed:
  - Iliac/femoral artery angiography when dissection or obstruction to the passage of the catheter/guidewire is encountered.
  - Renal arteriography if the criteria outlined in the Abdomen Imaging Guidelines are met see **PVD-6.5: Renovascular Hypertension**.
- Identifying disease for which invasive procedures have been shown to prolong survival:
  - Left main coronary artery disease plus right coronary artery disease plus left ventricular dysfunction.
  - Triple vessel coronary artery disease plus left ventricular dysfunction.
- Unstable angina (new, accelerating, or worsening symptoms that are suggestive of unstable angina), even in the absence of noninvasive cardiac testing.
- Symptomatic patients with a high pretest probability of CAD.
Angina that is unresponsive to optimized medical therapy see **CD-1.1: General Issues – Cardiac** and for which invasive procedures are needed to provide pain relief.

- Left ventricular dysfunction (congestive heart failure) in patients suspected of having coronary artery disease.
- Ventricular fibrillation or ventricular tachycardia where the etiology is unclear.
- Unheralded syncope (not near syncope).
- Recent noninvasive cardiac testing was equivocal, unsuccessful in delineating the clinical problem, or led to a conclusion that intervention is indicated for the following conditions:
  - Suspicion of cardiomyopathy, endocarditis, or myocarditis
  - Significant/serious ventricular arrhythmia
  - Evaluating progression of known CAD when symptoms are persistent or worsening
  - An intermediate or large amount of myocardium (>5%) may be in jeopardy
  - Evaluation of coronary grafts
  - Evaluation of previously placed coronary artery stents
  - Evaluation of structural disease
- Ruling out coronary artery disease prior to planned non-coronary cardiac or great vessel surgery (i.e. cardiac valve surgery, aortic dissection, aortic aneurysm, congenital disease repair such as atrial septal defect, etc.).
- Assessment for accelerated coronary artery disease associated with cardiac transplantation.
- Pre-organ transplant (non-cardiac). Some institutions perform a heart cath as part of their initial evaluation protocol. Others use an imaging stress test for evaluation. Either is appropriate and can be approved but **NOT** both.
- Valvular heart disease when there is a discrepancy between the clinical findings (history, physical exam, and non-invasive test results) or valvular surgery is being considered.
- Suspected pericardial disease.
- A history of prior cardiac transplant, per transplant center protocol

**CD-7.4: Right Heart Catheterization (RHC)**

**CD-7.4.1: General information RHC**

- It is performed most commonly from the femoral vein, less often through the subclavian or internal jugular veins and inter-atrial septal puncture approach.
- It includes a full oximetry for detection and quantification of shunts.
- Pressure measurements are made and are done simultaneously with aortic and left ventricular pressures.
- Cardiac outputs are calculated by several techniques including thermodilution.
CD-7.4.2: Diagnostic Right Heart Catheterization – Indications

- Atrial septal defect (ASD) including shunt detection and quantification
- Ventricular septal defect (VSD) including shunt detection and quantification
- Patent foramen ovale (PFO)
- Anomalous pulmonary venous return
- Congenital defects including persistent left vena cava
- Pulmonary hypertension
- Pericardial diseases (constrictive or restrictive pericarditis)
- Valvular disease
- Right heart failure
- Left heart failure
- Preoperative evaluation for valve surgery
- Newly diagnosed or worsening cardiomyopathy
- During a left heart cath where the etiology of the symptoms remains unclear.
- Pre-lung transplant to assess pulmonary pressures
- Uncertain intravascular volume status with an unclear etiology
- Assessment post-cardiac transplant
  - For routine endomyocardial biopsy
  - Assess for rejection
  - Assess pulmonary artery pressure
  - Can be done per the institution protocol or anytime organ rejection is suspected and biopsy is needed for assessment
- Evaluation of right ventricular morphology.
- Suspected arrhythmogenic right ventricular dysplasia.

CD-7.5: Combined Right and Left Heart Catheterization Indications

- Preoperative evaluation for valve surgery
- Newly diagnosed or worsening cardiomyopathy
- If the major component of the patient symptoms is dyspnea, and the indications for CD-7.3: Diagnostic Left Heart Catheterization are also met
- If indications are met according to CD-7.3: Diagnostic Left Heart Catheterization (LHC) and CD-7.4: Right Heart Catheterization, then a combination heart catheterization may be appropriate.
CD-7.6: Planned (Staged) Coronary Interventions

- The CPT® codes for percutaneous coronary interventions (PCI) include the following imaging services necessary for the procedure(s):
  - Contrast injection, angiography, ‘roadmapping’, and fluoroscopic guidance
  - Vessel measurement
  - Angiography following coronary angioplasty, stent placement, and atherectomy
- Separate codes for these services should not be assigned in addition to the PCI code/s because the services are already included.
- A repeat diagnostic left heart catheterization is not medically necessary when the patient is undergoing a planned staged percutaneous coronary intervention.
- CPT® 93530 to 93533 are appropriate for invasive evaluation of congenital heart disease.

References

CD-8: Pulmonary Artery and Vein Imaging

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CD-8.2: Pulmonary Vein Imaging – Indications  57
**CD-8.1: Pulmonary Artery Hypertension (PAH) - Indications**

- CT or CTA or MRA of the pulmonary arteries (CPT® 71260 or CPT® 71275 or CPT® 71555) is useful in the assessment of PAH, especially if there is suspicion for recurrent pulmonary emboli.
- In the absence of a clinical change, follow-up imaging for PAH is not indicated.
- Also see:
  - PVD-5: Pulmonary Artery Hypertension in the Peripheral Vascular Disease Imaging Guidelines.
  - CH-25: Pulmonary Embolism (PE) in the Chest Imaging Guidelines.

**CD-8.2: Pulmonary Vein Imaging – Indications**

- Cardiac MRI (CPT® 75557 or CPT® 75561 ), Chest MRV (CPT® 71555), Chest CTV (CPT® 71275), or Cardiac CT (CPT® 75572) can be performed to evaluate the anatomy of the pulmonary veins:
  - Prior to an ablation procedure performed for atrial fibrillation.
  - Post-procedure between 3-6 months after ablation because of a 1% to 2% incidence of asymptomatic pulmonary vein stenosis.
    - If no pulmonary vein stenosis is present, no further follow-up imaging is required.
    - If pulmonary vein stenosis is present on imaging following ablation and symptoms of pulmonary vein stenosis (usually shortness of breath) are present, can be imaged at 1, 3, 6, and 12 months.
  - The majority (81%) of pulmonary vein stenosis remain stable over 1 year. Progression occurs in 8.8% and regression occurs in a small percentage.

**References**

doi:10.1161/circulationaha.105.602250.


doi:10.1016/s0002-9343(01)00797-5.

doi:10.1016/j.jacc.2009.01.004
### CD-9: Congestive Heart Failure

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| CD-9.3: Myocardial Sympathetic Innervation Imaging | 60 |
CD-9.1: CHF – Imaging

- Congestive heart failure, including post-cardiac transplant failure:
  - An echocardiogram is generally the first study to be done after the clinical evaluation of the patient who is suspected of having heart failure.
  - If the ECHO is limited or does not completely answer the question, then further evaluation with MUGA, cardiac MRI or cardiac CT may be appropriate.
  - A stress test to assess for CAD may be appropriate. Follow stress testing guideline: **CD-1.4: Stress Testing with Imaging-Indications**

- Arteriovenous fistula with “high output” heart failure:
  - CT Chest with contrast (CPT® 71260 ) and/or CT Abdomen and/or CT Pelvis with contrast (CPT® 74160 or CPT® 72193 or CPT® 74177) OR
  - CTA Chest (CPT® 71275 ) and/or CTA Abdomen and/or CTA Pelvis (CPT® 74175 or CPT® 72191 or CPT® 74174) OR
  - MRI Chest and/or MRI Abdomen and/or MRI Pelvis without and with contrast (CPT® 71552 and/or CPT® 74183 and/or CPT® 72197) OR
  - MRA Chest and/or MRI Abdomen and/or MRI Pelvis (CPT® 71555 and/or CPT® 74185 and/or CPT® 72198)

- Right-sided congestive heart failure can be a manifestation of pulmonary hypertension or serious lung disease.
  - Chest CT (CPT® 71260) or chest CTA (CPT® 71275) to evaluate for recurrent pulmonary embolism

CD-9.2: Palliative Care in patients with heart failure

- There are currently no widely accepted published guidelines regarding end of life care for end-stage heart failure patients who are not candidates for advanced heart failure treatments such as left ventricular assist devices, heart pumps or heart transplantation. Consideration for palliative care services should be given to such patients.

CD-9.3: Myocardial Sympathetic Innervation Imaging

- In heart failure, the sympathetic nervous system is activated in order to compensate for the decreased myocardial function. Initially, this is beneficial, however, long-term this compensatory mechanism is detrimental and causes further damage.

- Markers have been developed, using radioactive iodine, in an attempt to image this increased myocardial sympathetic activity. Currently, AdreView™ (Iodine-123 meta-iodobenzylguanidine), is the only FDA-approved imaging agent available for this purpose. eviCore currently considers AdreView™ to be experimental and investigational.

- The AMA has established the following set of Category III codes to report these studies:
  - **0331T** - Myocardial sympathetic innervation imaging, planar qualitative and quantitative assessment
  - **0332T** - Myocardial sympathetic innervation imaging, planar qualitative and quantitative assessment; with tomographic SPECT.
References


CD-10.1: Cardiac Trauma – Imaging

Any of the following can be used to evaluate cardiac or aortic trauma:
- Echocardiogram (TTE, TEE)
- Cardiac MRI (CPT® 75557, CPT® 75561, and CPT® 75565)
- Cardiac CT (CPT® 75572)
- CCTA (CPT® 75574)
- Chest CTA (CPT® 71275)

References

<table>
<thead>
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<th>CD-11: CAD</th>
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<tbody>
<tr>
<td>CD-11.1: CAD General</td>
<td>65</td>
</tr>
</tbody>
</table>
CD-11.1: CAD General

- Risk factor modification
  - Statins remain the mainstay of medical treatment for cardiovascular risk reduction with an abundance of scientific evidence regarding their efficacy.
  - PCSK9 drugs are a new addition to the treatment of hyperlipidemia
    - Refer to specialty drug coverage criteria for these drugs.
<table>
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<tr>
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</tr>
</tbody>
</table>
CD-12.1: Oncologic Indications for Cancer Therapeutics-Related Cardiac Dysfunction (CTRCD)

- If an echocardiogram is not appropriate, MUGA evaluation of LV ejection fraction and wall motion analysis are appropriate for any of the following chemotherapy-related indications:
  - Determine LV function in patients on cardiotoxic chemotherapeutic drugs.
    - The time frame should be determined by the provider, but no more often than baseline and at every 6 weeks.
    - May repeat every 4 weeks if cardiotoxic chemotherapeutic drug is withheld for significant left ventricular cardiac dysfunction
  - If the LVEF is < 50% on echocardiogram than follow up can be done with MUGA at appropriate intervals.
  - Echocardiography vs. MUGA for Determining Left Ventricular Ejection Fraction (LVEF) in Patients on Cardiotoxic Chemotherapy Drugs:
    - eviCore guidelines support using **echocardiography rather than MUGA** for the determination of LVEF and/or wall motion EXCEPT in one of the circumstances described previously in **CD-3.4: MUGA Study – Cardiac Indications**.

Practice Note

- Advantages of Echocardiography in comparison to MUGA in patients on cardiotoxic chemotherapy:
  - No ionizing radiation
  - No IV access required when echo contrast is not used
  - Allows view of the pericardium to look for effusion
  - Allows estimate of pulmonary pressure
  - May allow visualization of a clot or tumor in the Inferior Vena Cava (IVC) and/or the right heart

References


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**Abbreviations for Chest Guidelines**

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<th>Description</th>
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<tr>
<td>AAA</td>
<td>abdominal aortic aneurysm</td>
</tr>
<tr>
<td>ACE</td>
<td>angiotensin-converting enzyme</td>
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<tr>
<td>AVM</td>
<td>arteriovenous malformation</td>
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<tr>
<td>BI-RADS</td>
<td>Breast Imaging Reporting and Database System</td>
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<tr>
<td>BP</td>
<td>blood pressure</td>
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<tr>
<td>BRCA</td>
<td>tumor suppressor gene</td>
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<tr>
<td>CAD</td>
<td>computer-aided detection</td>
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<tr>
<td>CBC</td>
<td>Complete blood count</td>
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<tr>
<td>COPD</td>
<td>chronic obstructive pulmonary disease</td>
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<tr>
<td>CT</td>
<td>computed tomography</td>
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<tr>
<td>CTA</td>
<td>computed tomography angiography</td>
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<tr>
<td>CTV</td>
<td>computed tomography venography</td>
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<td>DCIS</td>
<td>ductal carcinoma in situ</td>
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<tr>
<td>DVT</td>
<td>deep venous thrombosis</td>
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<tr>
<td>ECG</td>
<td>electrocardiogram</td>
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<tr>
<td>EM</td>
<td>electromagnetic</td>
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<tr>
<td>EMG</td>
<td>electromyogram</td>
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<tr>
<td>FDA</td>
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<tr>
<td>FDG</td>
<td>fluorodeoxyglucose</td>
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<td>FNA</td>
<td>fine needle aspiration</td>
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<td>GERD</td>
<td>gastroesophageal reflux disease</td>
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<td>GI</td>
<td>gastrointestinal</td>
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<td>HRCT</td>
<td>high resolution computed tomography</td>
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<td>IPF</td>
<td>idiopathic pulmonary fibrosis</td>
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<td>LCIS</td>
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<td>LFTP</td>
<td>localized fibrous tumor of the pleura</td>
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<td>MRA</td>
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<td>magnetic resonance imaging</td>
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<td>magnetic resonance venography</td>
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<td>NCV</td>
<td>nerve conduction velocity</td>
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<td>PET</td>
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<tr>
<td>PFT</td>
<td>pulmonary function tests</td>
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<td>PPD</td>
<td>purified protein derivative of tuberculin</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<td>---------</td>
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<tr>
<td>RODEO</td>
<td>Rotating Delivery of Excitation Off-resonance MRI</td>
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<tr>
<td>SPN</td>
<td>solitary pulmonary nodule</td>
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<tr>
<td>SVC</td>
<td>superior vena cava</td>
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</table>
CH-1: General Guidelines

A current clinical evaluation (within 60 days) is required prior to considering advanced imaging.
- A clinical evaluation should include the following:
  - A relevant history and physical examination.
  - Appropriate laboratory studies and non-advanced imaging modalities, such as plain x-ray or ultrasound.
- Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation.

CH-1.1: General Guidelines – Chest X-Ray

- A recent chest x-ray (generally within the last 60 days) that has been over read by a radiologist would be performed in many of these cases prior to considering advanced imaging.¹²
  - Identify and compare with previous chest films to determine presence and stability.
  - Chest x-ray can help identify previously unidentified disease and may direct proper advanced imaging for such conditions as:
    - Pneumothorax, (See CH-19: Pneumothorax/Hemothorax).
    - Pneumomediastinum, (See CH-19: Pneumothorax/Hemothorax).
    - Fractured ribs, (See CH-22: Chest Wall Mass).
    - Acute and chronic infections, and (See CH-13: Pneumonia and CH-14: Other Chest Infections).
- Malignancies.
- Exceptions to preliminary chest x-ray may include such conditions as:
  - Supraclavicular lymphadenopathy (See CH-2.1: Supraclavicular Region).
  - Known Bronchiectasis (See CH-7: Bronchiectasis).
  - Suspected Interstitial lung disease (See CH-11: Interstitial Disease).
  - Positive PPD or tuberculosis (See CH-14: Other Chest Infections).
  - Suspected Pulmonary AVM (See CH-26: Pulmonary Hypertension).

CH-1.2: General Guidelines – Chest Ultrasound

- Chest ultrasound (CPT® 76604) includes transverse, longitudinal, and oblique images of the chest wall with measurements of chest wall thickness, and also includes imaging of the mediastinum.
  - Chest ultrasound: CPT® 76604.
  - Breast ultrasound.
    - CPT® 76641: unilateral, complete.
    - CPT® 76642: unilateral, limited.
  - CPT® 76641 and CPT® 76642 should be reported only once per breast, per imaging session.
  - Axillary ultrasound: CPT® 76882 (unilateral); if bilateral, can be reported as CPT® 76882 x 2.
CH-1.3: General Guidelines – Chest CT

- Intrathoracic abnormalities found on chest x-ray, fluoroscopy, abdominal CT scan, or other imaging modalities may be further evaluated with chest CT with contrast (CPT® 71260).
  - Abnormalities not addressed in these guidelines should be sent for Medical Review

- Chest CT without contrast (CPT® 71250) can be used for the following:
  - Patient has contraindication to contrast.
  - Follow-up of pulmonary nodule(s).
  - High Resolution CT (HRCT).
  - Low-dose chest CT (CPT® G0297) See CH-34: Lung Cancer Screening.

- Chest CT without and with contrast (CPT® 71270) does not add significant diagnostic information above and beyond that provided by chest CT with contrast, unless a question regarding calcification, most often within a lung nodule, needs to be resolved.¹

**Chest CT Coding Notes:**

- High resolution chest CT should be reported only with an appropriate code from the set CPT® 71250-CPT® 71270.
  - No additional CPT® codes should be reported for the “high resolution” portion of the scan. The “high resolution” involves additional slices which are not separately billable.

CH-1.4: General Guidelines – Chest CTA (CPT® 71275)

- Chest CTA (CPT® 71275) can be considered for suspected Pulmonary Embolism and Thoracic Aortic disease.
  - CTA prior to minimally invasive or robotic surgery (See CD-4.8: Transcatheter Aortic Valve Replacement (TAVR) in the Cardiac Imaging Guidelines).

CH-1.5: General Guidelines – Chest MRI without and with Contrast (CPT® 71552)

- Indications for chest MRI are infrequent and may relate to concerns about CT contrast such as renal insufficiency or contrast allergy. MRI may be indicated:
  - Clarification of some equivocal findings on previous imaging studies, which are often in the thymic mediastinal region or determining margin (vascular/soft tissue) involvement with tumor and determined on a case-by-case basis.
    - Certain conditions include:
      - Chest muscle tendon injuries (MS-11: Muscle/Tendon Unit Injuries/Diseases).
      - Brachial plexopathy (PN-4: Brachial Plexus).
      - Thymoma (ONC-10.5: Thymoma).
**CH-1.6: General Guidelines – Nuclear Medicine**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<td>78597</td>
<td>Quantitative differential pulmonary perfusion, including imaging when performed</td>
</tr>
<tr>
<td>78598</td>
<td>Quantitative differential pulmonary perfusion and ventilation (e.g., aerosol or gas), including imaging when performed</td>
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**References**

# CH-2: Lymphadenopathy

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CH-2.1: Supraclavicular Region

- Ultrasound (CPT® 76536) is the initial study for palpable or suspected lymphadenopathy.
  - Allows simultaneous ultrasound-guided fine needle aspiration (FNA) (CPT® 76942).
  - If ultrasound is indeterminate, neck CT with contrast (CPT® 70491) or chest CT with contrast (CPT® 71260) can be performed.
  - See NECK-1: General in the Neck Imaging Guidelines.

CH-2.2: Axillary Lymphadenopathy

- There is no evidence-based support for advanced imaging of clinically evidenced axillary lymphadenopathy without biopsy.²,³ Most axillary adenopathy is infectious in primary care settings. Metastatic axillary involvement from a lung or chest primary is highly unusual (CT chest not often warranted).

- Localized axillary lymphadenopathy should prompt:
  - Ultrasound directed core needle biopsy or surgical excisional biopsy of the most abnormal lymph node if condition persists or malignancy suspected.
  - Search for adjacent hand or arm injury or infection, and
  - 3-4 week observation if benign clinical picture, and
  - Excisional or ultrasound directed core needle biopsy of most abnormal lymph node if condition persists or malignancy suspected.
  - No advanced imaging indicated.

- Generalized axillary lymphadenopathy should prompt:
  - Ultrasound directed core needle biopsy or surgical excisional biopsy of the most abnormal lymph node if condition persists or malignancy suspected.
  - Diagnostic work-up, including serological tests, for systemic diseases, and
  - Excisional biopsy of most abnormal lymph node if uncertainty persists.

- Occult Primary Cancer in axillary lymph node(s):
  - See ONC-31: Metastatic Cancer, Carcinoma of Unknown Primary Site, and Other Types of Cancer.

Axillary Lymphadenopathy – Practice Notes

Adenocarcinoma is the most common histology, with breast cancer seen most often; non-palpable breast cancer and axillary metastases accounts for less than 0.5% of all breast cancers. Carcinomas of the lung, thyroid, stomach, colon, rectum, and pancreas have the potential to spread to axillary lymph nodes, but these metastases are rarely the first manifestations of disease.
**CH-2.3: Mediastinal Lymphadenopathy**

- Chest CT with contrast (CPT® 71260) can be performed if mediastinal abnormalities are detected on a chest x-ray (over read by a radiologist) or other non-dedicated advanced chest imaging.
  - Follow-up chest CT (CPT® 71260) can be performed after 4 weeks if:
    - Enlarged lymph nodes are in the mediastinum with no other thoracic abnormalities; and
    - Low risk or no clinical suspicion for malignancy.
    - Thereafter, stability does not require further advanced imaging.
  - Further evaluations
    - Lymph node biopsy (see methods below) should be considered for:
      - Persistent lymphadenopathy on follow-up chest CT; or
      - Suspected malignancy.

**Practice Notes**

- Lymphadenopathy from neoplasms as well as from benign sources of inflammation can result in a positive PET scan. Therefore, the use of PET may not be helpful prior to histologic diagnosis.
- Less invasive methods of mediastinal biopsies are CT or ultrasound directed percutaneous biopsy, transbronchial biopsy, transbronchial biopsy using endobronchial ultrasound, and endoscopic ultrasound-guided FNA.
- More invasive and traditional methods are mediastinoscopy or thoracoscopy/thoracotomy.

**References**

CH-3.1: Cough

Initial evaluation should include a recent chest x-ray after the current episode of cough started or changed.\(^1,2\)
- In addition all medications known to cause coughing (e.g. ACE inhibitors, Sitagliptin) should be discontinued.\(^1,2,3\)

If the initial chest x-ray is without abnormalities and all medications known to cause coughing have been discontinued, a chest CT (either with contrast [CPT\(^\circledR\) 71260] or without contrast [CPT\(^\circledR\) 71250]) can be performed for the following:
- Non-Smoker cough after the following sequence for a total 3 week trial and investigation (all)\(^4\):
  - Antihistamine and decongestant treatment.\(^1,2\)
  - Bronchoprovocation challenge (e.g. methacholine challenge, exhaled nitric oxide test) and spirometry should be performed to rule out asthma.\(^1\)
  - Empiric trial of corticosteroids.\(^1,2\)
  - Treatment of gastroesophageal reflux disease (GERD).\(^1,2\)
    - See HD-29: Sinusitis.
- Current or past cigarette smokers with either\(^4\):
  - New cough lasting greater than 2 weeks.
  - Changed chronic cough in worsening frequency or character
    - See CH-6: Hemoptysis.
  - CT Maxillofacial without contrast (CPT\(^\circledR\) 70486) or limited sinus CT without contrast (CPT\(^\circledR\) 76380) can be considered in those with suspicion of Upper Airway Cough Syndrome (UACS) secondary to rhinosinus disease\(^4\)
- For any abnormalities present on the initial chest x-ray, advanced chest imaging can be performed according to the relevant Chest Imaging Guidelines section\(^1\).

Practice Notes

- The resolution of cough usually will occur at a median time of 26 days of stopping use of the angiotensin-converting enzyme (ACE) inhibitor drug.\(^2\) Smoking cessation is “almost always effective” in resolving cough in smoker.\(^2\)
- It should be realized that cough after URI (Upper Respiratory Infection) can typically last beyond 2-3 weeks.\(^3\)

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</table>
CH-4: Non-Cardiac Chest Pain

See the following guidelines:
- **CH-25: Pulmonary Embolism (PE).**
- **CH-29.1: Aortic Dissection.**
- **CD-1: General Guidelines.**

“Evidence is not conclusive whether Triple-rule-out CT (CAD, PE, and AD) will improve efficiency of patient management” with acute chest pain.¹

MRI is not supported in the evaluation of chest pain.

**CH-4.1: Non-Cardiac Chest Pain - Imaging**

Initial evaluation should include a chest x-ray.¹²
- If x-ray is abnormal, chest CT with contrast (CPT® 71260) or CTA chest with contrast (CPT® 71275) can be performed.¹²³⁴
- If x-ray is normal, patient should undergo evaluation of other possible causes of pain prior to advanced imaging (CT chest with contrast or CTA chest with contrast) including:¹²³⁴
  - Cardiac evaluation¹² (See Cardiac imaging guidelines **CD-1: General Guidelines**)
  - GI any one of the following:
    - Trial of anti-reflux medication, or pH probe, or esophageal manometry¹ or
    - Barium swallow or endoscopy
  - Either a barium swallow, esophageal pH monitoring, manometry, or endoscopy should be done in all after cardiac causes have been ruled out since GERD is the cause in almost 60%
  - Pulmonary Function Test (PFT’s)¹²
- Chest CT with contrast (CPT® 71260) can be performed if persistent:
  - The initial chest x-ray reveals no abnormalities; and either
    - Sickle cell disease², or
    - Suspected lung mass in a patient with chest pain, cough, and weight loss.²

**CH-4.2: Costochondritis/Other Musculoskeletal Chest Wall Syndrome**

Costochondritis or other suggested musculoskeletal chest wall syndrome does not require advanced imaging (CT or MRI) unless it meets other criteria in these guidelines.

Costochondritis can be readily diagnosed with palpation tenderness and/or hooking maneuver and imaging is non-specific.³

**Practice Notes**
Differential diagnosis of non-cardiac nonspecific chest pain includes aortic, pulmonary, gastrointestinal (GI), or musculoskeletal pathologies. Chest x-ray could identify pneumothorax, pneumomediastinum, fractured ribs, acute and chronic infections, and malignancies.¹
References
CH-5: Dyspnea/Shortness of Breath

CH-5.1: Dyspnea/Shortness of Breath 18
CH-5.2: Pre-Operative Assessment 18
CH-5.1: Dyspnea/Shortness of Breath

Dyspnea is the subjective experience of breathing discomfort. Initial evaluation should include a recent chest x-ray.\(^1,2\)
- If x-ray is abnormal, chest CT without contrast (CPT\(^\circledR\) 71250) can be performed.\(^1,2\)
- If the initial chest x-ray is indeterminate, chest CT without contrast (CPT\(^\circledR\) 71250, including HRCT), or chest CT with contrast (CPT\(^\circledR\) 71260) can be performed if the following evaluations have been conducted and are indeterminate:\(^2\)
  - ECG, echocardiogram or stress testing,\(^2\) and
  - Pulse oximetry and pulmonary function studies (PFT’s),\(^2\)

CH-5.2: Pre-Operative Assessment

“Split Function Studies” (CPT\(^\circledR\) 78597-Quantitative Differential Pulmonary Perfusion, Including Imaging When Performed or CPT\(^\circledR\) 78598-Quantitative Differential Pulmonary Perfusion and Ventilation (e.g., Aerosol or Gas), Including Imaging When Performed) can be considered for pre-operative assessment prior to planned segmental, lobar or lung removal.\(^3,4\)

- If pulmonary embolus (PE) is suspected, See CH-25: Pulmonary Embolism (PE).

References
CH-6.1: Hemoptysis

- CTA chest (CPT® 71275) may be performed after:
  - Abnormal chest x-ray, or
  - No chest x-ray needed if any of the following:
    - High risk for malignancy with >40 years of age and >30 pack-year smoking history, or
    - Persistent/recurrent with >40 years of age or >30 pack year smoking history, or
    - Massive hemoptysis (≥30 cc per episode or unable protect airway).

- Chest CT with contrast (CPT® 71260) OR without contrast (CPT® 71250) can be considered if meets above guidelines but there is a contraindication to iodinated contrast or in place of CTA.

Reference
https://acsearch.acr.org/docs/69449/Narrative.
| CH-7.1: Bronchiectasis – Imaging | 22 |

CH-7: Bronchiectasis
**CH-7.1: Bronchiectasis – Imaging**

- High resolution chest CT scan (HRCT) without contrast (CPT® 71250):¹ ⁴ ⁵
  - To confirm suspected diagnosis of bronchiectasis after an initial x-ray¹ ²; or
  - For known bronchiectasis with worsening symptoms or worsening PFT’s².
  - For hemoptysis with known or suspected bronchiectasis.³

**References**


CH-8.1: Bronchitis

- Advanced imaging is not needed for bronchitis.\textsuperscript{1,2}
- Chest x-ray to determine if any abnormality is present.

References


**CH-9.1: Asbestos Exposure**

- Chest x-ray as radiographic screening for asbestos exposure.\(^1,2\)
  - Stable calcified pleural plaques on chest x-ray do not require advanced imaging of the chest.\(^2\)

- CT of the chest should not be used to screen populations at risk for asbestos-related diseases.\(^2\)

- High resolution chest CT (HRCT) (CPT\(^\circledR\) 71250) is considered for:\(^2\)
  - Any change seen on chest x-ray.
  - Progressive respiratory symptoms that may indicate the development or progression of asbestos related interstitial fibrosis.
  - Send requests for additional follow-up imaging to Medical Director for review.

**Practice Notes**

- Asbestosis and asbestos-related diseases include: pleural effusion, pleural plaques, lung cancer, and malignant mesothelioma. The risk of developing mesothelioma increases with increasing intensity and duration of exposure.

**References**


CH-10.1: COPD – Imaging

- Chest x-ray should be performed initially.
  - Chest CT without contrast (CPT® 71250) or Chest CT with contrast (CPT® 71260)\(^1,2\) can be performed if:
    - Emphysema is known or suspected and a pre-operative study for Lung Volume Reduction Surgery (LVRS) is being requested.\(^1\) OR
    - Definitive diagnosis is not yet determined by laboratory studies and chest x-ray and one on the following is suspected:
      - Bronchiectasis
      - Sarcoidosis
      - Emphysema
      - Pneumoconiosis
      - Idiopathic pulmonary fibrosis
      - Langerhans cell histiocytosis
      - Hypersensitivity pneumonitis
      - Bronchiolitis obliterans
      - Lipoid pneumonia
      - Drug toxicity
      - Lymphangitic cancer\(^2\)

- Lung cancer screening is discussed in the following guideline:
  - See “Screening Indications” in CH-34: Lung Cancer Screening

Practice Notes

- COPD includes asthmatic bronchitis, chronic bronchitis, and emphysema. COPD is airflow reduction (FEV1/FVC ratio < 0.7 or FEV1 ≥ 80% predicted) in the presence of respiratory symptoms, such as dyspnea. Advanced chest imaging is not typically indicated in COPD exacerbation, which is an acute change in baseline dyspnea, cough, and/or sputum beyond normal day-to-day variations.\(^2\).

References

CH-11: Interstitial Disease

CH-11.1: Interstitial Disease

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**CH-11.1: Interstitial Disease**

- High resolution chest CT (HRCT) without contrast (CPT® 71250) is the diagnostic modality of choice to evaluate for:
  - Interstitial changes identified on other imaging (including chest x-ray) in patients with pulmonary symptoms and abnormal pulmonary function studies (PFT’S) (See **CH-5: Dyspnea/Shortness of Breath**)[1-6]
  - Initial request to identify interstitial disease with a connective tissue disease diagnosis, including:
    - Rheumatoid arthritis
    - Scleroderma
    - The myopathies
    - Asbestosis
    - Silicosis
    - Coal miner’s lung disease[1-6]
  - New or worsening pulmonary symptoms or worsening PFT’s in any type of interstitial disease, including connective tissue diseases[1-6]
  - Once a year in patients with known idiopathic pulmonary fibrosis (IPF) if showing progression or regression of disease will change patient management[3]

**References**

CH-12.1: Multiple Pulmonary Nodules

See CH-16: Solitary Pulmonary Nodule (SPN)\(^1\)

**Practice Notes**

- Increased risk of primary cancer as the total nodule count increased from 1 to 4 but decreased risk in patients with 5 or more nodules, most of which likely resulted from prior granulomatous infection.\(^1\)

**References**

CH-13.1: Pneumonia

- Chest x-ray would be performed initially in all patients with suspected pneumonia, prior to considering advanced imaging.\(^1,2\)
  - Chest CT with contrast (CPT\(^\circledast\) 71260) if initial or repeat chest x-ray findings reveal:
    - Complication of pneumonia (e.g. abscess, effusion, hypoxemia, respiratory distress, necrotizing pneumonia, pneumothorax).\(^1,2\)
    - Possible lung mass associated with the infiltrate.\(^2\)

References

## CH-14: Other Chest Infections

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**CH-14.1: PPD or TB**¹,²

- Chest CT with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) is appropriate for individuals with:
  - Positive PPD skin test or other positive tuberculin skin tests or suspected active (or reactivated) tuberculosis and a normal or equivocal chest x-ray¹
  - Suspected complications or progression of tuberculosis (e.g. pleural tuberculosis, empyema, and mediastinitis)².

- If chest CT is unremarkable, there is insufficient data to support performing subsequent chest CT unless symptoms develop or chest x-ray shows a new abnormality.

- Follow-up chest CT with contrast (CPT® 71260) with frequency at the discretion of the pulmonary specialist (not to exceed 3 studies in 3 months).
  - Re-evaluate individuals undergoing active treatment for tuberculosis who had abnormalities seen only on chest CT.

**CH-14.2: Fungal Infections**

- Chest CT with contrast (CPT® 71260) or High resolution chest CT (HRCT) without contrast (CPT® 71250) is appropriate for individuals with:³,⁴
  - Initial diagnosis of any fungal pneumonia or chest infection,³,⁴
  - Suspected complications or progression of the fungal chest infection (e.g. worsening pneumonitis; pleural effusion, empyema, mediastinitis).

- Follow-up chest CT with contrast (CPT® 71260) or High resolution chest CT (HRCT) without contrast (CPT® 71250) with frequency at the discretion of the pulmonary specialist.

**CH-14.3: Wegener's Granulomatosis/Granulomatosis with Polyangiitis**

- Chest CT without contrast (CPT® 71250)* should be done in all patients who have pulmonary symptoms and are newly diagnosed or suspected of having an Antineutrophil cytoplasmic autoantibody (ANCA)-associated vasculitides (AAV) for a baseline prior to initiating immunosuppressive therapy.⁵,⁶

- Selective use of additional imaging is useful in evaluating patients who are suspected or known to have AAV, including a CT scan of the head (sinuses, orbits, mastoids) in patients with visual or upper respiratory track symptoms or signs, and a CT scan of the neck (subglottic region) in patients with symptoms or signs of subglottic stenosis.⁶

*In most situations, CT scans in patients with AAV should be performed without an iodinated contrast agent administered.⁶
CH-14.4: Suspected Sternal Dehiscence

- Sternal wound dehiscence is primarily a clinical determination.
- Chest x-ray is performed prior to advanced imaging to identify abnormalities in the sternal wire integrity and/or a midsternal stripe. Other findings include rotated, shifted or ruptured wires.
- CT chest without contrast can be considered if there is planned debridement and/or repair.

References

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CH-15.1: Sarcoid

➤ Chest CT either with contrast (CPT® 71260) or without contrast (CPT® 71250) is appropriate for the following:¹
  ➥ Establish or rule out the diagnosis when suspected,
  ➥ Development of worsening symptoms,
  ➥ New symptoms appear after a period of being asymptomatic, or
  ➥ Treatment change is being considered in known sarcoid.

➤ If CT is equivocal, definitive diagnosis can only be made by biopsy.²,³,⁴

➤ There is currently no evidence-based data to support performing serial PET scans to monitor disease activity while tapering steroid therapy.²,³,⁴
  ➥ See CD-5.2: Cardiac MRI – Indication (excluding Stress MRI)
  ➥ See HD-22: Cerebral Vasculitis in the Head Imaging Guidelines.

References

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**CH-16: Solitary Pulmonary Nodule**

- For Lung Cancer Screening (LDCT) including incidental findings from LDCT, See **CH-34: Lung Cancer Screening**.

**CH-16.1: Imaging**

- Chest CT with contrast (CPT® 71260) or chest CT without contrast (CPT® 71250) can be performed initially for discrete nodule(s) in the following scenarios:¹²³
  - Lung nodule(s) seen on an imaging study other than a “dedicated” chest CT or MR. Examples of other studies:
    - Chest x-ray.
    - Abdominal CT.
    - Spine MRI.
    - Coronary CTA¹
  - But NOT in the following which are considered initial dedicated advanced chest imaging:
    - Chest CT without and with contrast (CPT® 71270).
    - Chest CTA without and with contrast (CPT® 71275).
    - Chest MRI without contrast (CPT® 71550).
    - Chest MRI without and with contrast (CPT® 71552).
    - Chest MRA without and with contrast (CPT® 71555).

- Comparisons should include the earliest available study and the more recent previous chest CT scans to determine if nodule was present and stable.¹ Using largest measurement of multiple lung nodules.¹
  - Similar-sized pleural nodule(s) is treated as a pulmonary nodule(s)

- The size of the lung or pleural nodule(s) is crucial information for decisions making regarding follow-up. The largest of multiple lung and/or pleural nodules will guide the surveillance interval. (See **CH-16.2: Incidental Pulmonary Nodules Detected on CT Images**, and **CH-17.1: Pleural-Based Nodules and Other Abnormalities**) Yet, multiple nodules may also change this interval. (See **CH-16.2: Incidental Pulmonary Nodules Detected on CT Images**).

**Practice Notes**

Abnormality examples include: mass, opacity, lesion, density, nodule, and calcification.

If no measurement is provided or if the abnormality is ill defined without measurement or described as scarring, the case should be sent to MD review.
CH-16.2: Incidental Pulmonary Nodules Detected on CT Images

### Incidentally Detected Solid Pulmonary Nodules Follow-up Recommendations

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<tr>
<th>Nodule Type</th>
<th>Size</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Single Nodule</td>
<td>&lt;6 mm (&lt;100 mm³)</td>
<td>Follow-up (optional) CT at 12 months. No routine follow-up if stable at 12 months</td>
</tr>
<tr>
<td></td>
<td>6–8 mm</td>
<td>CT at 6–12 months, then CT at 18–24 months if stable</td>
</tr>
<tr>
<td></td>
<td>&gt;8 mm</td>
<td>CT at 3 months, then CT at 6-12 and then at 18-24 months if stable. Consider PET/CT** or biopsy</td>
</tr>
<tr>
<td>Multiple Nodules</td>
<td>Follow-up (optional) CT at 12 months. *No routine follow-up if stable at 12 months</td>
<td>Use most suspicious nodule as a guide to management. Follow-up intervals may vary according to size and risk.</td>
</tr>
<tr>
<td></td>
<td>6-9 months, then at 18-24 months if stable</td>
<td>CT at 3–6 months, then at 18–24 months if stable. Consider PET/CT** or biopsy</td>
</tr>
</tbody>
</table>

### Incidentally Detected Sub-Solid Pulmonary Nodules Follow-up Recommendations

<table>
<thead>
<tr>
<th>Nodule Type</th>
<th>Size</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Ground glass opacity (GGO)</td>
<td>&lt;6 mm (&lt;100 mm³)</td>
<td>Consider follow-up at 2 and 4 years. If solid component(s) or growth develops, consider resection.</td>
</tr>
<tr>
<td></td>
<td>≥6 mm (≥100 mm³)</td>
<td>CT at 6–12 months to confirm persistence, then follow-up with CT every 2 years until 5 years</td>
</tr>
<tr>
<td>Single Part-solid</td>
<td>CT at 3–6 months to confirm persistence. If unchanged and solid component remains &lt;6 mm, then annual CT should be performed for 5 years. If the solid component has suspicious morphology (i.e., lobulated margins or cystic components), is &gt;8 mm or is growing: Consider PET/CT** or biopsy</td>
<td>In practice, part-solid nodules cannot be defined as such until &gt;6 mm. Persistent part-solid nodules with solid components &gt;6 mm should be considered highly suspicious.</td>
</tr>
<tr>
<td></td>
<td>≥6 mm (≥100 mm³)</td>
<td>Consider follow-up at 2 and 4 years. If growth develops, consider resection.</td>
</tr>
<tr>
<td>Multiple Part-Solid</td>
<td>CT at 3–6 months. If stable, consider CT at 2 and 4 years.</td>
<td>CT at 3–6 months. Subsequent management based on the most suspicious nodule(s).</td>
</tr>
</tbody>
</table>

(*Following the Fleischner Society Guidelines for high risk which include American College of Chest Physicians intermediate and high risk categories.¹ ²)

**If a PET/CT was found to be negative, follow-up with CT at 6–12 months, then CT at 18–24 months if stable.

CT examinations of the thorax performed to follow lung nodules should use a low-radiation technique
CH-16.3: Interval Imaging Outcomes

- No further advanced imaging is necessary if a nodule has been
  - Stable for 2 years
    - Nodules(s) stable on chest x-ray.
    - Nodule(s) \( \geq 6 \) mm stable on CT chest.\(^1\)
  - Stable for 1 year
    - Nodule(s) < 6 mm.\(^1\)
  - At any time, if:
    - Classically benign characteristics by chest x-ray or previous CT (e.g. benign calcification pattern typical for a granuloma or hamartoma).
    - Decreasing or disappearing nodule(s).\(^3\)
    - Lung nodule(s) which increases in size or number should no longer be considered for CT screening or surveillance, including resetting the 2 year Fleishner interval based on a new size, since stability drives screening or surveillance.\(^1,2,3,7\)
    - Instead, with an increasing nodule or number, PET (see below). Tissue sampling or other further diagnostic investigations should be considered.

CH-16.4: PET

- PET/CT (CPT\(^{\circledast}\) 78815) is appropriate for a distinct lung nodule \( \geq 8 \) mm on dedicated advanced chest imaging, as described in CH-16.1: Imaging.
  - If there is a history of malignancy, refer to the appropriate Oncology restaging/recurrence guideline for indications for PET imaging.
    - Pleural nodule See CH-17.1: Pleural-Based Nodules and Other Abnormalities.
  - Serial PET studies are not considered appropriate.
  - Not appropriate for infiltrate, ground glass opacity, or hilar enlargement.

Practice Notes

- A nodule is any pulmonary or pleural lesion that is a discrete, spherical opacity 2-30 mm in diameter surrounded by normal lung tissue. A larger nodule is called a mass. Entities that are not nodules, and are considered benign, include non-spherical linear, sheet-like, two-dimensional or scarring opacities.\(^3\)
- Malignant nodule features can include spiculation, abnormal calcification, size greater than 7-10 mm, interval growth, history of a cancer that tends to metastasize to the lung or mediastinum, and/or smoking history.\(^1,3\)
  - A nodule that grows at a rate consistent with cancer (doubling time 100 to 400 days) may be sampled for biopsy or resected.\(^1\)
  - Less than 1% of <6mm lung nodules are malignant.\(^1\)
  - Three per cent of all 8 mm lung nodules are malignant.\(^1\)
  - Only one follow-up at 6-12 months is sufficient for 6-8mm nodules and not all require traditional 2 year follow-up.\(^1\)
  - The larger the solid component of a subsolid nodule, the greater the risk of invasiveness and metastases.\(^1\)
Increased risk of primary cancer as the total nodule count increased from 1 to 4 but decreased risk in patients with 5 or more nodules, most of which likely resulted from prior granulomatous infection.\(^1\)

A nodule that does not grow in 6 months has a risk of malignancy at $<10\%$.

- **Benign** features can include benign calcification (80\% granuloma, 10\% hamartoma), multiple areas of calcification, small size, multiple nodules, negative PET, and stability of size over 2 years.\(^3\)

- **Ground glass** or subsolid opacities, which can harbor indolent adenocarcinoma with average doubling times of 3–5 years.\(^1\)

- **Repeat PET** is discouraged, since if the original PET is positive, biopsy may be performed. If the original PET is negative but subsequent chest CT shows increase in size of the nodule, biopsy may be performed.

- **False positive PET** can occur with infection or inflammation; false negatives can occur with small size nodule, ground glass lesions and indolent cancers such as bronchoalveolar or carcinoid.

- **False negative PET** can be seen in patients with adenocarcinoma in situ, carcinoid tumors, and mucinous adenocarcinomas. High pre-test likelihood of malignancy negative findings on the PET scan only reduce the likelihood of malignancy to 14\%; while in a patient with a low pre-test likelihood (20\%), a negative FDG PET scan reduces the likelihood of malignancy to 1\%.\(^6\)

References


CH-17.1: Pleural-Based Nodules and Other Abnormalities

- Chest CT with contrast (CPT® 71260) or chest CT without contrast (CPT® 71250) (with contrast is preferred for initial evaluation) can be performed for pleural nodule(s).
  - Pleural nodule(s) seen on an imaging study other than a “dedicated” chest CT or MR.
  - Pleural nodule(s) identified incidentally on any of the following dedicated chest studies can replace Chest CT as the initial dedicated study:
    - Chest CT without and with contrast (CPT® 71270).
    - Chest CTA without and with contrast (CPT® 71275).
    - Chest MRI without contrast (CPT® 71550).
    - Chest MRI without and with contrast (CPT® 71552).
    - Chest MRA without and with contrast (CPT® 71555).
  - After preliminary comparison with any available previous chest films to determine presence and stability.
  - Using largest measurement of multiple nodule(s). (See CH-16.1: Imaging).
  - Following the Fleischner Society Guidelines for high risk. (See CH-16.2: Incidental Pulmonary Nodules Detected on CT Images)

- PET/CT (CPT® 78815) can be considered if dedicated CT or MRI Chest identifies a pleural nodule/mass or defined area of pleural thickening that is >8 mm when there is a likelihood of malignancy including current or previous malignancy, pleural effusion, bone erosion, chest pain.

**Practice Notes**
- Pleural nodule/mass or thickening without suggestion of malignancy would undergo surveillance or biopsy.

**Reference**
CH-18.1: Pleural Effusion

➤ Chest CT with contrast (CPT® 71260) can be performed after both:1,2
  ◆ Chest x-ray including lateral decubitus films; and
  ◆ Thoracentesis to determine if fluid is exudative or transudative and remove as much as possible (this fluid can obscure the underlying lung parenchyma and possibly a mass).

➤ Chest ultrasound (CPT® 76604) can be used as an alternative to chest x-ray to evaluate for the presence of fluid within the pleural spaces and guide thoracentesis.

Practice Notes

➤ Bilateral effusions are more often systemic related transudates (congestive heart failure, renal failure, liver insufficiency, etc.), and advanced imaging is rarely needed. Large unilateral effusions can be malignant. Analysis of fluid may include: cytology, culture, cell count, and biochemical studies.

References


## CH-19: Pneumothorax/Hemothorax

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</table>
CH-19.1: Pneumothorax/Hemothorax

- Chest x-ray should be performed initially.
  - Chest CT with contrast (CPT® 71260) or without contrast (CPT® 71250) is appropriate if one or more of the following is applicable:
    - Diagnosis of a small pneumothorax is in doubt, and the presence of a pneumothorax will affect patient treatment decisions.  
    - Preoperative study for treatment of pneumothorax.  
    - Pneumothorax associated with hemothorax.  
    - Suspected complications from hemothorax (e.g. empyema).  
    - Suspected Alpha-1-Antitrypsin Deficiency (even without pneumothorax).

CH-19.2: Pneumomediastinum; Subcutaneous Emphysema

- Chest x-ray should be performed initially.
  - Chest CT with contrast (CPT® 71260) or without contrast (CPT® 71250) is appropriate if one or more of the following is applicable:
    - Recent vomiting and/or suspected esophageal perforation.  
    - Associated pneumopericardium.  
    - Associated pneumothorax.  
    - Preoperative study for treatment.

Practice Notes

- An expiration chest x-ray can enhance the evaluation of equivocal plain x-ray. There is no data supporting the use of serial chest CT to follow patients with a known pneumothorax or hemothorax who are asymptomatic or have stable symptoms. With the exception of the indications above, advanced imaging of the chest is rarely indicated in the diagnosis or management of pneumothorax. Inspiratory/expiratory chest x-rays are helpful in defining whether a pneumothorax is present.

References

# CH-20: Mediastinal Mass

| CH-20.1: Mediastinal Mass | 53 |
CH-20.1: Mediastinal Mass

- Chest CT with contrast (CPT® 71260) is the imaging study of choice to evaluate mediastinal abnormalities seen on chest x-ray or other non-dedicated chest imaging and can be done once initially if there is a concern for:¹⁻³
  - Mediastinal cyst including bronchogenic, thymic, pericardial or esophageal in nature.
    - Subsequent evaluations either with CT Chest with contrast (CPT® 71260) or MRI Chest without and with contrast (CPT® 71552) can be performed for:
      - New signs or symptoms, or
      - Preoperative assessment.
- For Adenopathy; See CH-2: Lymphadenopathy.
- For Goiter; See NECK-8.1: Thyroid Nodule.
- For Myasthenia Gravis; See PN-6.1: Neuromuscular Disease.

References
CH-21.1: Chest Trauma

- Chest X-ray should be performed initially.
  - Chest CT without contrast (CPT® 71250) or with contrast (CPT® 71260) is appropriate for the following situations:¹
    - Rib¹ or Sternal² Fracture:
      - With associated complications identified clinically or by other imaging, including pneumothorax, hemothorax, pulmonary contusion, atelectasis, flail chest, cardiovascular injury and/or injuries to solid or hollow abdominal organs.¹
      - Uncomplicated, single fractures, multiple fractures, non-acute fractures, or occult rib fractures are NOT an indication for chest CT unless malignancy is suspected as the etiology.¹
      - Routine follow-up advanced imaging of rib or sternal fractures is not indicated.¹
  - Suspected Pathological Rib Fractures, with or without a history of trauma, should undergo CT Chest without contrast (CPT® 71250) or Tc-99m bone scan whole body (CPT® 78306).¹
  - Clavicle Fractures:
    - Proximal (medial) 1/3 fractures or sternoclavicular dislocations can undergo Computed tomography (CT) and magnetic resonance imaging of the chest or shoulder.³
    - X-ray is adequate for evaluation of middle and distal 1/3 fractures.³
  - No advanced imaging of the abdomen or pelvis is indicated when there is chest trauma and no physical examination or laboratory evidence of abdominal and/or pelvic injury.

References
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<td>CH-22.1: Chest Wall Mass</td>
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</table>
CH-22.1: Chest Wall Mass

- Chest x-ray is useful in the workup of a soft-tissue mass and are almost always indicated as the initial imaging study.\(^1\)
  - Chest ultrasound (CPT\textsuperscript{®} 76604) may be useful as an initial imaging study in the setting of a suspected superficial or subcutaneous lipoma. This modality may also be valuable in differentiating cystic from solid lesions and has also been used to assess the vascularity of lesions.\(^1\)
  - Chest CT with contrast (CPT\textsuperscript{®} 71260) or chest CT without contrast (CPT\textsuperscript{®} 71250) or MRI chest without and with contrast (CPT\textsuperscript{®} 71552) or MRI chest without contrast (CPT\textsuperscript{®} 71550) can be considered unless chest x-ray or ultrasound demonstrate one of the following:\(^1,2\)
    - Obvious lipomas\(^1\) (See MS-10: Soft Tissue Mass or Lesion of Bone).
    - Clearly benign entity\(^1\) (See MS-10: Soft Tissue Mass or Lesion of Bone).

**Practice Notes**

- Chest x-rays of chest wall masses can detect calcification, ossification, or bone destruction as well as location and size.\(^3\)

**References**

CH-23.1: Pectus Excavatum and Carinatum

- Chest CT without contrast (CPT® 71250) or MRI chest without and with contrast (CPT® 71552) and 3-D reconstruction (CPT® 76377) if requested can be considered if:
  - Candidates for surgical correction.\(^1\), \(^2\)
    - Cosmetic repairs requests without physiological disability or severe deformities may not meet certain payers policies.
  - Cardiac or pulmonary dysfunction has been identified\(^1\), \(^2\)
    - ECG and echocardiography are indicated if there are cardiac symptoms or evidence of cardiac function abnormalities.
    - Chest x-ray and PFT’s are indicated if there is increasing shortness of breath.\(^1\)

- Chest measurements derived from Chest CT, such as the Haller Index, are helpful to the thoracic surgeon in pre-operative assessment of chest wall deformities to assess for the appropriateness of operative repair prior to the development of symptomatic pectus deformities.
  - See PEDCH-11: Pectus Deformities in the Pediatric Chest Imaging Guidelines.

References

**CH-24.1: Pulmonary AVM**

- Chest CT with contrast, chest CTA (preferred modality) (CPT® 71275), or chest MRA (CPT® 71555) can be obtained for evaluation of:¹,²,³
  - Suspected pulmonary AVM.
  - First degree relatives of a patient with a primary pulmonary AVM.
  - Evaluation of patients with paradoxical embolus/stroke and no evidence of patent foramen ovale on echocardiogram.

**Practice Notes**

- Pulmonary AVMs are abnormal connections between pulmonary arteries and veins, usually found in the lower lobes, that can be either primary or acquired (such as trauma, bronchiectasis). They can be identified in up to 98% of chest x-rays by a peripheral, circumscribed, non-calcified lesion connected by blood vessels to the hilum of the lung. Treatment is often by surgery or embolization of the feeding artery using platinum coils or detachable balloons.

**References**

CH-25.1: Pulmonary Embolism

Chest CT with contrast with PE protocol (CPT® 71260) or chest CTA (CPT® 71275) would be appropriate if at least one symptom, clinical/laboratory finding or risk factor from each of the lists below are present.

- With any one of the 3: 6,7,8
  - Dyspnea, new onset and otherwise unexplained;
  - Chest Pain, pleuritic;
  - Tachypnea
  AND, with any one of the 3: 6,7,8
  - Abnormal D-dimer test;
  - Wells Criteria score* higher than 4 points;
  - One Risk Factor** or Symptom** of new onset demonstrating high clinical probability of PE

<table>
<thead>
<tr>
<th>RISK FACTORS** 6,7,8</th>
<th>SYMPTOMS ATTRIBUTED TO PE** 6,7,8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immobilization at least 3 days or surgery in last 4 weeks or recent trauma</td>
<td>Signs or symptoms of DVT</td>
</tr>
<tr>
<td>Previous history of DVT or PE</td>
<td>Hemoptysis</td>
</tr>
<tr>
<td>Cancer actively treated in last 6 months or receiving palliative treatment</td>
<td>Right heart strain or failure</td>
</tr>
<tr>
<td>Recent history of a long airplane flight</td>
<td>Systolic BP&lt;90</td>
</tr>
<tr>
<td>Use of estrogen-based contraceptives (birth control pills, the patch, and vaginal ring)/Oral estrogen (1)</td>
<td>Syncope</td>
</tr>
<tr>
<td>Advanced age (&gt;/=70)</td>
<td>Cough</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>Heart Rate &gt;100</td>
</tr>
<tr>
<td>Obesity (BMI &gt;/= 35)</td>
<td>Palpitations</td>
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Well’s Criteria for Clinical Probability of PE*  

<table>
<thead>
<tr>
<th>Clinical sign/symptom</th>
<th>Probability</th>
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<tr>
<td>Clinical signs/symptoms of DVT (at minimum: leg swelling and pain with palpation of the deep veins)</td>
<td>3</td>
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<tr>
<td>PE is likely or equally likely diagnosis</td>
<td>3</td>
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<tr>
<td>Heart rate &gt;100</td>
<td>1.5</td>
</tr>
<tr>
<td>Immobilization at least 3 days or surgery in last 4 weeks</td>
<td>1.5</td>
</tr>
<tr>
<td>Previous history of DVT or PE</td>
<td>1.5</td>
</tr>
<tr>
<td>Hemoptysis</td>
<td>1</td>
</tr>
<tr>
<td>Cancer actively treated in last 6 months or receiving palliative treatment</td>
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Calculate Probability:  
- Low <2  
- Moderate 2 to 6  
- High >6  

Using the above criteria, only 3% of patients with a low pretest probability had PE versus 63% of those with a high pretest probability.

- Non-urgent cases which do not meet above 2-step criteria, should undergo prior to advanced imaging:
  - Chest x-ray (to rule out other causes of acute chest pain).
  - Primary cardiac and pulmonary etiologies should be eliminated.
- Pregnant women with suspected PE are suggested to proceed with:
  - D-dimer and/or;
  - Doppler studies of the lower extremities;
  - V/Q preferred if Doppler negative; Chest CTA (CPT® 71275) or chest MRA (CPT® 71555) can be performed if V/Q scanning is not available.
- Ventilation-perfusion scans, also called V/Q, scans (CPT® 78580-Pulmonary Perfusion Imaging; CPT® 78582-Pulmonary Ventilation (e.g., Aerosol or Gas) and Perfusion Imaging.
  - Is not a replacement for CTA Chest
  - Can be considered in any of the following:
    - Suspected pulmonary embolism if there is a contraindication to CT or CTA of the chest (ventilation-perfusion scans CPT® 78582).
    - Suspected pulmonary embolism when a Chest x-ray is negative and CTA Chest is not diagnostic (CPT®78580 or CPT®78582).
    - Follow-up of an equivocal or positive recent ventilation-perfusion lung scan to evaluate for interval change (CPT® 78580).
- Follow-up Imaging in Stable or Asymptomatic Patients with Known PE is not warranted
- Chest CT with contrast with PE protocol (CPT® 71260) or chest CTA (CPT® 71275) can be performed for any of the following indications:
  - Recurrent signs or symptoms such as dyspnea, or
  - Elevated d-dimer which is persistent or recurrently elevated, or
Right heart strain or failure identified by EKG, ECHO or Heart catheterization.

**Practice Notes**

- Pulmonary embolism is found in approximately 10% of all those that present with suspicion of PE. Dyspnea, pleuritic chest pain and tachypnea occur with about 50% incidence with leg swelling or pain just over 50%.
- D-dimer level has a high sensitivity and low specificity for diagnosing PE.
  - A negative D-dimer in combination with low or moderate PE risk classification has a negative predictive value approaching 100%.
  - D-dimer can be falsely elevated with recent surgery, injury, malignancy, sepsis, diabetes, pregnancy, or other conditions where fibrin products are likely to be present.
- CT imaging has supplanted V/Q scanning since the latter is difficult to obtain quickly, does not provide a substantial cost savings, and does not diagnose other pulmonary pathology.
- The decision to terminate anticoagulation treatment after previous pulmonary embolism (PE) with absent or stable symptoms is based on clinical evaluation and risk factors.
- Repeat studies do not allow one the ability to distinguish new from residual clot, with luminal diameter and clot character poorly correlated to symptoms and ECHO findings.
- Two thirds after primary thromboembolism have residual pulmonary artery clot at 6 months and 50% remains at one year.
- Subsequent persistence or elevation of D-dimer is associated with increased risk of recurrent PE. ECHO and Right Heart Catheterization (RHC) can identify those with pulmonary hypertension. Yet, 1/2 of all have persistent or new pulmonary hypertension after primary thromboembolism and only half of this latter group has dyspnea at rest or exercise intolerance.
References


CH-26: Pulmonary Hypertension

- See PVD-5: Pulmonary Artery Hypertension in the Peripheral Vascular Disease Imaging Guidelines.
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</table>
CH-27: Subclavian Steal Syndrome – General

- Occurs from blood flowing up the contralateral vertebral artery to the basilar artery and retrograde down the ipsilateral vertebral artery (reversal of flow) to supply collateral circulation to the arm on the side and past the stenotic or occluded proximal subclavian or innominate artery to perfuse that arm.

CH-27.1: Subclavian Steal Syndrome

- Initial evaluation should include clinical findings satisfying the symptom complex and initial imaging with carotid duplex study (CPT® 93882).
  - Satisfying the symptom complex.
    - Physical examination findings suggestive of subclavian stenosis include a discrepancy of >15 mmHg in blood pressure readings taken in both upper extremities, delayed or decreased amplified pulses in the affected side, and a bruit in the supraclavicular area on the affected side.
    - Symptoms include vertebral basilar artery insufficiency, vertigo, limb paresis, and paresthesias. Bilateral cortical visual disturbances, ataxia, syncope, and dysarthria occur less frequently.
    - Symptoms of cerebral ischemia may be produced by exercise of the affected arm.
  - Carotid duplex study (CPT® 93882) is the initial and definitive imaging study
    - Reversal of flow in the ipsilateral vertebral artery.
    - If the carotid duplex is not diagnostic for reversal of flow in the ipsilateral vertebral artery, then neurological symptoms should be evaluated according to the Head guidelines.

- Neck and chest MRA (CPT® 70548 and CPT® 71555) or CTA (CPT® 70498 and CPT® 71275) can be performed for diagnosis in patients with symptoms of vertebro-basilar ischemia if the clinical exam and duplex study are positive, indeterminate, or as preoperative studies if they will substitute for invasive angiography.

- Upper extremity MRA (CPT® 73225) or CTA (CPT® 73206) can be performed in symptomatic patients if needed to exclude pathology distal to the subclavian artery and if they will substitute for invasive angiography.


- Treatment options include ligation of the ipsilateral vertebral artery, aorta-subclavian artery bypass graft, or subclavian endarterectomy.

Practice Note:

- While MRA does not expose the patient to radiation, CTA should be considered the test of choice for subclavian steal syndrome given its superior spatial and temporal resolution.
References
CH-28.1: SVC Syndrome

- Chest CT with contrast (CPT® 71260) is the initial imaging studies of choice for the evaluation of suspected SVC syndrome based on the facial cyanosis and UE swelling without anasarca.\textsuperscript{1,2}

- MRV (CPT® 71555) or CTV (CPT® 71275) of the chest may be indicated when stenting of the SVC is being considered.\textsuperscript{1,2}

Practice Notes

- SVC syndrome is caused by acute or subacute, intrinsic or extrinsic obstruction of the SVC, most commonly from lung cancer (80-85%) and less often benign (fibrosis, mediastinitis, indwelling devices). Other symptoms include dyspnea, headache and dizziness.

References


# CH-29: Thoracic Aorta

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CH-29: Thoracic Aorta

- Thoracic aortic diseases are variable and critical; selected imaging procedures are dependent upon the physicians’ preference and expertise. As a result, all thoracic imaging in this section (CH-29) can be one of the following studies listed in the table below:

<table>
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<th>Table of Thoracic Aorta Imaging Options</th>
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<td>CT of chest, and/or abdomen, and/or pelvis (CPT® 71260, CPT® 74177, CPT® 74160, CPT® 72193);</td>
</tr>
<tr>
<td>CTA of chest, and/or abdomen, and/or pelvis (CPT® 71275, CPT® 74175, CPT® 72191, CPT® 74174);</td>
</tr>
<tr>
<td>MRA of chest, and/or abdomen, and/or pelvis (CPT® 71555, CPT® 74185, CPT® 72198)</td>
</tr>
</tbody>
</table>

CH-29.1: Aortic Dissection

- Classic symptoms of sharp, severe acute onset of retrosternal or interscapular chest pain is seen in 96% and is best adapted to the emergent setting. CXR is imprecise; any suspicion should be considered since up to 10% of patients with aortic dissection present without classic symptoms.

- For suspected aortic dissection, conduct CTA or MRA of the entire aorta (including arch branches) and extending through the femoral arteries. 1, 2, 3, 4, 5

- For follow-up, any requested imaging from the “Table of Thoracic Aorta Imaging Options” can be performed. 1,2,3,4,5,7,9
  - “Medically” treated (usually type B) patients.
    - Every 6 months if total aortic diameter is ≥4.5 cm.
    - Annually if total aortic diameter is <4.5 cm.
  - Surgery or Stent treatment for any type dissection (A or B).
    - First Year: 1 month, 3 months, 6 months, 12 months, then annually.

Practice Note

- CTA is the test of choice given its superior spatial resolution, ease of monitoring the patient in the CT scanner, availability and speed of imaging. MRI can be performed as well but has limitations.
CH-29.2: Thoracic Aortic Aneurysm (TAA)

- For suspected TAA, any requested imaging from the “Table of Thoracic Aorta Imaging Options” above:
  - Abnormalities identified on Chest –x-ray (abnormality including widened mediastinal) or other imaging studies (fluoroscopy, spine MRI, etc.) abnormality.\(^{1,2,3,4,5}\)

- For known TAA and chest pain or back pain, any requested imaging from the “Table of Thoracic Aorta Imaging Options” above.\(^{1,2,3,4,5}\)

- For planning for pre–thoracic endovascular repair (TEVAR) of thoracic aorta disease.\(^9\)
  - CTA of chest, and/or abdomen, and/or pelvis (CPT® 71275, CPT® 74175, CPT® 72191,CPT® 74174 ); or MRA of chest, and/or abdomen, and/or pelvis (CPT® 71555, CPT® 74185, CPT® 72198)

- For follow-up, any requested imaging from the “Table of Thoracic Aorta Imaging Options” above for the following:\(^{4,5,7,9}\)
  - “Medically” treated/observation.
  - 3.5 to 4.4 cm TAA can be followed annually.
  - >/= 4.5 cm TAA can be followed every 6 months.
  - >/= 3.0 cm TAA when there is concern for growth can have a one-time 3 month interval advanced imaging.
  - Surgery or Stent treatment.
    - Preoperative open or endovascular (stent) repair imaging is appropriate.
      - Suspicion of endoleaks.
    - Open Repair imaging every 3 to 5 years.
    - Endovascular graft/stent.
      - First year: 1 month, 3 months, 6 months, 12 months, then annually.

- Screening with Abdominal Aortic Aneurysm (AAA).
  - Known TAA can be screened for AAA using Abdominal Imaging Guidelines (usually US) See PVD-6.2: Abdominal Aortic Aneurysm (AAA).
  - Known AAA screening for TAA is not supported by sufficient evidence.

For educational information on the normal size of the aortic arch and descending thoracic, See Practice Notes.
CH-29.3: Screening Guidelines for Familial Syndromes

Screening for Familial Syndromes and Genetic Syndromes. 4,5,6,8,9

- Suspected Familial Thoracic Aortic Aneurysm.
  - ECHO (CPT® 93306, CPT® 93307, or CPT® 93308) and CXR for all First-degree relatives (parents, siblings, children) of patients with TAA and/or dissection.
  - Any imaging listed can be performed if these studies identify a TAA or are equivocal or do not visualize the ascending aorta adequately.
  - Follow-Up per TAA Follow-Up guidelines.

Screening for Marfan Syndrome or Ehlers-Danlos Syndrome, Vascular form or Type IV 4, 5,6,8,9

- Suspected, ECHO (CPT® 93306, CPT® 93307, or CPT® 93308) at the time of diagnosis.
- Follow-up:
  - Annual ECHO (CPT® 93306, CPT® 93307, or CPT® 93308) or per TAA Follow-Up guidelines.

For educational information on familial TAA, See Practice Notes.

CH-29.4: Thoracic Aorta in Individuals with Bicuspid Aortic Valve

Screening for Bicuspid Aortic Valve. 8,10

- Screening, any requested imaging from the “Table of Thoracic Aorta Imaging Options” and/or ECHO (CPT® 93306, CPT® 93307, or CPT® 93308).
  - Additional imaging such as cardiac MRI, cardiac CT, or CCTA is NOT generally indicated.
  - There is no evidence-based data to support screening relatives of patients with bicuspid aortic valve.
- Follow-up per TAA Follow-Up guidelines.
  - If no dilatation of the aortic root or ascending thoracic aorta is found, there is no evidence-based data to support continued surveillance imaging. See CH-29.2: Thoracic Aortic Aneurysm (TAA)

For more educational information on the Bicuspid Aortic Valve, See Practice Notes

For Coarctation; See PEDPVD-4.1: Thoracic Aortic Disease, PEDAB-14: Renovascular Hypertension and Other Secondary Causes of Hypertension, PEDCD-2.3: Congenital Heart Disease Modality Considerations, PEDCD-2.4: Congenital Heart Disease Timing Considerations
**CH-29.5: Calcified Ascending Aorta**

- Prior to open-heart operations. \(^{11,12,13}\)
  - Transesophageal echocardiography (TEE), Intraoperative ultrasonography and/or open direct aortic palpation are used to detect atherosclerotic changes in the aortic wall. \(^{10,11}\)

- Prior to TAVR/I (Transcatheter Aortic Valve Replacement/Implantation). \(^3\)
  - See CT and CTA in **CD-4.8: Transcatheter Aortic Valve Replacement (TAVR)**.

**Practice Notes: Aortic Dissection**

- There are two general types of aortic dissection:
  - **Type A**: Those that begin in the ascending aorta.
  - **Type B**: Those that begin from just distal to the left subclavian artery branch of the aorta.

- **Type A** often requires urgent surgical intervention with placement of an aortic graft or endovascular stent graft.

- **Type B** can usually be treated medically with careful blood pressure control. Surgery is reserved for distal dissections that are leaking, ruptured, or compromising blood flow to a vital organ, or if there is inability to control the blood pressure. Transesophageal echo may be equally diagnostic compared to CT or MRI.

- Routine follow-up imaging is important because 30%-40% of chronic dissections will become aneurysmal in 5 years and will require intervention, with less patent false lumina at higher risk.

- Penetrating ulcer (through the intima) and intramural hematoma (no intimal tear) are variant forms of aortic dissection and should follow that of aortic dissection, since they are considered precursors of aortic dissection.

**TAA**

- The normal size of the aortic arch and descending thoracic aorta is 3 cm. The aortic root is normally 3.5 cm. \(^4,5\)
  - TAA occurs most often in the descending (50%) and then equally likely in the ascending or arch aorta.
  - Risk factors include atherosclerosis, prolonged hypertension and trauma with mean age 65.
  - Risk of rupture is 0% if < 4 cm and 31% if > 6 cm, which is when surgery is often recommended.

**Familial TAA**

- Familial TAA presents at an earlier age, has a faster aortic growth rate, is seen in about 20% or non-Marfan TAA and has autosomal dominant inheritance, when compared to non-familial TAA.

- Bicuspid Aortic Valve.
Since 20% of individuals who underwent bicuspid aortic valve surgery had concurrent ascending aortic aneurysms that needed repair. All patients with bicuspid aortic valve should have both the aortic root and ascending thoracic aorta evaluated for evidence of aortic dilatation.

**Bicuspid Aortic Valve.**

Since 20% of individuals who underwent bicuspid aortic valve surgery had concurrent ascending aortic aneurysms that needed repair. All patients with bicuspid aortic valve should have both the aortic root and ascending thoracic aorta evaluated for evidence of aortic dilatation.

**References**


CH-30.1: Elevated Hemidiaphragm

- Chest CT with contrast (CPT® 71260) and neck CT with contrast (CPT® 70491) (if requested) with new diaphragmatic paralysis after.¹,²
  - Previous chest x-rays are available and reviewed to determine if the diaphragmatic elevation is a new finding, and/or
  - Fluoroscopic examination ("sniff test") to differentiate true paralysis from weakness.

- CT abdomen with contrast (CPT® 74160) to rule out liver or abdominal process if Chest CT is negative.¹,²

- Repeat advanced imaging studies in the absence of new signs or symptoms are not indicated.

Practice Notes

- The right hemidiaphragm sits about 2 cm higher than the left.
- “Eventration” is thin membranous replacement of muscle, usually on the right, as the most common cause of elevation.
- Any injury to the phrenic nerve from neck to diaphragm can lead to paralysis.
- Common phrenic causes are traumatic or surgical injury or malignancy involving the mediastinum.
- Any loss of lung volume or increased abdominal pressure can lead to diaphragm elevation.

References
CH-31: Thoracic Outlet Syndrome (TOS)

CH-31.1: Thoracic Outlet Syndrome
CH-31.1: Thoracic Outlet Syndrome

- Chest X-ray should be performed initially in all cases, after the onset of symptoms or if there has been a change in symptoms, since it can identify boney abnormalities or other causes of right upper extremity pain.\(^1,2\)

- MR imaging is the preferred imaging modality in patients with suspected TOS.\(^1,2\)
  - Chest MRI (CPT\textsuperscript® 71550) or upper extremity other than joint MRI (CPT\textsuperscript® 73218).
  - Neck and chest MRA (CPT\textsuperscript® 70548 and CPT\textsuperscript® 71555) can be used in place of MRI with suspected arterial or venous TOS.
  - CT Chest with contrast or CT Neck with contrast can be used in place of MRI for:
    - Suspected anomalous ribs or fractures, as bone anatomy is more easily definable with CT.
    - Postoperative patients in whom there is a question regarding a remnant first rib.
    - Dialysis-dependent renal failure, claustrophobia, or implanted device incompatibility.

- See PN-4: Brachial Plexus in the Peripheral Nerve Disorders Guidelines.

Practice Notes

- TOS refers to compression of the subclavian vessels and/or brachial plexus at the thoracic outlet of the chest (the area bounded by the two scalene muscles and the first rib).
- There are 3 types, with neurogenic causes seen in 80%, venous causes (also called effort thrombosis) found in 15% and the remaining 5% being arterial in etiology.
- Since this is such a rare entity and diagnosis is difficult, specialist evaluation by a vascular surgeon or thoracic surgeon is helpful in determining the appropriate imaging pathway.

References


### CH-32: Newer Imaging Techniques

<table>
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<td>85</td>
</tr>
<tr>
<td>CH-32.2: Navigational/EM – Guided Peripheral Bronchoscopy</td>
<td>85</td>
</tr>
</tbody>
</table>
CH-32.1: Virtual Bronchoscopy

- There is insufficient data currently available to generate appropriateness criteria for the use of virtual bronchoscopy, and this procedure should be considered investigational at this time.¹

- Virtual bronchoscopy uses multidetector CT with 3D rendering (CPT® 71260 and CPT® 76377) to generate an image of the tracheobronchial tree down to the level of the sixth- to seventh-generation bronchi, and can visualize areas inaccessible to the flexible bronchoscope.¹

CH-32.2: Navigational/EM– Guided Peripheral Bronchoscopy

- EM Guided Peripheral Bronchoscopy is not a covered benefit for all health plans.
  - Peripheral bronchoscopy technology uses electromagnetic (EM) navigational guidance with a CT road map for performing biopsies of peripheral lung lesions.²
    - Supplemental imaging See Preface-4.3: Unlisted Procedures/Therapy Treatment Planning.

References


CH-33.1: Pre-Transplant Imaging Studies

- Individuals on the waiting list or being considered for the lung transplant can undergo advanced imaging per that institution’s protocol as long as the studies do not exceed the following:
  - Chest CT with and without contrast (CPT® 71270), chest CT with (CPT® 71260), or chest CT without contrast (CPT® 71250),
  - ECHO
  - Imaging Stress Test (MPI, SE, MR) or Heart Catheterization (Right and Left); Heart catheterization can also be done after a positive stress test.

- Other studies that will be considered include V/Q scan, Six Minute Walk Test.

- Initial post-transplant follow-up: CT chest with and without contrast (CPT® 71270), CT chest with (CPT® 71260), or CT chest without contrast (CPT® 71250).
  - Requests for subsequent follow-up imaging will go to Medical Director review.

- See **CD-1.6: Transplant Patients**.

Reference


### CH-34: Lung Cancer Screening

| CH-34.1: U.S. Preventative Services Task Force: Lung Cancer Screening (Commercial and Medicaid) | 89 |
| CH-34.2: National Coverage Determination (NCD) for Lung Cancer Screening with Low Dose Computed Tomography (LDCT) (210.14) (Medicare) | 90 |
| CH-34.3: Incidental Pulmonary Nodules Detected on Low Dose CT Chest (LDCT) Images | 92 |
CH-34.1: U.S. Preventative Services Task Force: Lung Cancer Screening (Commercial and Medicaid)

Low-dose chest CT (CPT®G0297) may be approved for lung cancer screening if all of the following criteria are met:

<table>
<thead>
<tr>
<th>Screening Indications – Commercial and Medicaid</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>➤ All criteria below must be met for approval:</td>
<td>Low-Dose Chest CT with contrast CPT®G0297</td>
</tr>
<tr>
<td>➤ Patient has not received a low-dose CT lung screening in less than 12 months; and</td>
<td></td>
</tr>
<tr>
<td>➤ Patient has NO health problems that substantially limit life expectancy or the ability or willingness to have curative lung surgery*; and</td>
<td></td>
</tr>
<tr>
<td>➤ Patient is between 55 and 80 years of age; and</td>
<td></td>
</tr>
<tr>
<td>➤ Patient has at least a 30 pack-year history of cigarette smoking; and</td>
<td></td>
</tr>
<tr>
<td>➤ Currently smokes or quit within the past (&lt;/=) 15 years</td>
<td></td>
</tr>
</tbody>
</table>

*This is based on a range of chest or other organ signs, symptoms or conditions which would question the member’s ability to undergo surgical or non-surgical treatment if a lung cancer was discovered. For example, congestive heart failure, advanced cancer from another site or a member with COPD who uses oxygen when ambulating, would be examples of conditions that would “substantially limit life expectancy.” Conversely, stable COPD and its symptoms, including cough, shortness of breath would not “substantially limit life expectancy.”
CH-34.2: National Coverage Determination (NCD) for Lung Cancer Screening with Low Dose Computed Tomography (LDCT) (210.14) (Medicare)^2

Lung-RADS Assessment Categories

<table>
<thead>
<tr>
<th>Screening Indications - Medicare</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All criteria below must be met for approval:</td>
<td>Low-Dose Chest CT without contrast CPT® G0297</td>
</tr>
<tr>
<td>Patient has not received a low-dose CT lung screening in less than 12 months; and</td>
<td></td>
</tr>
<tr>
<td>Patient has NO signs or symptoms suggestive of underlying lung cancer**; and</td>
<td></td>
</tr>
<tr>
<td>Patient is between 55 and 77 years of age; and</td>
<td></td>
</tr>
<tr>
<td>Patient has at least a 30 pack-year history of cigarette smoking; and</td>
<td></td>
</tr>
<tr>
<td>Currently smokes or quit within the past ((\leq)) 15 years</td>
<td></td>
</tr>
<tr>
<td>A written order for LDCT lung cancer screening that includes counseling and shared decision making***</td>
<td></td>
</tr>
</tbody>
</table>

**The Medicare Decision Memo and NCD 210.14 consider lung cancer screening if “asymptomatic” with “no signs or symptoms of lung cancer.” Stable COPD and its symptoms, including cough, shortness of breath are not considered “signs or symptoms of lung cancer” and if other criteria meet, would allow LDCT approval. Conversely, signs or symptoms that would be more concerning for lung cancer could include hemoptysis, weight loss, soft tissue or bony masses and lymphadenopathy.

***A written order for LDCT lung cancer screening that meets the following criteria:

- For the initial LDCT lung cancer screening service: the beneficiary must receive a written order for LDCT lung cancer screening.
  - *A written order for LDCT lung cancer screening that meets the following criteria:
    - For the initial LDCT lung cancer screening service: the beneficiary must receive a written order for LDCT lung cancer screening during a lung cancer screening counseling and shared decision making visit, furnished by a physician [as defined in Section 1861(r)(1) of the Social Security Act (the Act)] or qualified non-physician practitioner (physician assistant, nurse practitioner, or clinical nurse specialist as defined in §1861(aa)(5) of the Act).
  - For subsequent LDCT lung cancer screenings: the beneficiary must receive a written order, which may be furnished during any appropriate visit (for example: during the Medicare annual wellness visit, tobacco cessation counseling services, or evaluation and management visit) with a physician (as defined in Section 1861(r)(1) of the Act) or qualified non-physician practitioner (physician assistant, nurse practitioner, or clinical nurse specialist as defined in Section 1861(aa)(5) of the Act).
A lung cancer screening counseling and shared decision making visit includes the following elements (and is appropriately documented in the beneficiary’s medical records):

- Determination of beneficiary eligibility including age, absence of signs or symptoms of lung disease, a specific calculation of cigarette smoking pack-years; and if a former smoker, the number of years since quitting;
- Shared decision making, including the use of one or more decision aids, to include benefits, harms, follow-up diagnostic testing, over-diagnosis, false positive rate, and total radiation exposure;
- Counseling on the importance of adherence to annual LDCT lung cancer screening, impact of comorbidities and ability or willingness to undergo diagnosis and treatment;
- Counseling on the importance of maintaining cigarette smoking abstinence if former smoker, or smoking cessation if current smoker and, if appropriate, offering additional Medicare-covered tobacco cessation counseling services; and
- If appropriate, the furnishing of a written order for lung cancer screening with LDCT. Written orders for both initial and subsequent LDCT lung cancer screenings must contain the following information, which must also be documented in the beneficiaries’ medical records:
  - Beneficiary date of birth,
  - Actual pack-year smoking history (number);
  - Current smoking status, and for former smokers, the number of years since quitting smoking;
  - Statement that the beneficiary is asymptomatic; and NPI of the ordering practitioner

*Patients that present with the following symptoms are not eligible for screening, rather, they should be considered symptomatic for lung cancer: unexplained cough, hemoptysis, or unexplained weight loss of more than 15 pounds in the past year.*
**CH-34.3: Incidental Pulmonary Nodules Detected on Low Dose CT Chest (LDCT) Images**

- For lung nodules, including incidental findings from studies other than screening LDCT, see **CH-16.2: Incidental Pulmonary Nodules Detected on CT Images**.
- Additional intervening diagnostic LDCT Chest (CPT® 71250) or PET/CT (CPT® 78815) can be approved based on the Lung-RADS Version-1.0 designation 3, 4A, 4B or 4X, as indicated in the chart below:

<table>
<thead>
<tr>
<th>Primary Category/Category Descriptor*</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>3: Probably benign finding(s) - short term follow up suggested; includes nodules with a low likelihood of becoming a clinically active cancer</td>
<td>6 month LDCT with a return to annual LDCT screening if unchanged.</td>
</tr>
<tr>
<td>4A: Suspicious - Findings for which additional diagnostic testing and/or tissue sampling is recommended</td>
<td>PET/CT may be used when there is a ≥ 8 mm solid component. Follow-up with LDCT in 3 months with another LDCT in 6 months and a return to annual screening if stable and there is low suspicion of lung cancer.</td>
</tr>
<tr>
<td>4B or 4X: Suspicious - Findings for which additional diagnostic testing and/or tissue sampling is recommended</td>
<td>CT Chest with or without contrast, PET/CT and/or tissue sampling depending on the probability of malignancy and comorbidities. PET/CT may be used when there is a ≥ 8 mm solid component. If there is low suspicion of lung cancer, follow-up with LDCT in 3 months with another LDCT in 6 months and a return to annual screening if stable.</td>
</tr>
</tbody>
</table>

- Category 3 nodules that are unchanged on interval CT should be coded as category 2, Benign Appearance or Behavior, and individuals returned to screening in 12 months.³
- For example, if the first LDCT was done January 1st and designated Lung-RADS 3 with an interval LDCT done on July 1st – the LDCT annual screening would resume January 1st of the following year.
- Category 4A, 4B and 4X is intended to direct the individual out of screening and into a diagnosis based on findings such as a larger, growing or increasingly suspicious nodule.³
  - If there is a high suspicion of lung cancer with these follow-up CT and/or PET/CT studies, biopsy or surgical excision should be considered.
  - If there is a low suspicion of lung cancer with these follow-up CT and/or PET/CT studies, a LDCT should be performed in 3 months and 6 months with a return to annual LDCT screening if unchanged.
<table>
<thead>
<tr>
<th>Category</th>
<th>Category Descriptor</th>
<th>Findings</th>
<th>Management</th>
<th>Probability of Malignancy</th>
<th>Estimated Population Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete</td>
<td></td>
<td>prior chest CT examination(s) being located for comparison</td>
<td>Additional lung cancer screening CT images and/or comparison to prior chest CT examinations is needed</td>
<td>n/a</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>part or all of lungs cannot be evaluated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>No nodules and definitely benign nodules</td>
<td>no lung nodules</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benign</td>
<td>Nodules with a very low likelihood of becoming a clinically active cancer due to size or lack of growth</td>
<td>solid nodule(s): &lt; 6 mm new &lt; 4 mm</td>
<td>Continue annual screening with LDCT in 12 months</td>
<td>&lt; 1%</td>
<td>90%</td>
</tr>
<tr>
<td>Appearance or</td>
<td></td>
<td>part solid nodule(s): &lt; 6 mm total diameter on baseline screening</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior</td>
<td></td>
<td>non solid nodule(s) (GGN): &lt; 20 mm OR ≥ 20 mm and unchanged or slowly growing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>category 3 or 4 nodules unchanged for ≥ 3 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probably</td>
<td>Probably benign finding(s) - short term follow up suggested; includes nodules with a low likelihood of becoming a clinically active cancer</td>
<td>solid nodule(s): ≥ 6 to &lt; 8 mm at baseline OR new 4 mm to &lt; 6 mm</td>
<td>6 month LDCT</td>
<td>1-2%</td>
<td>5%</td>
</tr>
<tr>
<td>Benign</td>
<td></td>
<td>part solid nodule(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 6 mm total diameter with solid component &lt; 6 mm OR new &lt; 6 mm total diameter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>non solid nodule(s) (GGN) ≥ 20 mm on baseline CT or new</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Suspicious Findings for which additional diagnostic testing and/or tissue sampling is recommended

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Additional Features</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A</td>
<td>solid nodule(s): ≥ 8 to &lt; 15 mm at baseline OR growing &lt; 8 mm OR new 6 to &lt; 8 mm</td>
<td>part solid nodule(s): ≥ 6 mm with solid component ≥ 6 mm to &lt; 8 mm OR with a new or growing &lt; 4 mm solid component</td>
<td>5-15%</td>
</tr>
<tr>
<td></td>
<td>endobronchial nodule</td>
<td>3 month LDCT; PET/CT may be used when there is a ≥ 8 mm solid component</td>
<td>2%</td>
</tr>
<tr>
<td>4B</td>
<td>solid nodule(s) ≥ 15 mm OR new or growing, and ≥ 8 mm</td>
<td>part solid nodule(s) with: a solid component ≥ 8 mm OR a new or growing ≥ 4 mm solid component</td>
<td>&gt; 15%</td>
</tr>
<tr>
<td></td>
<td>Chest CT with or without contrast, PET/CT and/or tissue sampling depending on the *probability of malignancy and comorbidities. PET/CT may be used when there is a ≥ 8 mm solid component.</td>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>4X</td>
<td>Category 3 or 4 nodules with additional features or imaging findings that increases the suspicion of malignancy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Other

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Coding</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>modifier - may add on to category 0-4 coding</td>
<td>As appropriate to the specific finding</td>
<td>n/a</td>
</tr>
<tr>
<td>C</td>
<td>modifier - may add on to category 0-4 coding</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

## Prior Lung Cancer

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Coding</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>modifier for patients with a prior diagnosis of lung cancer who return to screening</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

---

**Practice notes**

*The full description of the LUNG-RADS categories*

References
<table>
<thead>
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<th>Cardiac Rhythm Implantable Device (CRID) Guidelines</th>
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<td>Glossary</td>
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</tr>
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<td>CRID-2: Definite Indications for ICD Implantation</td>
</tr>
<tr>
<td>CRID-3: Reasonable Indications for ICD Implantation</td>
</tr>
<tr>
<td>CRID-4: ICD Implantation—Non-Indications</td>
</tr>
<tr>
<td>CRID-5: Indications for Cardiac Resynchronization Therapy (CRT)-D Implantation</td>
</tr>
<tr>
<td>CRID-6: Cardiac Resynchronization Therapy (CRT)-D Implantation—Non-Indications</td>
</tr>
<tr>
<td>CRID-7: Definite Indications for Permanent Pacemaker Implantation</td>
</tr>
<tr>
<td>CRID-8: Reasonable Indications for Permanent Pacemaker Implantation</td>
</tr>
<tr>
<td>CRID-9: Permanent Pacemaker Implantation</td>
</tr>
<tr>
<td>CRID-10: Cardiac Resynchronization Therapy (CRT)-P</td>
</tr>
<tr>
<td>CRID-11: Leadless Implantable Devices</td>
</tr>
</tbody>
</table>
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitor</td>
<td>angiotensin-converting enzyme inhibitor</td>
</tr>
<tr>
<td>AMI</td>
<td>acute myocardial infarction</td>
</tr>
<tr>
<td>ARVC</td>
<td>arrhythmogenic right ventricular cardiomyopathy</td>
</tr>
<tr>
<td>CC</td>
<td>complications/comorbid conditions</td>
</tr>
<tr>
<td>CHF</td>
<td>congestive heart failure</td>
</tr>
<tr>
<td>CM</td>
<td>cardiomyopathy</td>
</tr>
<tr>
<td>CRT</td>
<td>cardiac resynchronization therapy</td>
</tr>
<tr>
<td>EP</td>
<td>electrophysiology</td>
</tr>
<tr>
<td>ICD</td>
<td>implantable cardioverter defibrillator</td>
</tr>
<tr>
<td>LV</td>
<td>left ventricular</td>
</tr>
<tr>
<td>LVEF</td>
<td>left ventricular ejection fraction</td>
</tr>
<tr>
<td>MCC</td>
<td>major complications/comorbid conditions</td>
</tr>
<tr>
<td>MI</td>
<td>myocardial infarction</td>
</tr>
<tr>
<td>NCCM</td>
<td>non-compaction cardiomyopathy</td>
</tr>
<tr>
<td>NYHA</td>
<td>New York Heart Association functional classification</td>
</tr>
<tr>
<td>VF</td>
<td>ventricular fibrillation</td>
</tr>
<tr>
<td>VT</td>
<td>ventricular tachycardia</td>
</tr>
</tbody>
</table>
### Glossary

<table>
<thead>
<tr>
<th>Class</th>
<th>NYHA Heart Failure Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No symptoms and no limitation in ordinary physical activity, e.g. shortness of breath when walking, climbing stairs etc.</td>
</tr>
<tr>
<td>II</td>
<td>Mild symptoms (mild shortness of breath and/or angina) and slight limitation during ordinary activity.</td>
</tr>
<tr>
<td>III</td>
<td>Marked limitation in activity due to symptoms, even during less-than-ordinary activity, e.g. walking short distances (20–100 m). Comfortable only at rest.</td>
</tr>
<tr>
<td>IV</td>
<td>Severe limitations. Experiences symptoms even while at rest. Mostly bedbound patients</td>
</tr>
</tbody>
</table>

**Abnormal blood pressure response to exercise**: Flat response/failure to augment; rise then fall during exercise; vasoactive cardiovascular drugs may result in an abnormal blood pressure response to exercise

**Non-Sustained Ventricular Tachycardia (NSVT)**: Three or more consecutive ventricular beats at a rate of greater than 120 beats/min with a duration of less than 30 seconds

**Incessant VT**: Frequent recurrences of ongoing hemodynamically stable VT

**Long QT Syndrome (LQTS)**: A congenital disorder characterized by a prolongation of the QT interval on ECG and a propensity to ventricular tachyarrhythmias, which may lead to syncope, cardiac arrest, or sudden death.

The QT interval on the ECG, measured from the beginning of the QRS complex to the end of the T wave, represents the duration of activation and recovery of the ventricular myocardium. QT intervals corrected for heart rate (QTc) longer than 0.44 seconds are generally considered abnormal, though a normal QTc can be more prolonged in females (up to 0.46 sec). The Bazett formula is the formula most commonly used to calculate the QTc, as follows: QTc = AT/square root of the R-R interval (in seconds).

**Optimal Medical Therapy**: Three months of heart failure medications in maximally titrated doses as tolerated. These include beta blockers, ACE inhibitors or angiotensin II receptor blocker, and diuretics.

**Structural Heart Disease**: A structural or functional abnormality of the heart, or of the blood vessels supplying the heart, that impairs its normal functioning.

**Non-Compaction Cardiomyopathy**: A rare congenital cardiomyopathy that affects children and adults. It results from the failure of myocardial development during embryogenesis. It is also called spongiform cardiomyopathy. Symptoms are often a result of a poor pumping performance by the heart. The disease can be associated with other problems with the heart and the body.
Preface to the eviCore CRID Guidelines

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Preface-1: Guideline Development

- The eviCore evidence-based, proprietary clinical guidelines evaluate a range of advanced imaging and procedures, including CT, MRI, PET, and Radiation Oncology, Sleep Studies, and Cardiac and Spine interventions.
- eviCore healthcare reserves the right to change and update the guidelines. The guidelines undergo a formal review annually. eviCore’s guidelines are based upon major national and international association and society guidelines and criteria, peer-reviewed literature, major treatises, and input from health plans, practicing academic and community-based physicians.
- These guidelines are not intended to supersede or replace sound medical judgment, but instead should facilitate the identification of the most appropriate imaging procedure, given the patient’s clinical condition. These guidelines are written to cover medical conditions as experienced by the majority of patients. However, these guidelines may not be applicable in certain clinical circumstances, and physician judgment can override the guidelines.
- Clinical decisions, including treatment decisions, are the responsibility of the patient and his/her provider. Clinicians are expected to use independent medical judgment which takes into account the clinical circumstances to determine patient management decisions.
- eviCore supports the Choosing Wisely® initiative (www.choosingwisely.org) by the American Board of Internal Medicine (ABIM) Foundation and many national physician organizations, to reduce the overuse of diagnostic tests that are low value, no value, or whose risks are greater than the benefits.
- eviCore’s guidelines are based upon expert consensus and analysis reported by the following specialty societies, publications, studies and trials:
  - The American College of Cardiology (ACC)
  - The American Heart Association (AHA)
  - The Heart Rhythm Society (HRS)
  - The Multicenter Automatic Defibrillator Implantation Trial (MADIT/MADIT-2)
  - The Multicenter Unsustained Tachycardia Trial (MUSTT)
  - The Defibrillator in Acute Myocardial Infarction Trial (DINAMIT)
  - The Resynchronization/defibrillation for Ambulatory Heart Failure Trial (RAFT)
  - The Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)
  - The Resynchronization Reverses Remodeling in Systolic Left Ventricular Dysfunction trial (REVERSE)
  - Immediate Risk Stratification Improves Survival trial (IRIS)
  - The Comparison of Medical Therapy, Pacing, and Defibrillation in Heart Failure trial (COMPANION)
  - The Antiarrhythmic Versus Implantable Defibrillators trial (AVID)
  - The Canadian Implantable Defibrillator Study (CIDS)
  - The Cardiac Arrest Study Hamburg (CASH)
Preface-2: Benefits, Coverage Policies, and Eligibility Issues

- Benefits, coverage policies, and eligibility issues pertaining to each Health Plan may take precedence over eviCore’s guidelines. Providers are urged to obtain written instructions and requirements directly from each payer.

- Medicare Coverage Policies
  - For Medicare and Medicare Advantage enrollees, the coverage policies of CMS (Centers for Medicare and Medicaid Services) may take precedence over eviCore’s guidelines.
  - Payers may choose to adopt other evidence-based guidelines (such as eviCore’s guidelines) rather than using Local Coverage Determinations and other Medicare coverage policy.

- Investigational and Experimental Studies
  - Certain imaging studies described in these guidelines are considered investigational by various payers, and their coverage policies may take precedence over eviCore’s guidelines.

- Clinical and Research Trials
  - Similar to investigational and experimental studies, clinical trial imaging requests will be considered to determine whether they meet health plan coverage and eviCore’s evidence-based guidelines.

- State and federal legislations may need to be considered in the review of advanced imaging requests.

Preface-3: Clinical Information

- The philosophy behind eviCore guidelines entails using an evidence-based approach to determine the most appropriate procedure for each individual, at the most appropriate time in the diagnostic and treatment cycle.

- Procedures should be requested after initial consultation and physician treatment planning, and following full counseling of the individual.

- Current clinical information, which may include history, physical examination, symptoms, laboratory results, and imaging reports, are necessary for determining the medical necessity of implantable cardioverter defibrillator (ICD) devices and cardiac resynchronization therapy (CRT-D).

- The information provided to eviCore should have clinical relevance to the request.

- If the information provided makes no reference to the potential indication for the request, then the medical necessity for the procedure(s) cannot be supported.

Preface-4: References

- References are available at the end of the guidelines.
Preface-5: Copyright Information

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Preface-6: Trademarks

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## CRID-1: Procedure Codes

CRID 1.1: Procedure Code Descriptions

<table>
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<tr>
<th>Procedure Code</th>
<th>Description</th>
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</table>
The CPT® code set 33202-33249 includes the various Pacemaker and Defibrillator procedures including the insertion, replacement and removal of the leads. Some of the codes apply to both the pacemaker and the defibrillator. Codes are included for informational purposes only and any given code’s inclusion on this list does not necessarily indicate prior authorization is required. Pre-authorization requirements vary by health plan.

<table>
<thead>
<tr>
<th>CPT®</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>33206</td>
<td>Insertion of new or replacement of permanent pacemaker with transvenous electrode(s); atrial</td>
</tr>
<tr>
<td>33207</td>
<td>Insertion of new or replacement of permanent pacemaker with transvenous electrode(s); ventricular</td>
</tr>
<tr>
<td>33208</td>
<td>Insertion of new or replacement of permanent pacemaker with transvenous electrode(s); atrial and ventricular</td>
</tr>
<tr>
<td>33212</td>
<td>Insertion of pacemaker pulse generator only; single existing single lead</td>
</tr>
<tr>
<td>33213</td>
<td>Insertion of pacemaker pulse generator only; with existing dual leads</td>
</tr>
<tr>
<td>33214</td>
<td>Upgrade of implanted pacemaker system, conversion of single chamber system to dual chamber system (includes removal of previously placed pulse generator, testing of existing lead, insertion of new lead, insertion of new pulse generator)</td>
</tr>
<tr>
<td>33227</td>
<td>Removal of permanent pacemaker pulse generator with replacement of pacemaker pulse generator; single lead system</td>
</tr>
<tr>
<td>33228</td>
<td>Removal of permanent pacemaker pulse generator with replacement of pacemaker pulse generator; dual lead system</td>
</tr>
<tr>
<td>33221</td>
<td>Insertion of pacemaker pulse generator only; with existing multiple leads</td>
</tr>
<tr>
<td>33224</td>
<td>Insertion of pacing electrode, cardiac venous system, for left ventricular pacing, with attachment to previously placed pacemaker or pacing cardioverter-defibrillator pulse generator</td>
</tr>
<tr>
<td>33225</td>
<td>Insertion of pacing electrode, cardiac venous system, for left ventricular pacing, at time of insertion of pacing cardioverter-defibrillator pulse generator (including upgrade to dual chamber system and pocket revision)</td>
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<tr>
<td>33229</td>
<td>Removal of permanent pacemaker pulse generator with replacement of pacemaker pulse generator; multiple lead system</td>
</tr>
<tr>
<td>33230</td>
<td>Insertion of pacing cardioverter-defibrillator pulse generator only; with existing dual leads</td>
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<tr>
<td>33231</td>
<td>Insertion of pacing cardioverter-defibrillator pulse generator only; with existing multiple leads</td>
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<tr>
<td>33240</td>
<td>Insertion of pacing cardioverter-defibrillator pulse generator only; with existing single leads</td>
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<tr>
<td>33249</td>
<td>Insertion or replacement of permanent pacing cardioverter-defibrillator system with transvenous lead(s), single or dual chamber</td>
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<td>Code</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>33262</td>
<td>Removal of pacing cardioverter-defibrillator pulse generator with replacement of pacing cardioverter-defibrillator pulse generator; single lead system</td>
</tr>
<tr>
<td>33263</td>
<td>Removal of pacing cardioverter-defibrillator pulse generator with replacement of pacing cardioverter-defibrillator pulse generator; dual lead system</td>
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<tr>
<td>33264</td>
<td>Removal of pacing cardioverter-defibrillator pulse generator with replacement of pacing cardioverter-defibrillator pulse generator; multiple lead system</td>
</tr>
<tr>
<td>33270</td>
<td>Insertion or replacement of permanent subcutaneous implantable defibrillator system, with subcutaneous electrode, including defibrillation threshold evaluation, induction of arrhythmia, evaluation of sensing for arrhythmia termination, and programming or reprogramming of sensing or therapeutic parameters when performed</td>
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<tr>
<td>33271</td>
<td>Insertion of subcutaneous implantable defibrillator electrode</td>
</tr>
<tr>
<td>33274</td>
<td>Transcatheter insertion or replacement of permanent leadless pacemaker, right ventricular, including imaging guidance (eg, fluoroscopy, venous ultrasound, ventriculography, femoral venography) and device evaluation (eg, interrogation or programming), when performed</td>
</tr>
<tr>
<td>33275</td>
<td>Transcatheter removal of permanent leadless pacemaker, right ventricular</td>
</tr>
<tr>
<td>33289</td>
<td>Transcatheter implantation of wireless pulmonary artery pressure sensor for long-term hemodynamic monitoring, including deployment and calibration of the sensor, right heart catheterization, selective pulmonary catheterization, radiological supervision and interpretation, and pulmonary artery angiography, when performed</td>
</tr>
<tr>
<td>0515T</td>
<td>Insertion of wireless cardiac stimulator for left ventricular pacing, including device interrogation and programming, and imaging supervision and interpretation, when performed; complete system (includes electrode and generator [transmitter and battery])</td>
</tr>
<tr>
<td>0516T</td>
<td>Insertion of wireless cardiac stimulator for left ventricular pacing, including device interrogation and programming, and imaging supervision and interpretation, when performed; electrode only</td>
</tr>
<tr>
<td>0517T</td>
<td>Insertion of wireless cardiac stimulator for left ventricular pacing, including device interrogation and programming, and imaging supervision and interpretation, when performed; pulse generator component(s) (battery and/or transmitter) only</td>
</tr>
<tr>
<td>0519T</td>
<td>Removal and replacement of wireless cardiac stimulator for left ventricular pacing; pulse generator component(s) (battery and/or transmitter)</td>
</tr>
<tr>
<td>0520T</td>
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## CRID-2: Definite Indications for ICD Implantation

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| CRID-2.3: Syncope of Undetermined Origin and Positive EP Study | 13 |
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| CRID-2.5: Ischemic Cardiomyopathy | 13 |
| CRID-2.6: Nonischemic Dilated Cardiomyopathy (DCM) | 14 |
CRID-2.1: Survivors of Cardiac Arrest

- ICD implantation is indicated in individuals who are survivors of cardiac arrest due to ventricular tachycardia (VT) or ventricular fibrillation (VF) after evaluation has excluded any completely reversible causes.

CRID-2.2: Structural Heart Disease with Sustained VT

- ICD implantation is indicated in individuals with structural heart disease (such as prior myocardial infarction (MI), congenital heart disease, and/or ventricular dysfunction) and spontaneous, sustained VT (greater than 30 seconds), whether hemodynamically stable or unstable.

CRID-2.3: Syncope of Undetermined Origin and Positive EP Study

- ICD implantation is indicated in individuals with syncope of undetermined origin who have clinically relevant, hemodynamically significant sustained VT or VF induced at electrophysiology (EP) study.

CRID-2.4: Unexplained Syncope

- ICD implantation is indicated in individuals with unexplained syncope, significant left ventricular (LV) dysfunction (LV ejection fraction less than 50%), and structural heart disease such as prior myocardial infarction (MI), congenital heart disease, and/or ventricular dysfunction.

CRID-2.5: Ischemic Cardiomyopathy

- ICD implantation is indicated in individuals with any of the following:
  - LV dysfunction due to prior myocardial infarction (MI) and all of the following:
    - LV ejection fraction less than or equal to 35%
    - At least 40 days post-MI
    - Are NYHA functional Class II or III
    - Are on optimal medical therapy, defined as 3 months of maximally titrated doses as tolerated of an ACE inhibitor/angiotensin II receptor blocker, beta-blocker, and diuretic
  - LV dysfunction due to prior MI and all of the following:
    - LV ejection fraction less than or equal to 30%
    - At least 40 days post-MI
    - Are NYHA functional Class I
  - Have non-sustained VT due to prior MI and all of the following:
    - LV ejection fraction less than or equal to 40%
    - Have inducible VF or sustained VT at EP study performed at least 96 hours after revascularization or MI
      - If the ejection fraction was less than 35% prior to the most recent MI then the 40 day waiting period can be waived.
**CRID-2.6: Nonischemic Dilated Cardiomyopathy (DCM)**

- ICD implantation is indicated in individuals with nonischemic dilated cardiomyopathy who have all of the following:
  - LV ejection fraction less than or equal to 35%
  - NYHA Class II or III CHF
  - Are on optimal medical therapy
    - Optimal medical therapy is defined as 3 months of maximally titrated doses as tolerated of an ACE inhibitor/angiotensin II receptor blocker, beta-blocker, and, if needed, a diuretic

- Trials assessing ICD therapy in primary prophylaxis in DCM have not generally included asymptomatic, NYHA functional Class I patients

**CRID- 2.7: Replacement of ICD**

- ICD Generator replacement is indicated as device is nearing Elective Replacement Indicator (ERI) regardless of the change in left ventricular ejection fraction
## CRID-3: Reasonable Indications for ICD Implantation

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CRID-3.1: General Considerations

- For the “reasonable” or “considered” indications listed in this CRID-3 guideline, consensus opinion is less clear about the use of ICD implantation in these settings. Limited evidence suggests that ICD placement may be reasonable or may be considered; this category includes VF or hypotensive VT events where pharmaceutical or ablative techniques are indicated but the results of treatment are too unpredictable to withhold ICD implantation.

CRID-3.2: Sustained Ventricular Tachycardia with Normal LV Function

- ICD implantation is reasonable for individuals with sustained VT and normal or near-normal ventricular function

CRID-3.3: Cardiomyopathy

- Cardiomyopathy due to Hypertrophic Cardiomyopathy:
  - ICD implantation is reasonable for individuals with hypertrophic cardiomyopathy who have one or more risk factors for sudden cardiac death
    - Risk factors for sudden cardiac death include the following:
      - Unheralded syncope
      - Family history of sudden death
      - Septal wall thickness of greater than or equal to 30 mm
      - Abnormal blood pressure response to exercise
      - Nonsustained VT (< 30 seconds)

- Cardiomyopathy due to Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC):
  - ICD implantation is reasonable for individuals with ARVC who have one or more risk factors for sudden cardiac death
    - Risk factors for sudden cardiac death include the following:
      - Unheralded syncope
      - Family history of sudden death
      - Nonsustained VT(< 30 seconds)
      - Clinical signs of RV failure

CRID-3.4: Long QT Syndrome

- ICD implantation is reasonable in Long-QT Syndrome in the following settings:
  - Syncope and/or VT while receiving beta-blockers or if beta-blockers are contraindicated
  - Asymptomatic with other risk factors for sudden cardiac death
    - Risk factors for sudden cardiac death include the following:
      - QTc greater than 500 msec or
      - LQT 2 or 3
      - Family history of sudden death
CRID-3.5: Brugada Syndrome
- ICD implantation is reasonable for individuals with Brugada Syndrome who have had the following:
  - Syncope or
  - Documented or inducible VT or VF

CRID-3.6: Catecholaminergic Polymorphic Ventricular Tachycardia
- ICD implantation is reasonable for individuals with catecholaminergic polymorphic VT who have syncope and/or documented sustained VT while receiving beta-blockers

CRID-3.7: Other Indications
- ICD implantation is reasonable, regardless of LV ejection fraction measurement, for individuals with:
  - Cardiac sarcoidosis
  - Giant cell myocarditis
  - Chagas disease
- LV non compaction
  - ICD implantation should be considered for the primary prevention of sudden cardiac death due to malignant ventricular arrhythmias in individuals with non-compaction cardiomyopathy and impaired LV function (LV ejection fraction less than 50%)
    - ICD implantation is also indicated for normal LV function (LVEF greater than 50%) primary prevention cases with positive family history of sudden cardiac death. This exception is due to the presence of sarcomeric gene mutations reported in non-compaction cardiomyopathy
- ICD implantation may be considered in affected individuals with a familial cardiomyopathy associated with sudden death
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<tr>
<th>CRID-4: ICD Implantation—Non-Indications</th>
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<td>CRID-4.7: Ablation Candidate, No Structural Heart Disease</td>
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**CRID-4.1: Ischemic Cardiomyopathy**
- ICD implantation is not indicated in individuals who have had a myocardial infarction within the past 40 days or who have had coronary revascularization within the past 90 days unless the following applies:
  - A separate indication for permanent pacemaker implantation exists (thus preventing a likely repeat procedure for an upgraded device in the near future)

**CRID-4.2: NYHA Class IV CHF**
- ICD implantation is not indicated for individuals with NYHA functional class IV symptoms unless one of the following applies:
  - It is a CRT-D device meeting the indications for CRT-D implantation listed in CRID-5.1: Sinus Rhythm, Dilated Cardiomyopathy with NYHA Class II, III, or IV Congestive Heart Failure (CHF)
  - The individual is awaiting heart transplantation
  - Left ventricular assist device (LVAD) is being used as destination therapy

**CRID-4.3: Limited Life Expectancy**
- ICD implantation is not indicated for individuals who do not have a reasonable expectation of survival with an acceptable functional status for at least one year, even if they meet ICD implantation criteria listed in:
  - CRID-2: Definite Indications for ICD Implantation or
  - CRID-3: Reasonable Indications for ICD Implantation

**CRID-4.4: Incessant VT or VF**
- ICD implantation is not indicated for individuals with incessant VT or VF
  - Incessant VT or VF is defined as hemodynamically stable VT or VF continuing for hours

**CRID-4.5: Psychiatric Conditions**
- ICD implantation is not indicated in individuals with significant psychiatric illnesses that may be aggravated by device implantation or that may preclude systematic follow-up

**CRID-4.6: Reversible Cause of VT/VF**
- ICD implantation is not indicated when VF or VT is due to a reversible cause such as:
  - Severe electrolyte disturbance
  - Drug-induced torsades de pointes
  - Acute, reperfused myocardial infarction with preserved ejection fraction
CRID-4.7: Ablation Candidate, No Structural Heart Disease

- ICD implantation is **not** indicated if the individual has no structural heart disease and is a candidate for ablation. Surgical or catheter ablation can be curative in this setting
### CRID-5: Indications for Cardiac Resynchronization Therapy (CRT)-D Implantation

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<td>CRID-5.3: Sinus Rhythm, Dilated Cardiomyopathy with non-LBBB and NYHA Class III or IV Congestive Heart Failure (CHF)</td>
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<td>CRID-5.5: Cardiac Resynchronization Therapy (CRT)-P</td>
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</table>
CRID-5.1: Sinus Rhythm, Dilated Cardiomyopathy with NYHA Class II, III, or IV Congestive Heart Failure (CHF)

- CRT-D implantation is indicated in individuals with ischemic or nonischemic dilated cardiomyopathy who have all of the following:
  - Left bundle branch block with QRS greater than or equal to 150 msec
  - LV ejection fraction less than or equal to 35%
  - Are NYHA functional Class II, III, or ambulatory class IV on stable optimal medical therapy
    - Optimal medical therapy is defined as 3 months of maximally titrated doses as tolerated of an ACE inhibitor/angiotensin II receptor blocker, beta-blocker, and diuretic

CRID-5.2: Sinus Rhythm, Dilated Cardiomyopathy with NYHA Class II, III, or IV Congestive Heart Failure (CHF) and QRS duration 120-149 ms

- CRT-D implantation is indicated in individuals with ischemic or nonischemic dilated cardiomyopathy who have all of the following:
  - Left bundle branch block with QRS duration 120 to 149 msec
  - LV ejection fraction less than or equal to 35%
  - NYHA functional Class II, III, or ambulatory class IV on stable optimal medical therapy
    - Optimal medical therapy is defined as 3 months of maximally titrated doses as tolerated of an ACE inhibitor/angiotensin II receptor blocker, beta-blocker, and diuretic

CRID-5.3: Sinus Rhythm, Dilated Cardiomyopathy with non-LBBB and NYHA Class III or IV Congestive Heart Failure (CHF)

- CRT-D Implantation is indicated in individuals who have all of the following:
  - NYHA Class III, or IV Congestive Heart Failure
  - Non-LBBB with QRS duration greater or equal to 150 ms
  - LV ejection fraction less than or equal to 35%

CRID-5.4: Atrial Fibrillation and NYHA Class I, II, or III Congestive Heart Failure

- CRT is indicated in patients with AF and the following:
  - A left ventricular ejection fraction (LVEF) ≤35 percent on guideline-directed medical therapy and all of the following:
    - The patient requires ventricular pacing or otherwise meets CRT criteria“Meets CRT criteria” means either:
      - Has left bundle branch block (LBBB) and a QRS duration ≥ 120 ms and New York Heart Association (NYHA) functional class II, III, or ambulatory class IV HF symptoms on stable optimal medical therapy; or
- Has a non-LBBB pattern with a QRS duration ≥150 and NYHA class III or ambulatory class IV HF symptoms
- Atrioventricular nodal ablation or pharmacologic rate control will allow near 100 percent ventricular pacing with CRT

**CRID-5.5: Cardiac Resynchronization Therapy (CRT)-P**

- See: **CRID-10: Cardiac Resynchronization Therapy (CRT)-P**
| CRID-6: Cardiac Resynchronization Therapy (CRT)-D Implantation—Non-Indications |
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| CRID 6.2: Reversible Causes of Cardiomyopathy                  | 25 |
CRID-6.1: Ischemic Cardiomyopathy

- CRT-D or CRT-P implantation is **not** indicated in individuals who have had a myocardial infarction within the past 40 days or who have had coronary revascularization within the past 90 days **unless** the following applies:
  - A separate indication for permanent pacemaker implantation exists (thus preventing a likely repeat procedure for an upgraded device in the near future)

CRID 6.2: Reversible Causes of Cardiomyopathy

- CRT-D implantation is not indicated in the setting of a reversible cardiomyopathy such as: toxic, metabolic, or tachycardia induced cardiomyopathy
  - Once the reversible aberration is corrected, clinical reassessment is indicated
**CRID-7: Definite Indications for Permanent Pacemaker Implantation**

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<td>CRID-7.6: Syncope</td>
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CRID-7.1: Symptomatic Bradycardia

- Permanent pacemaker implantation is indicated for symptomatic bradycardia, including frequent sinus pauses that produce symptoms and any degree of AV block producing symptoms.
- Permanent pacemaker implantation is indicated for third-degree and advanced second-degree AV block at any anatomic level associated with ventricular arrhythmias presumed due to AV block, or any other medical conditions requiring drug therapy that results in symptomatic bradycardia (for example, beta blocker therapy in patients with prior myocardial infarction, or tachy-brady syndrome in atrial fibrillation).

CRID-7.2: Symptomatic Chronotropic Incompetence

- Permanent pacemaker implantation is indicated for symptomatic chronotropic incompetence defined as limitations due to the inability to achieve 80% of maximum predicted heart rate (220-age).

CRID-7.3: Indications for Asymptomatic Patients

- Permanent pacemaker implantation is indicated for asymptomatic patients with third degree AV block.
- Permanent pacemaker implantation is indicated for asymptomatic patients with advanced second degree AV block (Mobitz type II) and intermittent third degree AV block.
- Permanent pacemaker implantation is indicated for asymptomatic patients with second degree AV block and documented periods of asystole greater than or equal to 3.0 seconds.
- Permanent pacemaker implantation is indicated for second degree AV block in awake, symptom-free patients with atrial fibrillation and a documented pause of 5 seconds or longer.
- Permanent pacemaker implantation is indicated for alternating bundle branch block in asymptomatic patients.
- Permanent pacemaker implantation is indicated for asymptomatic patients with second degree AV block at any anatomic level associated with neuromuscular diseases known to involve the heart.

CRID-7.4: Prior to Planned Catheter Ablation

- Permanent pacemaker implantation is indicated prior to a planned catheter ablation of the AV junction intended for a rate control strategy for management of atrial fibrillation.
CRID-7.5: Persistent Second Degree AV Block

- Permanent pacemaker implantation is indicated for persistent second degree AV block in the His-Purkinje system with alternating bundle branch block or third degree AV block within or below the His-Purkinje system after myocardial infarction.

CRID-7.6: Syncope

- Permanent pacemaker implantation is indicated for syncope caused by spontaneously occurring carotid sinus stimulation and carotid sinus pressure that induces ventricular asystole of more than 3 seconds.
# CRID-8: Reasonable Indications for Permanent Pacemaker Implantation

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CRID-8.1: General Considerations

- For the “reasonable” or “considered” indications listed in this CRID-8 guideline, consensus opinion is less clear about permanent pacing in these settings, with evidence suggesting that device placement may be reasonable or may be considered.

CRID-8.2: Sinus Node Dysfunction

- Permanent pacemaker implantation is reasonable for individuals with sinus node dysfunction with a resting heart rate of less than 40 bpm when periodic symptomatic bradycardia is suspected.

CRID-8.3: Syncope

- Permanent pacemaker implantation may be reasonable or may be considered for individuals with syncope in the following settings:
  - Syncope of unexplained origin when clinically significant abnormalities of sinus node function are discovered or provoked in electrophysiological studies
  - Syncope without clear, provocative events and with a hypersensitive cardioinhibitory response of 3 seconds or longer
  - Significantly symptomatic neurocardiogenic syncope associated with Bradycardia documented spontaneously or at the time of tilt table testing
  - Syncope after cardiac transplantation even when bradyarrhythmia has not been documented

CRID-8.4: Asymptomatic Second Degree AV Block

- Permanent pacemaker implantation is reasonable for individuals with asymptomatic second degree AV block at intra- or infra- His levels found at electrophysiological study

CRID-8.5: First or Second AV Block

- Permanent pacemaker implantation is reasonable for individuals with first or second degree AV block with symptoms similar to those of pacemaker syndrome

CRID-8.6: Symptomatic Recurrent SVT

- Permanent pacemaker implantation is reasonable for individuals with symptomatic, recurrent SVT that is reproducibly terminated by pacing when catheter ablation and/or drugs fail to control the arrhythmia or produce intolerable side effects
CRID-8.7: Relative Bradycardia – Postoperative Cardiac Transplant

- Permanent pacemaker implantation may be considered for individuals when relative bradycardia is prolonged or recurrent, which limits rehabilitation or discharge after postoperative recovery from cardiac transplantation or in post-transplant syncope even if bradyarrhythmia has not been documented.

CRID-8.8: Incidental Finding at Electrophysiology (EP) Study

- Permanent pacemaker implantation may be reasonable for an incidental finding at electrophysiology study of a markedly prolonged HV interval (greater than or equal to 100 milliseconds) or non-physiological intra- or infra- Hisian block in asymptomatic patients.

CRID-8.9: Neuromuscular Diseases Known to Involve the Heart

- Permanent pacemaker implantation may be considered for progressive neuromuscular diseases known to involve the heart with any degree of AV block (including first degree AV block) or any fascicular block, with or without symptoms, because there may be unpredictable progression of AV conduction disease. Progressive neuromuscular diseases known to involve the heart include:
  - Myotonic muscular dystrophy
  - Kearns-Sayre syndrome
  - Erb dystrophy (limb-girdle muscular dystrophy)
  - Peroneal muscular atrophy

CRID-8.10: Cardiomyopathy with a history of heart failure and an LV Ejection Fraction less than 50% on optimal medical therapy

See: CRID-10: Cardiac Resynchronization Therapy (CRT)-P
CRID 9.1: Non-Indications

- Permanent pacemaker implantation is **not** indicated in any of the following settings:
  - Sinus node dysfunction in asymptomatic patients
  - Sinus node dysfunction in patients for whom the symptoms, suggestive of bradycardia, have been clearly documented to occur in the absence of bradycardia
  - Sinus node dysfunction in symptomatic patients due to nonessential drug therapy
  - Fascicular block without AV block or symptoms concerning for AV block
  - Incidentally noted hypersensitive cardioinhibitory response to carotid sinus stimulation without symptoms or with vague symptoms
  - Asymptomatic first degree AV block
  - Asymptomatic type I second degree AV block at the supra-His (AV node) level or that which is not known to be intra- or infra-Hisian
  - Permanent ventricular pacing not indicated for asymptomatic transient AV block in the absence of intraventricular conduction defects or in isolated single fascicular block
  - Permanent pacing not indicated for situational vasovagal syncope in which avoidance behavior is effective
CRID-10: Cardiac Resynchronization Therapy (CRT)-P

CRID-10.1: Indications for CRT-P
CRID-10.1: Indications for CRT-P

- High grade AV block and NYHA Class I, II or III Congestive Heart Failure:
  - CRT-P implantation is indicated in individuals who have all of the following:
    - LV ejection fraction less than 50%
    - NYHA Class I, II, or III heart failure
  - High grade AV block, including AV nodal ablation, requiring more than 40% pacing (CRT-P)

References


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# CRID-11: Leadless Implantable Devices

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CRID-11.1: Leadless Pacemaker

- Permanent RV leadless pacemakers (CPT® 33274) are implanted directly into the right ventricle and are capable only of VVI and VVIR pacing. They cannot be used for dual-chamber pacing, and the estimated battery life is about 10 years. While acute and sub-acute retrieval has been described from inadvertent misplacement of the devices, there are no current standards regarding the removal of chronic systems. As such, they are considered experimental and investigational at this time.

CRID-11.2: Wireless Cardiac Resynchronization

- Permanent LV leadless pacemakers (CPT® 0515T) are implanted directly in the left ventricle for synchronization with RV leads in the setting of cardiac resynchronization therapy. At this time they are considered experimental and investigational.

CRID-11.3: Wireless Pulmonary Artery Pressure Sensor

- (CPT® 33289) Wireless Pulmonary Artery Pressure Sensor devices (CardioMEMS™ HF System) are implanted into a branch of the pulmonary artery during right heart catheterization and require a specialized delivery system. These devices monitor constant pulmonary artery pressures over time, utilizing the concept that as pulmonary artery pressures increase, outpatient medical therapy can be adjusted. This can potentially reduce inpatient admissions and treatment. Although FDA approved, these devices have yet to be incorporated into the standard of care and remain investigational and experimental at this time.
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## Abbreviations for Head Imaging Guidelines

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<tr>
<td>ACTH</td>
<td>adrenocorticotropic hormone</td>
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<tr>
<td>AD</td>
<td>Alzheimer’s Disease</td>
</tr>
<tr>
<td>ADH</td>
<td>antidiuretic hormone</td>
</tr>
<tr>
<td>AION</td>
<td>arteritic ischemic optic neuritis</td>
</tr>
<tr>
<td>AVM</td>
<td>arteriovenous malformation</td>
</tr>
<tr>
<td>CBCT</td>
<td>Cone-beam computerized tomography</td>
</tr>
<tr>
<td>CMV</td>
<td>cytomegalovirus</td>
</tr>
<tr>
<td>CSF</td>
<td>cerebrospinal fluid</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>CTA</td>
<td>computed tomography angiography</td>
</tr>
<tr>
<td>DNA</td>
<td>deoxyribonucleic acid</td>
</tr>
<tr>
<td>DWI</td>
<td>diffusion weighted imaging (for MRI)</td>
</tr>
<tr>
<td>EEG</td>
<td>electroencephalogram</td>
</tr>
<tr>
<td>ENT</td>
<td>Ear, Nose, Throat</td>
</tr>
<tr>
<td>ESR</td>
<td>erythrocyte sedimentation rate</td>
</tr>
<tr>
<td>FDG</td>
<td>fluorodeoxyglucose</td>
</tr>
<tr>
<td>FSH</td>
<td>follicle-stimulating hormone</td>
</tr>
<tr>
<td>FTD</td>
<td>Frontotemporal Dementia</td>
</tr>
<tr>
<td>GCA</td>
<td>giant cell arteritis</td>
</tr>
<tr>
<td>GCS</td>
<td>Glasgow Coma Scale</td>
</tr>
<tr>
<td>HIV</td>
<td>human immunodeficiency virus</td>
</tr>
<tr>
<td>LH</td>
<td>luteinizing hormone</td>
</tr>
<tr>
<td>MMSE</td>
<td>mini mental status examination</td>
</tr>
<tr>
<td>MRA</td>
<td>magnetic resonance angiography</td>
</tr>
<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
</tr>
<tr>
<td>MRN</td>
<td>magnetic resonance neurography</td>
</tr>
<tr>
<td>MS</td>
<td>multiple sclerosis</td>
</tr>
<tr>
<td>MSI</td>
<td>magnetic source imaging</td>
</tr>
<tr>
<td>NAION</td>
<td>non-arteritic ischemic optic neuritis</td>
</tr>
<tr>
<td>NPH</td>
<td>normal pressure hydrocephalus</td>
</tr>
<tr>
<td>PET</td>
<td>positron emission tomography</td>
</tr>
<tr>
<td>PML</td>
<td>progressive multifocal leukoencephalopathy</td>
</tr>
<tr>
<td>PNET</td>
<td>primitive neuro ectodermal tumor</td>
</tr>
<tr>
<td>PWI</td>
<td>perfusion weighted imaging (for MRI)</td>
</tr>
<tr>
<td>SAH</td>
<td>subarachnoid hemorrhage</td>
</tr>
<tr>
<td>SIADH</td>
<td>Syndrome of Inappropriate Antidiuretic Hormone Secretion</td>
</tr>
<tr>
<td>SLE</td>
<td>systemic lupus erythematosus</td>
</tr>
<tr>
<td>TIA</td>
<td>transient ischemic attack</td>
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<tr>
<td>TMJ</td>
<td>temporomandibular joint disease</td>
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<tr>
<td>TSH</td>
<td>thyroid-stimulating hormone</td>
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<tr>
<td>VBI</td>
<td>vertebrobasilar</td>
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<tr>
<td>VP</td>
<td>ventriculoperitoneal</td>
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<tr>
<td>XRT</td>
<td>radiation therapy</td>
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**HD-1: General Guidelines**

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination and appropriate laboratory studies should be performed prior to considering the use of an advanced imaging (CT, MR, Nuclear Medicine) procedure. An exception can be made if the patient is undergoing a guideline-supported, scheduled follow-up imaging evaluation.

  - The clinical evaluation should include a relevant history and physical examination, including a neurological examination (unless the request is for a scheduled follow-up of known problems such as MS, tumors, or hydrocephalus, scheduled surveillance with no new symptoms, screening asymptomatic patient due to family history and otherwise meet criteria for repeat imaging), as well as appropriate laboratory studies and non-advanced imaging modalities
  
  - A neurological exam is required prior to advanced imaging except in the following scenarios:
    - Tinnitus, TMJ, Sinus or mastoid disease, ear pain, hearing loss and epistaxis.
    - The request is from a neurologist or neurosurgeon who has seen the patient since onset of symptoms
  
  - Other meaningful contact (telephone call, electronic mail or messaging) with an established patient can substitute for a face-to-face clinical evaluation

**HD-1.1: General Guidelines – Anatomic Issues**

- If two studies using the same modality both cover the anatomic region of clinical interest, only one is generally needed, with the exception of the following scenarios:

  - Maxillofacial CT (CPT® 70486, CPT® 70487, CPT® 70488) or orbital/temporal bone CT (CPT® 70480, CPT® 70481, CPT® 70482): both cover the structures of the orbits, sinuses, and face. Two separate imaging studies are only supported if there is suspicion of simultaneous involvement of more posterior lesions, especially of the region involving the middle or inner ear

  - Pituitary Gland: one study (either MRI Head [CPT® 70553] or MRI Orbit, Face, Neck [CPT® 70543]) is adequate to report the imaging of the pituitary. If a previous routine MRI Head was reported to show a possible pituitary tumor, a repeat MRI with dedicated pituitary protocol may be performed

  - Internal Auditory Canal: (IAC) MRI can be reported as a limited study with one code from the set (CPT® 70540, CPT® 70542, CPT® 70543), but should not be used in conjunction with MRI Head codes (CPT® 70551, CPT® 70552, CPT® 70553) if IAC views are performed as part of the brain

  - Mandible (jaw): Maxillofacial CT (CPT® 70486, CPT® 70487, CPT® 70488) or Neck CT (CPT® 70490, CPT® 70491, CPT® 70492) can be used to report imaging of the mandible. Neck CT will also image the submandibular space
    - If MRI is indicated, MRI Orbit, Face, Neck (CPT® 70540, CPT® 70542, or CPT® 70543) can be used to report imaging of the mandible and submandibular space
MRI of the Temporomandibular Joint(s) (TMJ) is reported as CPT® 70336. This code is inherently bilateral and should not be reported twice on the same date of service.

**HD-1.2: General Guidelines – Modality**

- MRI is preferable to CT for most indications. For exceptions, see **HD-1.4: General Guidelines – CT Head**.
- MRI may be performed for these indications following an initial CT:
  - MRI Head without and with contrast (CPT® 70553) may be performed to follow-up abnormalities seen on CT Head without contrast (CPT® 70450) when a mass, lesion, or infection is found.
  - MRI Head without contrast (CPT® 70551) or MRI Head without and with contrast (CPT® 70553) (preferred) may be performed to follow-up abnormalities seen on CT Head without contrast (CPT® 70450) when there is suspected Multiple Sclerosis or other demyelinating disease.
  - MRI Head without (CPT® 70551) or MRI Head without and with contrast (CPT® 70553) may be performed to follow up on stroke or TIA when initial CT Head was done on emergent basis.
  - MRI Head without and with contrast (CPT® 70553) for evaluation of new onset seizures.

**HD-1.3: General Guidelines – MRI Head**

- MRI, with contrast, (CPT® 70552) should not be ordered except to follow-up on a very recent non-contrast study (within two weeks).

The AMA CPT manual does not describe nor assign any minimum or maximum number of sequences for any CT or MRI study. Both MRI and CT imaging protocols are often influenced by the individual clinical situation of the patient and additional sequences are not uncommon. There are numerous MRI sequences that may be performed to evaluate specific clinical questions, and this technology is constantly undergoing development. Additional sequences, however, are still performed and coded under the routine MRI Brain CPT® 70551, CPT® 70552, or CPT® 70553.

**HD-1.4: General Guidelines – CT Head**

- Scenarios in which MRI is contraindicated (i.e. pacemakers, ICDs, cochlear implants, aneurysm clips, orbital metallic fragments, etc.)
- Head CT without contrast (CPT® 70450) in nearly all cases, to show:
  - Mass effect
  - Blood/blood products
  - Urgent/emergent settings due to availability and speed of CT
  - Trauma
  - Recent hemorrhage, whether traumatic or spontaneous
  - Bony structures of the head evaluations.
· Hydrocephalus evaluation and follow-up (some centers use limited non-contrast “fast or rapid MRI” (CPT® 70551) to minimize radiation exposure in children - these requests may be approved).
· Prior to lumbar puncture in patients with cranial complaints (without contrast) (CPT® 70450)

**HD-1.5: General Guidelines – CT and MR Angiography: (CTA and MRA)**

- Head MRA (CPT® 70544) is generally done without contrast
- MRA Neck may be done either without contrast, with contrast, or without and with contrast, depending on facility preference and protocols and type of scanner
- Head MRA or CTA may be considered with suspected intracranial vascular disease, for example:
  - Pulsatile tinnitus
  - Hemifacial spasm if consideration for surgical decompression
  - Evaluation of stroke or TIA (See **HD-21: Stroke/TIA**)
  - Trigeminal neuralgia failed medical therapy
  - Cerebral sinus thrombosis suspected with increased intracranial pressure (refractory headaches, papilledema, diagnosis of pseudotumor cerebri)
  - Aneurysm suspected with acute “thunderclap” headache syndrome and appropriate screening or evaluation of known subarachnoid hemorrhage
  - Intra-cranial pre-operative planning if there is concern of possible vascular involvement or risk for vascular complication from procedure
  - Suspicion of vasculitis based on supporting clinical evidence
  - NOTE: Evaluation of posterior circulation disease requires both neck and head MRA/CTA to visualize the entire vertebral-basilar system.
- CTA or MRA Head without or with or without and with contrast for follow up of aneurysm clipping or coiling procedures (See **HD-12.1: Intracranial Aneurysms**)
- CT and MR Venography (CTV and MRV) are reported with the same codes as the CTA/MRA counterpart:
  - If arterial and venous CT or MR studies are both performed in the same session, only one CPT® code should be used to report both procedures
  - MRA without and with contrast with venous sinus thrombosis to differentiate total from subtotal occlusion

**HD-1.6: General Guidelines – PET Coding Notes**

- Metabolic Brain PET should be reported as Metabolic Brain PET (CPT® 78608)
- Amyloid Brain PET should be reported as limited PET (CPT® 78811) or limited PET/CT (CPT® 78814)
HD-1.7: General Guidelines – Other Imaging Situations

- Nausea and vomiting, persistent, unexplained and a negative GI evaluation: can undergo MRI Head without contrast (CPT® 70551)
- See AB-1.10: Special Considerations in the Abdomen Imaging Guidelines
- ECT treatment to screen for intracranial disease: can undergo either MRI Head without contrast (CPT® 70551) or Head CT without contrast (CPT® 70450)
- Screening for metallic fragments before MRI should be done initially with plain x-ray.
  - The use of Orbital CT to rule out orbital metallic fragments prior to MRI is rarely necessary
  - Plain x-rays are generally sufficient; x-ray detects fragments of 0.12 mm or more, and CT detects those of 0.07 mm or more
- Plain x-ray is generally sufficient to screen for aneurysm clips
- CPT® 76377 (3D rendering requiring image post-processing on an independent workstation) can be considered when performed in conjunction with conventional angiography (i.e.: conventional 4 vessel cerebral angiography).

References
HD-2: Taste and Smell Disorders

HD-2.1: Taste and Smell Disorders
HD-2.1: Taste and Smell Disorders

- MRI Head without and with contrast (CPT® 70553) or without contrast (CPT® 70551) is considered with unexplained unilateral or bilateral anosmia (inability to perceive odor) or dysgeusia (loss of taste)\(^1,2\)

- If sinus or facial bone disorders is suspected, then consider initially Maxillofacial CT without contrast (CPT® 70486)\(^2\)

References
HD-3.1: Ataxia

MRI Head without and with contrast (CPT® 70553) or MRI Head without contrast (CPT® 70551) is considered in all patients with ataxia:¹

- If spinal disease is suspected add MRI Cervical, Thoracic and/or Lumbar spine without contrast (CPT® 72141, CPT® 72146, CPT® 72148)¹
- If these symptoms are acute and stroke is suspected See HD-21: Stroke/TIA
- If MS is suspected, See HD-16: Multiple Sclerosis (MS) and Related Conditions
- If these symptoms are acute following head trauma, CT Head without contrast (CPT® 70450) and/or CT Temporal Bone without contrast (CPT® 70480) can be added¹

Reference

https://acsearch.acr.org/docs/69477/Narrative/
# HD-4: Behavioral Disorders

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</table>
HD-4: Behavioral Disorders – General Information

Autism: See **PEDHD-17: Autism Spectrum Disorders**

HD-4.1: Behavioral Disorders

Neuroses and psychoses do not routinely need advanced imaging:

- Bipolar disorder, schizophrenia, and related disorders may require advanced imaging in the following clinical circumstances:
  - Atypical clinical presentation
    - Acute onset
    - Late onset over age 40
    - Presents in setting of general medical illness or intensive care setting
    - Non-auditory hallucinations (e.g., visual, tactile, olfactory)
    - Patients who fail to respond to treatment in the expected manner and who manifest features suggestive of an organic brain disorder (for example, focal deficits, severe headache, or seizures) may undergo
  
- MRI Head without contrast (CPT® 70551) or MRI Head without and with contrast (CPT® 70553), or CT Head without contrast (CPT® 70450)

References

HD-5: Chiari and Skull-Base Malformation

See Pediatric Head Guidelines, **PEDHD-9: Chiari and Skull Base Malformations**
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**HD-6.1: Facial Palsy**

Typical features of Bell’s palsy include spontaneous onset over 72 hours, otherwise normal neurological and systemic examination, variable initial ipsilateral temporal and auricular pain, and slow improvement over several months. Unless “red flags” are present, imaging is not necessary.

- MRI Brain without and with contrast (CPT® 70553) or MRI Head without contrast (CPT® 70551) (with attention to posterior fossa and IACs) is considered with the following “red flags” of unexplained facial paresis/paralysis in clinical scenarios with:¹,²
  - Trauma to the temporal bone²
  - History of tumor² systemic cancer, HIV or Lyme disease
  - No improvement in 8 weeks¹
  - No full recovery in 3 months²
  - Gradual onset over weeks to months
  - Vertigo or hearing loss
  - Bilateral involvement
  - Other atypical or Inconsistent features² including:
    - Second episode of paralysis on the same side²
    - Paralysis of isolated branches of the facial nerve²
    - Paralysis associated with other cranial nerves²

- MRI Head without and with contrast (CPT® 70553) may be considered for known sarcoidosis with suspected neurosarcoid or CNS involvement

**HD-6.2: Hemifacial Spasm**

- MRI Brain without and with contrast (CPT® 70553)

- May add CTA Head (CPT® 70496) or MRA Head (CPT® 70544) prior to a vascular decompression surgical procedure to clarify the vascular anatomy in patients who have failed conservative medical management

**References**

**HD-7.1: Recurrent Laryngeal Palsy**

The following can be considered with unilateral vocal cord/fold palsy identified by laryngoscopy¹

- MRI Head without and with contrast (CPT® 70553) or MRI Head without contrast (CPT® 70551)
- CT Neck with contrast (CPT® 70491) or MRI Neck without and with contrast (CPT® 70543)
- CT Chest with contrast (CPT® 71260) may be added with left vocal cord palsy¹

**Reference**

### HD-8: Dementia

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**HD-8.1: Dementia**

MRI Head without contrast (CPT® 70551) or MRI Head without and with contrast (CPT® 70553) or CT Head without contrast (CPT® 70450) is considered after an initial clinical diagnosis of dementia\(^3,4\) has been established based on a detailed history of memory loss with impairment of day-to-day activities confirmed by family members or others with knowledge of the patient’s status and/or abnormal bedside mental status testing such as Mini-Mental Status Exam (MMSE) with score <26, Montreal Cognitive Assessment Survey (MoCA) with score <26, Memory Impairment Screen (MIS) with score <5, and the St. Louis University Mental Status (SLUMS) with score <21. Neuropsychological testing can be performed when history and bedside mental status examination cannot provide a confident diagnosis\(^1,2\).

**Practice Notes**

3D analysis of the temporal lobes and hippocampus (also known as volumetric analysis or Neuro Quant) lacks sufficient specificity and sensitivity to be clinically useful in the evaluation or follow up of patient with dementia, and it’s use is limited to research studies.

**HD-8.2: Dementia - PET**

Send these requests for Medical Director review. Amyloid Brain PET (CPT® 78811 or CPT® 78814) imaging is considered experimental and investigational in the diagnosis of Alzheimer’s disease and in differentiating between Alzheimer’s disease and other neurodegenerative/neurologic disorders.\(^3,4,5\) Amyloid PET studies may be approved one time for Medicare patients enrolled in approved clinical trials under Coverage with Evidence Development (CED) program. For CMS, approval with CED is available for patients enrolled in studies approved by CMS. See the link below for a list of the CMS approved clinical trials: [https://www.cms.gov/Medicare/Coverage/Coverage-with-Evidence-Development/Amyloid-PET.html](https://www.cms.gov/Medicare/Coverage/Coverage-with-Evidence-Development/Amyloid-PET.html)

- FDG Brain PET (CPT® 78608) is considered experimental and investigational in the diagnosis of Alzheimer’s disease and in differentiating between Alzheimer’s disease and other neurodegenerative/neurologic disorders
  - CPT® 78608 is used to report FDG PET metabolic brain studies for dementia, seizure disorders, and dedicated PET tumor imaging studies of the brain
  - CPT® 78609 is used to report PET Brain perfusion studies that are not performed with FDG. These scans are nationally noncovered by Medicare
  - Amyloid-beta (Aβ) Brain Studies:
    - Medicare will reimburse for Brain PET only through CED
    - Only one study will be paid per beneficiary and the radiopharmaceutical must be FDA-approved. As of September 2, 2016, examples of radiopharmaceuticals which met this qualification include Amyvid™ (florbetapir F18), Neuraceq™ (florbetaben F18) and Vizamyl™ (flutemetamol F18)
FDG PET for Dementia and Neurodegenerative Diseases

- Medicare covers FDG PET for individuals with a recent diagnosis of dementia and documented cognitive decline of at least six months who meet diagnostic criteria for both Alzheimer’s disease (AD) and Frontotemporal Dementia (FTD).
- The individual must have been evaluated for specific alternate neurodegenerative diseases or other causative factors, but the etiology of the symptoms remains unclear.
- Other conditions must also be met. For the complete coverage policy, see the Medicare National Coverage Determinations (NCD) Manual, Section 220.6.13.
- Medicare also covers FDG PET for individuals with mild cognitive impairment or early dementia when the study is performed in the context of a CMS-approved clinical trial. Requirements are detailed in Section 220.6.13 of the NCD Manual.
- All other uses of FDG PET for patients with a presumptive diagnosis of dementia-causing neurodegenerative disease for which CMS has not specifically indicated coverage continue to be noncovered. Examples of noncovered indications described in the NCD include: possible or probable Alzheimer’s disease (AD), clinically typical fronto-temporal dementia (FTD), dementia of Lewy bodies, and Creutzfeld-Jacob disease.


Practice Notes

The frontotemporal dementias (FTDs) are a group of neurodegenerative disorders that differ from Alzheimer’s disease. The basic pathology involves accumulation of tau proteins in the brain rather than amyloid. Onset tends to be younger (less than 65) and progression usually more rapid than in senile dementia-Alzheimer type (SDAT). There is no treatment, and the medications used to help memory in Alzheimer’s disease are not effective.

There are several subtypes of FTD; most common are the behavioral variant with early loss of executive functions, impaired judgment disinhibition and impulsivity, and the semantic variant with primary and progressive loss of language ability. Other less common subtypes include progressive supranuclear palsy, corticobasal syndrome, and FTD associated with motor neuron disease.

Diagnosis is based on clinical features, neuropsychological testing, and brain imaging (preferably MRI) to rule out other structural disease. Metabolic (FDG) PET Brain may also be helpful by demonstrating patterns of abnormality more consistent with FTD than Alzheimer’s disease.

For additional information: http://www.alz.org/dementia/fronto-temporal-dementia-ftd-symptoms.asp.
References


**HD-9.1: Epilepsy/Seizures**

- MRI Head without and with contrast (CPT® 70553) or MRI Head without contrast (CPT® 70551) may be considered
  - For refractory or drug resistant seizures
  - For preoperative planning
    - PET (CPT® 78608) can be considered for planning in patients with seizures who are candidates for surgical treatment

- MRI Head without and with contrast (preferred study) (CPT® 70553) or MRI Head without contrast (CPT® 70551) may be considered
  - For new onset seizures
  - If CT Head was performed for an initial evaluation, MRI (as described above) may be approved for additional evaluation
  - Follow-up studies after a previous routine normal study may be considered if performed with special “Epilepsy Protocol” (typically 3T magnet, thin sections with angled slices through hippocampus and temporal lobes)

- FDG PET for Refractory Seizures
  - Medicare covers FDG PET for pre-surgical evaluation for the purpose of localization of a focus of refractory seizure activity.

**References**


HD-10: Facial Pain/Trigeminal Neuralgia

HD-10.1: Facial Pain/Trigeminal Neuralgia
**HD-10.1: Facial Pain/Trigeminal Neuralgia**

- MRI head without and with contrast (CPT® 70553) (with special attention to the skull base), and/or facial imaging orbital MRI without and with contrast (CPT® 70543) may be of value in a given case, including:
  - Suspected tic douloureux or one of its cranial nerve variants such as glossopharyngeal neuralgia (CN IX)
  - Concern about an underlying diagnosis of multiple sclerosis.
  - Trigeminal neuralgia which involves the ophthalmic nerve, (periorbital or forehead pain), once post-herpetic neuralgia (a complication of shingles) has been excluded by history
- See [HD-1.5: General Guidelines - CT and MR Angiography: (CTA and MRA)](HD-1.5)
- See [HD-6.2: Hemifacial Spasm](HD-6.2)

**Practice Notes**
The differential diagnosis of facial pain is extensive, complex, and difficult, and there is considerable case-to-case variation in optimal imaging pathway.

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HD-11.1: Headache Non-Indications

Neuroimaging is not usually warranted in patients with migraine and a normal neurologic examination.⁴

- Advanced imaging of the head is NOT indicated for any of the following:
  - Primary headache disorder in the absence of focal neurological deficits or “red flags” (headaches that meet criteria for migraine or tension variety) (See HD-11.2: Headaches with Red Flags)
  - Chronic headaches or intermittent recurring headaches with a normal exam, no significant recent changes in pattern or character of headache
  - A new, recent onset headache without “red flags” or findings such as focal deficits, papilledema, age over 50, headache that awakens patient from sleep, or “thunderclap” headache

Practice Notes

Cervicogenic Headache - Defined as headaches caused by a disorder of the cervical spine, usually accompanied by neck pain or other signs and symptoms of cervical disease. Typical findings include reduced cervical range of motion, side-locked pain, and symptoms exacerbated by provocative maneuvers such as head movement or digital pressure. If suspected clinically, MRI Cervical Spine without contrast (CPT® 72141) or MRI Cervical Spine without and with contrast (CPT® 72156) if suspicion of infection, neoplasm or recent surgery. See SP-3: Neck (Cervical Spine) Pain Without/With Neurological Features and Trauma

HD-11.2: Headaches with Red Flags

- Red Flags:
  - Unusual symptoms or history (fever, cancer history, immunosuppression, sudden onset, new onset age > 50, history of head trauma, headache awakens patient from sleep, headache precipitated by cough or valsalva); OR
  - Abnormal examination findings (altered mental status, papilledema, focal signs or symptoms, headache accompanied by seizures, meningismus)

- Chronic headache with significant change in character, severity or frequency of headache or transformation to chronic daily headache, or development of any “red flag” findings noted above

- If any of the above abnormal findings are present, the following advanced imaging studies may be considered:
  - MRI head without and with contrast (preferred study) (CPT® 70553); or
  - MRI head without contrast (CPT® 70551); or
  - CT head without contrast (CPT® 70450)
  - MRA/MRV (CPT® 70544) or CTA/CTV (CPT® 70496) can be added to evaluate the recent onset of a progressive, severe, daily headache, with or without papilledema.

See HD-17: Papilledema/Pseudotumor Cerebri
HD-11.3: Sudden Onset of Headache

- For sudden onset of headache including:
  - Worst, most severe headache ever experienced or thunderclap-type\(^1,2,6\) (example: awakening from sleep)\(^2,4\)
  - Sudden onset unilateral headache, suspected carotid or vertebral dissection or ipsilateral Horner syndrome\(^1\)

- If any of these onset of headache features are present, the following advanced imaging studies may be considered:
  - CT Head without contrast (preferred study) (CPT® 70450); or
  - MRI Head without contrast (CPT® 70551) or MRI without and with contrast (CPT® 70553) and
  - CTA Head with contrast (CPT® 70496); or
  - MRA Head without and with contrast (CPT® 70546); or
  - MRA Head without contrast (CPT® 70544); or
  - If arterial dissection is suspected an MRA Neck or CTA Neck may also be performed

See HD-12.1: Intracranial Aneurysms and HD-21.1: Stroke/TIA

HD-11.4: Trigeminal Autonomic Cephalgias

- Trigeminal autonomic cephalgias includes cluster headache short-lasting, unilateral, neuralgiform headache attacks with conjunctival injection and tearing (SUNCT) syndromes; hemicrania continua.
  - May also include one-time pituitary screening\(^1,12\)

- Cluster Headache (may also include pituitary)

- The following advanced imaging studies may be considered for trigeminal autonomic cephalgias and cluster headache:
  - MRI Head without and with contrast (preferred study) (CPT® 70553); or
  - MRI Head without contrast (CPT® 70551)

See HD-10: Facial Pain/Trigeminal Neuralgia

HD-11.5: Skull Base, Orbit, Periorbital or Oromaxillary

- Skull base, orbital, periorbital or oromaxillary\(^1\) imaging is appropriate for concern of skull base tumors in patients with head and neck cancers, other skull base abnormalities seen on previous imaging, any invasive sinus infections as well as sinus tumors or orbital tumors with intracranial extension. In these clinical scenarios, any one of the following procedures may be considered:
  - MRI Head and Orbits without and with contrast (preferred study) (CPT® 70553 and CPT® 70543); or
  - MRI Head and Orbits without contrast (CPT® 70551 and CPT® 70540); or
  - CT Head and Orbits without and with contrast (CPT® 70470 and CPT® 70482); or
  - CT Head and Orbits with contrast (CPT® 70460 and CPT® 70481)
HD-11.6: Suspected Intracranial Extension of Sinusitis or Mastoiditis

- For suspected intracranial extension of sinusitis or mastoiditis, not cervicogenic
  - MRI Head without and with contrast (CPT® 70553) may be considered (See HD-29: Sinusitis)

HD-11.7: New Headache Onset Older than Age 50

- For new onset headache in patients older than 50 years of age, the following may be considered:
  - MRI Head without and with contrast (preferred study) (CPT® 70553); or
  - MRI Head without contrast (CPT® 70551);
  - If Giant Cell Arteritis is suspected, MRA Head without and with contrast (CPT® 70546) may be added.

HD-11.8: Cancer or Immunosuppression

- For new headache in patients with cancer or who are immunocompromised, the following may be considered:
  - MRI Head without and with contrast (preferred study) (CPT® 70553); or
  - MRI Head without contrast (CPT® 70551)

HD-11.9: Prothrombotic States

- For Prothrombotic states including anticoagulation, the following may be considered:
  - MRI Head without and with contrast (CPT® 70553); or
  - CT Head without contrast (CPT® 70450);
  - If there is concern for venous sinus thrombosis in those with hypercoaguable states, MRA/MRV (CPT® 70544) or CTA/CTV (CPT® 70496) may be added

- Taking one or more anticoagulants is a red flag for headaches or head trauma and imaging is indicated. Anticoagulants include warfarin, Arixtra, Xarelto, Eliquis, Savaysa, Heparin, Fragmin, Innohep, Lovenox, Orgaran, Angiomax, Pradaxa, Acova, Iprivask and Refludan.

- Taking two or more antiaggregants is a red flag for headaches or head trauma and imaging is indicated. Antiaggregants include aspirin, Plavix, Aggrenox, Brilinta, Pravigard, Pletal, Effient, Kengreal, Persantine, and Ticlid.

HD-11.10: Pregnancy

- For new onset headache in pregnancy, the following may be considered:
  - MRI Head without contrast (Gadolinium relatively contraindicated in pregnancy) (CPT® 70551)
  - MRA/MRV (CPT® 70544) or CTA/CTV (CPT® 70496) may be added if there is concern for venous sinus thrombosis.
**HD-11.11: Physical Exertion**
- For onset of headache with Valsalva maneuver, cough, physical exertion or sexual (post-coital) activity, but not merely a worsening of a pre-existing headache with these activities, the following procedures may be considered:
  - MRI Head without and with contrast (preferred study) (CPT® 70553); or
  - MRI Head without contrast (CPT® 70551); or
  - CT Head without contrast (CPT® 70450); and
  - MRA Head without contrast (CPT® 70544) or
  - CTA Head without and with contrast (CPT® 70496)

**HD-11.12: Post-Trauma**
- For post-traumatic headaches within 2 weeks of the injury See **HD-13: Head Trauma**
- For post-traumatic headaches persisting for longer than 2 weeks following the injury, but within one year of the injury, the following may be considered:
  - CT Head without contrast (CPT® 70450); or
  - MRI Head without contrast (CPT® 70551); or
  - MRI Head without and with contrast (CPT® 70553)

**HD-11.13: Acute Systemic Infections**
- For acute systemic infections with meningeal neck stiffness the following may be considered:
  - MRI Head without and with contrast (preferred study) (CPT® 70553); or
  - MRI Head without contrast (CPT® 70551)

**HD-11.14: Hydrocephalus Shunts**
- For new onset of headache or neurologic deficits in adults with known hydrocephalus and shunts, the following may be considered:
  - MRI Head without and with contrast (CPT® 70553); or
  - CT Head without contrast (CPT® 70450); or
  - MRI Head without contrast (CPT® 70551)

**HD-11.15: Low Pressure Headache and CSF Leak**
Evaluation of suspected low pressure headache and CSF leak may include MRI Head without and with contrast (CPT® 70553) and MRI Cervical, Thoracic and Lumbar spine, which according to facility protocols may be completed without contrast (CPT® 72141, CPT® 72146, and CPT® 72148), with and without contrast (CPT® 72156, CPT® 72157, and CPT® 72158) or with contrast only (CPT® 72142, CPT® 72147, and CPT® 72149) or CT myelography (CT Cervical, Thoracic, and Lumbar spine with contrast [CPT® 72126, CPT® 72159, CPT® 72132])
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**HD-12.1: Intracranial Aneurysms**

- Head CTA (CPT® 70496) or Head MRA (CPT® 70544) can be performed in any of the following clinical scenarios:
  - Symptoms or signs of cerebral aneurysm, including:
    - “Thunderclap headache” See **HD 11.3: Sudden Onset of Headache**
    - Third nerve palsy with pupillary involvement (pupil-sparing third nerve palsies are not caused by external compression)
    - Suspicion of aneurysm bleed [CT Head or MRI Brain or CSF exam showing evidence of subarachnoid hemorrhage (SAH) or intracerebral hemorrhage]
    - Abnormal Head CT or MRI Brain suggesting possible aneurysm
  - Screening for High Risk Populations as defined by the following criteria (screening usually begins at age 20 unless unusual circumstances as aneurysms are uncommon in children and adolescents):
    - Positive Family History: Two or more first degree relatives (parent, sibling, or child) with history of cerebral aneurysm or SAH: screening every 5 years beginning at age 20
      - One first degree relative (parent, sibling, or child) with history of cerebral aneurysm or SAH may also have one screening study but risks and benefits should be discussed with patient
    - Autosomal dominant polycystic kidney disease (screening begins at age 20 to 65 and is repeated at ten-year intervals)
    - Aortic coarctation or bicuspid aortic valve
    - Type 4 (Vascular) Ehlers-Danlos Syndrome
    - Marfan’s Syndrome
    - Loeys-Dietz Syndrome
    - Microcephalic osteodysplastic primordial dwarfism
    - Patients with previous history of SAH or treatment for cerebral aneurysm: continued surveillance and screening every 5 years
  - Follow up of known cerebral aneurysm
    - Known incidentally discovered aneurysms which have never bled. The optimal interval and duration of recommended follow up in the literature are undefined. The risk of aneurysm rupture is related to size, location (posterior circulation is higher risk), and patient factors including age, sex (higher for female), and history of smoking and hypertension.
    - Follow up at 6 months, 12 months and then annually for up to 5 years or until aneurysm is determined to be stable; and then at decreasing frequency, generally every 5 years unless judged to be at higher risk (see above risk factors).
    - MRI Brain without contrast (CPT® 70551) or with and without (CPT® 70553) may be added if there are new signs, symptoms or clinical findings, or to evaluate giant aneurysm (>2.5 cm).
  - Follow up of treated aneurysms, clipping or coiling (with or without SAH)
    - Follow up at 3 to 6 month intervals for the first year, then 6 to 12 months for up to 2 years, then annually to ensure that aneurysm is not recanalizing. If stable and occluded at last imaging then follow up surveillance every 5 years.
    - MRA Head without contrast (CPT® 70544), with contrast (CPT® 70545), or
without and with contrast (CPT® 70546) or CTA Head (CPT® 70496) at discretion of the specialist (neurosurgeon)

- Spinal MRI (Cervical, Thoracic, Lumbar (without and with contrast) (CPT® 72156, CPT® 72157, CPT® 72158) is appropriate to evaluate patients with SAH and negative studies for brain aneurysm in whom spinal abnormalities (i.e. AVM) may be suspected as the cause of hemorrhage.

**HD-12.2: Arteriovenous Malformations (AVMs) and Related Lesions**

- MRI Head without and with contrast (CPT® 70553) or without contrast (CPT® 70551) may be considered in the following clinical scenarios:
  - AVM is suspected based on a history of SAH.
  - Screening for:
    - Hereditary hemorrhagic telangiectasia syndrome (Osler Weber Rendu).
    - Familial cavernous malformation: Screening should include MRI Head without or with contrast (with gradient echo images).

- In addition to MRI, one Head CTA (CPT® 70496) or Head MRA (CPT® 70544) can be performed for screening. If negative, no further screening studies are indicated

- Head CTA (CPT® 70496) or brain MRA (CPT® 70544 or CPT® 70546) may be considered when known AVM are being evaluated for embolization or surgery

- Repeat advanced imaging with MRI Head without and with contrast (CPT® 70553) or without contrast (CPT® 70551), plus MRA Head (CPT® 70544) or CTA Head (CPT® 70496) may be considered depending on the character of the disease and risk factors, or in the following clinical scenarios:
  - New hemorrhage episode is likely
  - Onset or change of seizures
  - Focal neurological signs
  - As follow up after treatment (surgery or embolization) as requested by specialists.

**Practice Notes**

Trauma is the most common reason for subarachnoid hemorrhage. Ruptured berry aneurysm is the most common reason for non-traumatic subarachnoid hemorrhage in adults.

Small aneurysms are present in about 1 to 2% of adults, but very few ever reach a size for which bleeding is a risk (> 5 mm). Small (< 3 to 4 mm) unruptured aneurysms in those with no personal history of SAH have a 0.1% to 0.5% a year rate of bleeding. The risk of cerebral aneurysm with family history ranges from 2% with one first degree relative to 30 to 35% for identical twin or two parents. The risks and benefits of screening these populations need to be considered before advanced imaging.

AVMs most often come to clinical notice either by bleeding or by acting as a seizure focus. They are usually congenital, recognized later in life and have an initial risk of bleeding of 2% per year.
References


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**HD-13.1: Head Trauma**

Patients with head trauma are at risk for facial and cervical trauma.

See **SP-3: Neck (Cervical Spine) Pain Without/With Neurological Features and Trauma**

- Head CT without contrast (CPT® 70450) is the primary imaging modality in patients with acute head trauma and any of the following modified Canadian Criteria:
  - Taking one anticoagulant or two antiaggregants, (e.g., aspirin and Plavix)
  - Known platelet or clotting disorder
  - Renal failure (creatinine > 6)
  - Glasgow coma scale (GCS) score of less than 15 at 2 hours following injury
  - > 30 minutes of amnesia
  - Any “dangerous mechanism of injury” (fall greater than 5 steps down stairs or from height greater than 3 feet; any pedestrian motor vehicle accident or ejection from motor vehicle)
  - Suspected open skull fracture
  - Signs of basilar skull fracture
  - Two or more episodes of vomiting
  - Patient > 64 years old

- MRI Head without contrast (CPT® 70551) is thereafter used when the clinical findings are not explained by the CT results or to evaluate late effect of brain injury

- Follow-up imaging, MRI or CT, for known subdural hematomas, intracerebral hemorrhage, or contusions can be done at the discretion of ordering specialist

**Practice Note**

Recent studies have shown that Diffusion tensor MRI tractography may be more sensitive in demonstrating abnormalities such as axonal injury in closed head injury than conventional MRI, but these techniques are best described presently as research tools and their use in routine clinical practice is not determined.

Decisions regarding return to normal activities, including sports, are made based on the clinical status of the patient and repeat imaging is unnecessary.

**References**


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HD-14.1: CNS Infection

- Signs of intracranial infection include: 1) headaches, seizures or new focal deficits in a setting of fever or elevated white blood cell count (WBC); 2) known infection elsewhere; 3) or immunosuppression. The following studies may be considered for suspected intracranial infection if any of these signs of infection are present:
  - MRI Head without and with contrast (CPT® 70553) (preferred), or
  - MRI Head without contrast (CPT® 70551), or
  - CT Head without contrast (CPT® 70450), or
  - CT Head without and with contrast (CPT® 70470)

References

HD-15.1: Movement Disorders

- The majority of movement disorders are diagnosed based on a clinical diagnosis and do not require imaging. These include:
  - Typical Parkinson’s Disease\(^1\)
  - Essential Tremor or tremors of anxiety or weakness
  - Restless Leg Syndrome
  - Tics or spasms which can be duplicated at will

- MRI of the Brain without, or without and with contrast (CPT\(®\) 70551 or CPT\(®\) 70553) is considered in the following clinical scenarios:
  - Atypical Parkinsonism because of unusual clinical features (for example, persistent unilateral signs and symptoms, young onset under age of 50, rapid progression), incomplete or uncertain medication responsiveness, or clinical diagnostic uncertainty.\(^1\) These cases should be forwarded for medical director review.
  - Suspected Huntington Disease\(^1\)
  - Evaluation for surgical treatment of Essential Tremor or Parkinson’s disease, including Deep Brain Stimulator placement.

- DAT-SPECT (ioflupane I-123 SPECT) (CPT\(®\) 78607) may be considered:
  - To evaluate patients in whom the diagnosis and differentiation between Parkinson’s disease and Essential Tremor remains unclear after evaluation by experts in movement disorders and medication trials.
  - DAT Scans are not useful for differentiation of subtypes of Parkinson’s syndromes, to monitor progression of disease or predict risk of development of disease.

Practice Notes

There is little evidence to support the use of MRA/CTA and PET in the evaluation of movement disorders.\(^2\)
References


**HD-16.1: Multiple Sclerosis (MS)**

- MRI Head without and with contrast (CPT® 70553) and MRI Cervical and Thoracic spine without and with (CPT® 72156 and CPT® 72157) use in these clinical scenarios requires clinical suspicion based on recurrent episodes of variable neurological signs and symptoms or clinically isolated syndromes and the baseline exclusion of appropriate alternative conditions that can mimic MS. An Orbital MRI without and with contrast (CPT® 70543) may be considered if optic neuritis is suspected, in addition to the above scenario.

- If a non-contrast study shows incidental evidence of possible demyelinating disease, repeat with MRI Brain with contrast (CPT® 70552) may be approved within 2 weeks of previous non-contrast study as the presence of enhancing lesions may be helpful in confirming the diagnosis. If non-contrast study was performed more than 2 weeks prior to the request for repeat imaging, an MRI Brain with and without contrast (CPT® 70553) is appropriate.

- If the diagnosis is still equivocal after initial screening repeat studies in 3 to 6 months may be performed.

- Evidence does not support the use of 3T MRI as being more effective than 1.5T units for diagnosis or follow up of MS. Requests for repeat imaging should meet guidelines for timeliness as noted within these guidelines regardless of type of facility requested.

- MRI Lumbar spine usually is not needed since Cervical and Thoracic studies will usually visualize the entire spinal cord.

- Repeat Brain and/or Spine imaging in an established patient may be considered in the following scenarios:
  - New episode of neurological deficit
  - Baseline, in 3 to 6 months and then annually when instituting or maintaining immune-modulating agents and when changing therapy
  - Symptoms suggestive of Progressive Multifocal Leukoencephalopathy (PML) during Tysabri therapy.
    - Screening for patients on natalizumab (Tysabri) or other drugs with risk of PML (Progressive Multifocal Leukoencephalopathy)
      - If Anti-JCV antibody negative: MRI Brain annually
      - If Anti-JCV antibody positive: MRI every 6 months
      - If Anti-JCV antibody positive and titer > 1.5, and > two years on treatment: MRI Brain may be performed every 3 months.

- Repeat imaging requests for MRI without contrast for follow up may be approved when requested by a specialist.

- Family members need not be screened, unless they exhibit suspicious signs or symptoms suggestive of MS.
**Practice Notes**

Multiple Sclerosis is common and variable with more women affected and at a younger age than men. MS tends to be relapsing-remitting (improves between episodes), relapsing-progressive (worsens with attacks) and chronic progressive (gradual and steady).

MS is a clinical diagnosis, traditionally recognized by “lesions dispersed in time and space,” which means involvement of different areas of the neuraxis at different times.”

Screening based on family history of MS is not supported by the peer-reviewed evidence.

Sagittal MRI of the Spinal cord with phased array detector coil (CPT® 72156 or CPT® 72157) is an alternative spinal imaging.

**References**

HD-17: Papilledema/Pseudotumor Cerebri

HD-17.1: Papilledema/Pseudotumor Cerebri
HD-17.1: Papilledema/Pseudotumor Cerebri

- MRI Head without and with contrast (CPT® 70553) can be considered when there is suspected elevated intracranial pressure, such as with pseudotumor cerebri (benign intracranial hypertension) and papilledema, to exclude cerebral mass lesions, obstructive hydrocephalus, or occult meningeal disease.
  - Orbital MRI (CPT® 70543) or Orbit CT without and with (CPT® 70482) may be considered if there is concern for orbital pseudotumor or a primary bilateral orbital disorder.
  - Repeat imaging may be considered to evaluate either:
    - Shunt dysfunction in those patients who have had ventriculoperitoneal (VP) or lumboperitoneal (LP) shunts
    - Clinical deterioration
  - MRA Head without contrast or CTA Head without and with contrast can be approved for papilledema with suspected venous sinus thrombosis.
    - CT and MR Venography (CTV and MRV) are reported with the same codes as the CTA/MRA counterpart. If arterial and venous CT or MR studies are both performed in the same session, only one CPT® code should be used to report both procedures.
  - See HD-1.5: General Guidelines - CT and MR Angiography: (CTA and MRA) for information regarding contrast in MRA.

Reference
<table>
<thead>
<tr>
<th>HD-18: Paresthesias</th>
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<td>HD-18.1: Paresthesias</td>
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</table>
HD-18.1: Paresthesias

Requests will be sent for Medical Director review. Paresthesia(s) (localized numbness and tingling) are symptoms of a local (nerve entrapment for example), regional (Multiple Sclerosis for example) or central (stroke for example) disorder. Advanced imaging can be considered initially, based on the highest suspicion disorder, according to these guidelines.

References
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<tr>
<td>HD 19.2: Additional Imaging</td>
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**HD-19.1: Pituitary**

- Endocrine laboratory studies should be performed prior to considering advanced imaging, including Prolactin levels; thyroid function levels should also be checked to evaluate for untreated or inadequately treated hypothyroidism as a cause of hyperprolactinemia and pituitary hyperplasia
  - Lab results should be recent, within 6 weeks of the request.

- Pituitary imaging is primarily performed with MRI Head without and with contrast (CPT® 70553):
  - MRI Orbit, Face, Neck (CPT® 70543) or CT Head without and with contrast (CPT® 70470) are alternatives
  - CT Head without contrast (CPT® 70450) or without and with contrast (CPT® 70470) and/or CT Maxillofacial without contrast (CPT® 70486) is occasionally used in addition to MRI to visualize perisellar bony structures in the preoperative evaluation of certain sellar tumors and for preoperative planning for transphenoidal approaches

- Incidentally found lesions on other studies:
  - If a pituitary abnormality is reported incidentally on a MRI Brain or CT Brain performed for other reasons, a follow-up dedicated pituitary study may be obtained (MRI Brain without and with contrast CPT® 70553 or MRI Orbit/Face/Neck CPT® 70543. CPT® 70553 covers both brain and dedicated pituitary if performed at the same time; no additional CPT® codes are needed); further evaluation and subsequent imaging dependent on specific imaging and biochemical laboratory evaluation findings.

### Pituitary Imaging

<table>
<thead>
<tr>
<th>Microadenoma (&lt; 10 mm)</th>
<th>Indication</th>
<th>Initial Imaging</th>
<th>Repeat Imaging</th>
</tr>
</thead>
</table>
| **Acromegaly**
  (Elevated IGF-1 confirmed by lack of suppression of growth hormone on glucose suppression testing, with or without acromegaly) | MRI Head without and with contrast (CPT® 70553) | ➢ MRI Brain without and with contrast (CPT® 70553)
  ➢ At least 12 weeks after surgery to evaluate for residual tumor
  ➢ If treated with Pegvisomant, 6 to 12 months after treatment initiated, then annually if stable
  ➢ If hormone levels increase or neurological findings appear | |
| **Microadenoma**: Nonfunctioning, unexplained pituitary asymmetries, and incidentally found small tumors (< 10 mm) | MRI Head without contrast and with contrast (CPT® 70553) | ➢ MRI Head without contrast and with contrast (CPT® 70553) at:
  ➢ 6 and 12 months, then yearly for 3 years if stable. After 3 years, then every other year for the next 6 years, then every 5 years if stable | |
| **Rathke’s cleft cyst/Simple cyst** | MRI Head without and with contrast (CPT® 70553) | ➢ MRI Head without and with contrast (CPT® 70553) in one year; if stable and without mass effect or invasion into surrounding structures, no further imaging is required. | |
### Prolactinomas*

- MRI Head without and with contrast (CPT® 70553) with:
  - Unexplained elevated prolactin level above normal reference range
  - After initial start of dopamine agonist therapy, repeat MRI in 1 year (or in 3 months if macroadenoma), also repeat if prolactin levels continue to rise while on dopaminergic agents, or if new symptoms emerge (e.g., galactorrhea, visual disturbances, headaches, or other hormonal disorders occur)
  - Image after 2 years of dopamine agonist treatment for those who are being considered for discontinuation of treatment due to remission
  - After 2 years of dopamine agonist therapy, for those who have achieved normal Prolactin levels and no visible tumor remnant, and for whom dopamine agonists have been discontinued or tapered, image if prolactin level increases above normal range.
  - Galactorrhea/nipple discharge with normal prolactin and thyroid function levels: See [BR-7: Nipple Discharge/Galactorrhea](#)

### TSH, FSH, ACTH and LH producing

MRI Head without and with contrast (CPT® 70553) when hormone levels are inappropriately elevated.

### Male Hypogonadism

- MRI Head without and with contrast (CPT® 70553) if
  - Severe secondary hypogonadism (morning serum testosterone level < 150 ng/dl and low or normal LH and FSH levels)
  - Serum, free, or bioavailable morning testosterone level below normal range and low or normal LH and FSH levels accompanied by one of the following:
    - Panhypopituitarism, hyperprolactinemia, symptoms or signs of tumor mass effect (e.g. headache, visual impairment, or visual field deficit), ****suspected alterations in sex hormone binding globulin (SHBG)

### Panhypopituitarism

MRI Head without and with contrast (CPT® 70553)

<table>
<thead>
<tr>
<th>ADH Abnormalities</th>
<th>Indication</th>
<th>Initial Imaging</th>
<th>Repeat Imaging for Non-Operative Care</th>
</tr>
</thead>
</table>
| **Diabetes Insipidus (DI)** | MRI Head without and with contrast (CPT® 70555) if:  
- Laboratory testing consistent with DI (serum osmolality should be high and urine osmolality should be low) and etiology uncertain | NA |
| **Syndrome of Inappropriate ADH (SIADH)** | MRI Head without and with contrast (CPT® 70555) if:  
- Etiology remains uncertain or is thought to be in the nervous system;  
- Urine osmolality should be high and serum osmolality low | NA |
### Macroadenoma (>10 mm) (if not surgically removed and normal hormonal testing)

| MRI Head without and with contrast (CPT® 70553) | MRI Head without and with contrast(CPT® 70553) every: |
|-----------------------------------------------|------------------------------------------------|---|
|                                               | ♦ 6 months for the first year; then |
|                                               | ♦ Annually for 5 years (longer if craniopharyngiomas); |
|                                               | ♦ Every 6 months if treatment is deferred. |

### Other Pituitary Region Tumors**

Evaluation may require CT in addition to MRI to evaluate for hyperostosis. Requests will be sent for Medical Director review.

<table>
<thead>
<tr>
<th>Enlarged/Empty Sella Turcica***</th>
<th>Head CT without and with contrast (CPT® 70470) or, MRI Head without and with contrast (CPT® 70553) to:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>♦ Exclude residual pituitary tumor, and</td>
</tr>
<tr>
<td></td>
<td>♦ To assess the position of the chiasm since herniation into the sella, causes Chiasmatic-type visual loss</td>
</tr>
</tbody>
</table>

MRI without and with contrast (CPT® 70553) 1 to 5 years after the initial study can be performed.

### Practice Notes

Normal ranges may vary among different labs.

**FSH**
- Male: 5-15 mIU/mL
- Female: Follicular or luteal phase 5-20 mIU/mL, Midcycle peak 30-50 mIU/mL, Postmenopausal >35 mIU/mL

**LH**
- Male: 3-15 mIU/mL
- Female: Follicular or luteal phase 5-22 mIU/mL, Midcycle peak 30-250 mIU/mL, Postmenopausal >30 mIU/mL

**Testosterone**
- Male 300-1200 ng/dL
- Female 20-75 ng/dL

**TSH**
- 0.5-5 µIU/mL

**GH**
- After oral glucose, <2 ng/mL

**Osmolality**
- Urine 38-1400 mosm/kg H20
- Serum 275-295 mosm/kg H20
**HD 19.2: Additional Imaging**

- Post-operatively, follow-up pituitary imaging is generally done at the discretion of the neurosurgeon, usually at 4 months and then at one year if stable.

- For those who are treatment resistant on standard or maximal tolerable doses of dopamine agonist therapy (e.g. visible tumor remnant or persistent elevation of Prolactin levels) and who will not be treated with surgery/radiation, continue imaging periodically as per microadenoma or macroadenoma guidelines, accordingly.

- For those in whom treatment is discontinued at the onset of menopause, continue imaging periodically as per microadenoma or macroadenoma guidelines, accordingly.

**Practice Notes**

*Prolactinoma Note:* Most common of the secreting Microadenoma (>50) *To establish the diagnosis of hyperprolactinemia, a single measurement of serum prolactin is recommended; a level above the upper limit of normal confirms the diagnosis as long as the serum sample was obtained without excessive venipuncture stress.* Long-term or inadequately treated primary hypothyroidism can cause pituitary hyperplasia that may mimic a pituitary tumor and therefore thyroid functions should also be checked to evaluate for untreated or inadequately treated hypothyroidism as a cause of hyperprolactinemia and pituitary hyperplasia. Routine surveillance during pregnancy is not recommended due to risk to fetus. Repeat imaging with MRI without gadolinium is performed for new or worsening symptoms, such as headaches or visual symptoms. *In women with microprolactinomas, it may be possible to discontinue dopaminergic therapy when menopause occurs. Surveillance for increasing size of the pituitary tumor should continue on a periodic basis.*

**Other Pituitary Region Tumor Notes:** Craniopharyngiomas arise in the parasellar area. About 10% of meningiomas arise in this area.

***Enlarged/Empty Sella Turcica Notes:** An enlarged sella turcica without evident tumor is an incidental finding on MRI Head or CT Head from a defect in the dural diaphragm of the sella (especially if there is elevated intracranial pressure from another cause), pituitary surgery, or as a result of a pituitary tumor which has expanded the sella and then infarcted (pituitary apoplexy).

****Acromegaly:** Rarely, biochemically confirmed acromegaly with a normal pituitary gland on MRI may occur. Somatostatin receptor scintigraphy (Octreoscan) of thorax and abdomen and growth hormone-releasing hormone (GHRH) level may be considered to evaluate ectopically located disease.

*****Male Hypogonadism:** Certain conditions can cause alterations in sex hormone-binding globulin (SHBG) which can impact testosterone levels. Free or bioavailable testosterone concentrations should be measured when total testosterone concentrations are close to the lower limit of the normal range and when altered SHBG levels are suspected (e.g. moderate obesity, nephrotic syndrome, hypo- and hyperthyroidism, use of glucocorticoids, progestins, estrogens, and androgenic steroids, anticonvulsants, acromegaly, diabetes mellitus, aging, HIV disease, liver cirrhosis,
hepatitis). Note that if the initial testosterone level is found to be low, reversible illness, drugs and nutritional deficiency should be excluded as a cause prior to repeating testosterone level. LH and FSH should be obtained to evaluate for secondary (central) hypogonadism, once low testosterone level is confirmed.

References
HD-20.1: Scalp and Skull Lesions

The majority of these are benign soft tissue or bony lesions easily defined by physical examination or with skull x-rays or ultrasound.

- CT Head without or without and with contrast (CPT® 70450 or CPT® 70470) is appropriate for the following scenarios:
  - Any lesion on physician examination and skull x-ray or ultrasound which is not clearly benign.
  - Langerhans’ cell histiocytosis, myeloma, and metastatic cancer, when symptoms suggest bony lesions.

- MRI Head without contrast (CPT® 70551) or with and without contrast (CPT® 70553) may be considered if there is concern for intracranial extension.
<table>
<thead>
<tr>
<th>HD-21: Stroke/TIA</th>
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<tr>
<td>HD-21.1: Stroke/TIA</td>
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<tr>
<td>HD-21.2: Venous Infarcts</td>
</tr>
</tbody>
</table>
**HD-21.1: Stroke/TIA**

- **One** from each of the following procedures can be considered for the initial occurrence or repeat episodes of TIA, stroke\(^1\text{-}^4\) or Transient Global Amnesia\(^5\)
  - CT Head without contrast (CPT\(^\®\) 70450) or CT Head without and with contrast (CPT\(^\®\) 70470) or MRI Head without and with contrast (CPT\(^\®\) 70553) or MRI Head without contrast (CPT\(^\®\) 70551)
    - MRI is preferred with later presentation for evaluation and can be considered after an initial CT head\(^1\text{-}^4\)
  - Duplex ultrasound of the Carotid Arteries (CPT\(^\®\) 93880) or MRA Neck without contrast (CPT\(^\®\) 70547) or MRA Neck with contrast (CPT\(^\®\) 70548) or MRA Neck without and with contrast (CPT\(^\®\) 70549) or Neck CTA (CPT\(^\®\) 70498); and MRA Head without contrast (CPT\(^\®\) 70544) or CTA Head (CPT\(^\®\) 70496)
  - MRA Head without contrast (CPT\(^\®\) 70544) or CTA Head with contrast (CPT\(^\®\) 70496) may be considered in addition to the above in the following clinical scenarios:
    - Vertebrobasilar stroke (vertigo associated with diplopia, dysarthria, bifacial numbness or ataxia\(^1\text{-}^4\)
    - Suspected carotid or vertebral artery dissections.\(^2\text{-}^4\) Risks may include premature stroke (under age 50), head or neck trauma, fibromuscular dysplasia, Ehlers-Danlos syndrome, and chiropractic neck manipulation
      - Repeat imaging as determined by a specialist.
    - Suspected venous infarcts [as MRV (CPT\(^\®\) 70544) or CTV (CPT\(^\®\) 70496)] if identified on CT/MRI Head\(^6\)
  - MRA Neck without and with contrast (CPT\(^\®\) 70549) is reserved for evaluation of possible or known arterial dissection
  - Transcranial Doppler Studies may also be performed for patients with documented stroke or TIA (See [HD-24.8: Transcranial Doppler (CPT\(^\®\) 93886)](#))

**HD-21.2: Venous Infarcts**

- MRV (CPT\(^\®\) 70544) or CTV (CPT\(^\®\) 70496) and MRI Head without contrast (CPT\(^\®\) 70551) are appropriate in the following scenarios:
  - Intracranial hypertension with headache, vomiting and papilledema from venous sinus thrombosis
  - Venous infarction is identified on MRI Head or CT Head
  - Women with postpartum stroke or postpartum papilledema
  - Children or young adults who present with a stroke in which headache and seizures are prominent features, or who are known to have an intrinsic system clotting disorder

**Practice Notes**

Transient Global Amnesia is the “...sudden onset of transient inability to retain new information and to recall previous events for a variable period of time, generally occurring in middle-aged or elderly patients formerly in good health and without significant cardiac or cerebrovascular disease...”\(^5\)
References


**HD-22.1: Cerebral Vasculitis**

- MRI Head without and with contrast (CPT® 70553) is considered when CNS vasculitis is suspected
  - MRA Head without and with contrast (CPT® 70546) and MRA Neck without or with contrast (CPT® 70549); CTA may be considered in addition to MRI

**Practice Notes**

Classification of vasculitides based on vessel size adapted from Joseph. MRA and CTA are useful for the evaluation of the large proximal arteries; evaluation of a possible small vessel vasculitis may be beyond the resolution of routine Head MRA and CTA. However, other abnormalities, such as atherosclerotic disease, arterial dissection, Moyamoya disease, or reversible cerebral vasoconstriction may be demonstrated. Conventional angiogram is superior to MRA and CTA in demonstrating abnormalities in smaller vessels and is considered the “gold standard” in the evaluation of primary small vessel CNS vasculitis.

<table>
<thead>
<tr>
<th>Dominant Vessel Involved</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large arteries</td>
<td>Giant cell arteritis</td>
<td>Aortitis with rheumatoid disease; Infection (e.g. syphilis)</td>
</tr>
<tr>
<td></td>
<td>Takayasu’s arteritis</td>
<td></td>
</tr>
<tr>
<td>Medium Arteries</td>
<td>Classical polyarteritis nodosa</td>
<td>Infection (e.g. hepatitis B)</td>
</tr>
<tr>
<td></td>
<td>Kawasaki disease</td>
<td></td>
</tr>
<tr>
<td>Small vessels and medium arteries</td>
<td>Wegener’s granulomatosis</td>
<td>Vasculitis with rheumatoid disease, systemic lupus erythematosus, Sjögren’s syndrome, drugs, infection (e.g. HIV)</td>
</tr>
<tr>
<td></td>
<td>Churg–Strauss syndrome</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microscopic polyangiitis</td>
<td></td>
</tr>
<tr>
<td>Small vessels</td>
<td>Henoch-Schönlein purpura</td>
<td>Drugs (e.g. sulphonamides, etc.) Infection (e.g. hepatitis C)</td>
</tr>
<tr>
<td></td>
<td>Essential cryoglobulinaemia</td>
<td></td>
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<tr>
<td></td>
<td>Cutaneous leukocytoclastic vasculitis</td>
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**References**

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<tr>
<td>HD-23.1: Dizziness, Vertigo, and Syncope</td>
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**Cardiology and Radiology Imaging Guidelines**

V1.0.2019

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**HD-23.1: Dizziness, Vertigo, and Syncope**

- The initial components in the evaluation of false sensations of balance or motion include obtaining a patient history and performing a physical examination that can assist in diagnosis. These include the elimination of inciting factors\(^1,2\)

- Evaluation of arterial blood flow (Carotid Doppler, transcranial Doppler, Neck and Head MRA/CTA), CT Head and MRI Head are not indicated unless a primary neurological cause of transient loss of consciousness is suspected based on the presence of neurological symptoms and signs indicating an intracranial disorder. Neurological testing is not indicated for patients with uncomplicated syncope

- Prior to advanced imaging, the minimum initial evaluation should include the following:
  - A detailed description of the symptoms
  - Orthostatic blood pressure\(^1,2\)
  - Dix-Hallpike maneuver or other positional testing\(^1,2\)
  - Nystagmus examination\(^1,2\)
  - Any one Gait examination, including Romberg\(^1,2\)
  - Psychiatric evaluation including for anxiety or panic disorders (if suspected)\(^1,2\)
  - Hearing testing (if associated with hearing loss) to determine if conductive, sensorineural, or mixed\(^5\)
  - Vision examination\(^1\)

- CT Temporal bone without contrast (CPT® 70480) may be considered in addition to the MRI evaluation if concern for trauma, superior canal dehiscence or other bony abnormalities

- MRI Head with attention to internal auditory canal without and with contrast (CPT® 70553) or without contrast (CPT® 70551; limited study CPT® 70540 or CPT® 70543)\(^3,5\) can be considered when the initial evaluation reveals:
  - Any associated neurological signs or symptoms\(^2\)
    - Cerebrovascular symptoms of TIA or CVA\(^2\)
    - Examples include drop attacks, seizures, coincident headache, ataxia, aura or focal neurological findings
  - Equivocal or unusual nystagmus findings, including direction changing or persistent downbeat nystagmus\(^2,4\)
  - Absent head thrust sign\(^2\)
  - Short duration (minutes) recurrent attacks\(^2\)
    - CT Temporal bone without contrast (CPT® 70480) may be considered in addition to the MRI evaluation\(^5\)
  - Hearing loss associated with
    - Progressive unilateral hearing loss\(^3\)
    - Sensorineural\(^5\)
    - Conductive: CT Temporal bone without contrast (CPT® 70480) may be considered in addition to the MRI evaluation
    - Congenital or total hearing loss: CT Temporal bone without contrast (CPT® 70480) may be considered in addition to the MRI evaluation
- Pre-surgical planning or cochlear implant candidate: CT Temporal bone without contrast (CPT® 70480) may be considered in addition to the MRI evaluation
  - Features atypical for benign positional vertigo, which may include abnormal cranial nerve findings, visual disturbances, and severe headache
- Central vertigo
- See HD-21: Stroke/TIA

References
<table>
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Some payers may consider these techniques investigational, and their coverage policies may take precedence over eviCore’s guidelines.

HD-24.1: Treatment Planning

- Advanced imaging (CT and MRI) performed for the purpose of surgical planning and navigation should be coded as Unlisted CT (CPT® 76497) or Unlisted MRI (CPT® 76498)
  - All requests for imaging to be performed for the purpose of surgical planning and navigation should be forwarded to Medical Director Review
- Requests may refer to systems such as Brainlab or Stealth imaging procedures
- This includes requests for intraoperative studies (inpatient studies do not require preauthorization)
- Some health plans do not require prior authorization for the unlisted codes for treatment planning, and eviCore is not contracted to review them. Please refer to individual health plan policy.

HD-24.2: Functional MRI (f-MRI)

- f-MRI is useful in pre-operative scenarios to define the “eloquent” areas of brain
- The ordering physician must be a neurosurgeon or radiation oncologist. All other requests should be sent for MD review. It must be evident that brain surgery is planned, and that f-MRI is being performed to avoid the language centers, or other processing centers, of the brain
- f-MRI can be approved with PET Brain in epilepsy surgery planning
- Procedure codes for functional MRI:
  - CPT® 70554 MRI Head, functional MRI, including test selection and administration of repetitive body part movement and/or visual stimulation, not requiring physician or psychologist administration
  - CPT® 70555 MRI Head, functional MRI; requiring physician or psychologist administration of entire neurofunctional testing

HD-24.3: Magnetic Resonance Spectroscopy (MRS)

- All requests for MRS (CPT® 76390) will be forwarded for Medical Director review
- MRS involves analysis of the levels of certain chemicals in a pre-selected voxels (small regions) on an MRI scan done at the same time
- MRS is evaluated on a case-by-case basis, and may be considered:
  - Distinguish recurrent brain tumor from radiation necrosis as an alternative to PET (CPT® 78608)
  - Diagnosis of certain rare inborn errors of metabolism affecting the CNS (primarily pediatric patients)
HD-24.4: CSF Flow Imaging

- This is generally imaged as a part of a head MRI study. It is not coded separately for preoperative evaluation of hydrocephalus and Chiari syndrome, with either features of hydrocephalus or syrinx.
- There is no specific or unique procedure code for this study; it is done as a special sequence of a routine MRI head without contrast (CPT® 70551).
- If not previously performed as part of a recent study, a second study for the purpose of evaluating CSF flow may be performed.

HD-24.5: CT or MRI Perfusion

- Performed as part of a CT Head or MRI Head examination in the evaluation of patients with very new strokes or brain tumors.
- Category III 0042T - “cerebral perfusion analysis using CT”. The study is generally limited to evaluation of acute stroke (< 6 hours). Other indications are usually regarded as investigational and experimental. Individual health plan policies should be confirmed.
- There is no specific CPT® code for MRI Perfusion. Perfusion weighted images are obtained with contrast and are not coded separately from a contrasted MRI Head examination. If MRI Head without and with contrast is approved, no additional CPT® codes are necessary or appropriate to perform MRI perfusion.

HD-24.6: Magnetic Resonance Neurography (MRN)

MRN is currently considered investigational by most payers.

HD-24.7: Cone Beam Computed Tomography (CBCT)

- MD review is required.
- CPT® Codes: CPT® 70486, CPT® 70487, CPT® 70488, CPT® 70480, CPT® 70482
  (No separate 3-D rendering codes should be reported)

See HD-30: Temporomandibular Joint Disease (TMJ) and Dental/Periodontal/Maxillofacial Imaging

HD-24.8: Transcranial Doppler (CPT® 93886)

- Transcranial Doppler (TCD) is a noninvasive ultrasonic technique that measures local blood flow velocity and direction in the proximal portions of large intracranial arteries.
- It is used principally in the evaluation and management of patients with cerebrovascular disease:
  - Annual screening for patients with Sickle Cell Anemia (Hb-SS) and Sickle Beta Thalassemia (Sβ)
  - Evaluation of right to left cardiac shunts: Detection of microemboli in patients with stroke or TIA.
Evaluation of intracranial occlusive disease in patients with documented stroke or TIA
Evaluation of hemodynamic effects of known severe extra-cranial occlusive disease
Other indications and uses of TCD generally involve in-patient settings: Evaluation of vasospasm in SAH, determination of brain death, evaluation of acute stroke and need for thrombolitics or other intervention, and intraoperative monitoring

Screening for moyamoya disease for patient with known disease in other immediate family members.

**Note:** TCD studies are not indicated for evaluation of brain tumors, degenerative disease, psychiatric disorders, epilepsy, migraine or other headache disorders.

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<tr>
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<td>Emboli detection without intravenous microbubble injection</td>
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<td>93893</td>
<td>Emboli detection with intravenous microbubble injection</td>
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**Note:** CPT® 93890, CPT® 93891, CPT® 93892, CPT® 93893 represent add on services that require additional expertise, lab time, and equipment not included in the complete and limited codes.

CPT® 93890 Vasoreactivity Study: Measures response of cerebral blood flow to increased CO2 levels (following breath holding or administration of acetazolamide); It is used to evaluate risk of stroke and significance of carotid stenosis; patients with loss of normal reactive changes are likely to be at increased risk of stroke.

CPT® 93892/CPT® 93893: Identification of right to left shunts (microembolic signals may be detected during TCD monitoring) and may indicate source of emboli in patients with stroke or TIA. TCD bubble test is very sensitive and may be superior to transthoracic and transesophageal echocardiography in detection of right to left shunts.

**References**


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**HD-25.1: Epistaxis**

- All cases should go to Medical Director for review.
- Maxillofacial CT without or without and with contrast (CPT® 70486 or CPT® 70488) and/or MRI orbit, face, and/or neck without and with contrast (CPT® 70549) is appropriate based on endoscopic findings of mass lesion during ENT examination.

**References**

HD-26.1: Mastoid Disease

- See Pediatric Head Guidelines, **PEDHD-16.2: Ear Pain**
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**HD-27.1: Hearing Loss**

- MRI Head with attention to internal auditory canal without and with contrast (CPT® 70553), or MRI Head with attention to internal auditory canal without contrast (CPT® 70551) or CT Temporal bone without contrast (CPT® 70480) can be considered for hearing loss.\(^1\) Clinical information provided should include evaluation of hearing either by bedside testing or by formal audiology.

- Limited Study MRI with attention to internal auditory canal (CPT®70540, CPT® 70542, CPT®70543) can be approved in place of MRI Head with attention to internal auditory canal when requested by the provider in the following scenarios:
  - Any sensorineural hearing loss (cochlea or auditory nerve)\(^1\)
  - Any conductive hearing loss\(^1\)(including Cholesteatoma\(^2\))
  - Cochlear implants candidate\(^1\)
  - Fluctuating hearing loss\(^1\)

**Practice Note**

An initial evaluation generally determines whether a patient’s hearing loss is conductive (external or middle ear structures) or sensorineural (inner ear structures, such as cochlea or auditory nerve) hearing loss.\(^1,2\)

**References**

**HD-28: Ear Pain (Otalgia)**

**HD-28.1: Ear Pain (Otalgia)**

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HD-28.1: Ear Pain (Otalgia)

- CT Temporal bone without and with contrast (CPT® 70482) or without contrast (CPT® 70480) and/or MRI Head without contrast (CPT® 70551) or without and with contrast (CPT® 70553) can be considered for:
  - Common causes of ear pain including ear infections, dental problems, sinus infection, neck problems, tonsillitis, and pharyngitis, as well as otitis media or otitis externa or no obvious cause, which do not improve with treatment over a reasonable time
  - Cerebellopontine angle or other intracranial tumor is suspected
  - Nervus intermedius neuralgia in order to exclude a structural lesion

See HD-27: Hearing Loss

References

HD-29: Sinusitis

HD-29.1: Sinus Imaging in Adults
HD-29.1: Sinus Imaging in Adults

- There is no evidence to support advanced imaging of acute (< 4 weeks) and subacute (4 to 12 weeks) uncomplicated rhinosinusitis\(^1,3\)

- There is no evidence to support routine follow-up advanced imaging after treatment with clinical improvement of sinusitis\(^1\)

- CT Maxillofacial without contrast (CPT\(^7\) 70486) or limited sinus CT without contrast (CPT\(^7\) 76380) is considered for any of the following:
  - Acute (< 4 weeks) and sub-acute (4 to 12 weeks) rhinosinusitis in immune-deficient patients (i.e., fungal sinusitis)\(^1\)
  - Recurrent (< 30 days episodes separated by at least 10 asymptomatic days) acute/subacute/chronic rhinosinusitis.\(^1,2,3\)
  - Sinonasal polyposis\(^1\)
  - Chronic (> 12 weeks) sinusitis\(^3\) with at least two of the following signs and symptoms:
    - Mucopurulent drainage
    - Nasal obstruction
    - Facial pain – pressure, fullness
    - Decreased sense of smell
  - Worsening or failure to improve within 72 hours of initial management \(^4\)
  - Acute sinusitis with no improvement in symptoms after a minimum of 4 weeks of treatment

- In addition to standard Sinus CT imaging (CPT\(^7\) 70486), both CT and MRI imaging may be approved in the following scenarios:
  - Orbital and/or Intracranial complications with ocular and/or neurological deficit\(^1,3,4\)
    - MRI Face, Orbit, and Neck without and with contrast (CPT\(^7\) 70543) or
    - MRI Head without and with contrast (CPT\(^7\) 70553) or
    - MRI Head without contrast (CPT\(^7\) 70551) and/or
    - CT Orbit without contrast (CPT\(^7\) 70480) or
    - CT Orbit with contrast (CPT\(^7\) 70481) or
    - CT Head without and with contrast (CPT\(^7\) 70470)
  - A new obstructing sinus mass, including retention cysts and nasal polyps, that obscures the physician’s view on endoscopy MRI Face, Orbit, and Neck without and with contrast (CPT\(^7\) 70543) or
    - MRI Head without and with contrast (CPT\(^7\) 70553) or
    - MRI Head without contrast (CPT\(^7\) 70551) and/or
    - CT Orbit without contrast (CPT\(^7\) 70480) or
    - CT Orbit with contrast (CPT\(^7\) 70481) or
    - CT Head without and with contrast (CPT\(^7\) 70470)
  - Fungal Sinusitis\(^1\)
    - MRI Face, Orbit, and Neck without and with contrast (CPT\(^7\) 70543) or
    - MRI Head without and with contrast (CPT\(^7\) 70553) or
    - MRI Head without contrast (CPT\(^7\) 70551) and/or
    - CT Orbit without contrast (CPT\(^7\) 70480) or
    - CT Orbit with contrast (CPT\(^7\) 70481) or
    - CT Head without and with contrast (CPT\(^7\) 70470) or
One time repeat imaging may be approved in the following scenarios:

- An ENT specialist requests the imaging and:
  - There is no improvement after an additional 4 weeks of conservative treatment after initial imaging was completed; and
  - There has been a follow-up visit since the previous imaging; or
  - If there is a new abnormality on exam such as obstructing mass

- CT Maxillofacial (CPT® 70486) may be approved following MRI Brain if request otherwise meets criteria for imaging of sinus disease

- 3D Rendering (CPT® 76376 or CPT® 76377) may be added if ordered by a specialist for sinus surgery preoperative planning

**Practice Notes**

- Rhinosinusitis is defined as inflammation of the nasal cavity and adjacent paranasal sinuses. Acute sinusitis refers to symptom duration < 4 weeks, subacute 4 to 12 weeks, and chronic > 12 weeks. Complicated sinusitis refers to symptoms suggesting spread of disease into adjacent structures, including orbital or intracranial complications.\(^1,2,3\)

**References**


HD-30: Temporomandibular Joint Disease (TMJ) and Dental/Periodontal/Maxillofacial Imaging

| HD-30.1: Temporomandibular Joint Disease (TMJ) | 87 |
| HD-30.2: Dental/Periodontal/Maxillofacial Imaging | 87 |
**HD-30.1: Temporomandibular Joint Disease (TMJ)**

- TMJ MRI (CPT® 70336) is the diagnostic study of choice and should be reserved for those who fail a minimum of 6 weeks of non-surgical treatment and who are actively being considered for TMJ surgery.
- CT Maxillofacial without contrast (CPT® 70486) or without and with contrast (CPT® 70488) may be performed when there is suspicion of bony involvement from the MRI and if primary bony pathologies are suspected clinically.
- Ultrasound (CPT® 76536) can be used to look for the presence of a joint effusion and to evaluate cartilage and disk displacement with open and closed mouth imaging and to guide injections.

**HD-30.2: Dental/Periodontal/Maxillofacial Imaging**

- All requests will be forwarded to Medical Director for review.
- Cone beam CT may be supported for surgical planning when plain x-rays alone are insufficient. Potential indications include but are not limited to:
  - Impacted teeth
  - Supernumerary teeth
  - Dental/periodontal trauma
  - Root resorption
  - Foreign body
  - Odontogenic cysts, tumors, or other jaw pathology
  - Cleft pathology
  - Orthognathic surgery for dentofacial anomalies
  - Osteomyelitis and odontogenic infections (MRI is the preferred modality after x-ray, See MS-9.1: *Infection – General*)
  - Bisphosphonate-related osteonecrosis of the jaw
  - Salivary gland stones
  - Maxillofacial bone graft planning
  - Dental implants related to tooth loss from injury, trauma, or jaw pathology such as cysts, tumors, or cancer

- Some payers do not include orthodontic clinical conditions such as replacement of teeth lost due to caries or periodontal disease, non-trauma related dental implantology, or endodontic treatment not related to trauma to the natural tooth in their coverage policies.
  - Thus, Cone beam CT scans in these patients would also not be included in the coverage policy.
  - These coverage policies will take precedence over eviCore’s guidelines.

- Cone Beam CT: Report with CPT® Codes: CPT® 70486, CPT® 70487, CPT® 70488, CPT® 70480, CPT® 70482
- 3-D rendering (CPT® 76376 or CPT® 76377) should NOT be reported separately.
- Cone beam CT (CBCT) may also be called i-CAT scanner or mini-CAT scanner.
References


   [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4147437/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4147437)

**HD-31.1: Tinnitus**

- Advanced imaging is not usually indicated in the evaluation of tinnitus, unless one or more of the following signs and symptoms are present:
  - Tinnitus localized to a single ear
  - Pulsatile tinnitus
  - Focal neurological abnormalities
  - Asymmetric hearing loss

- If one or more of these signs and symptoms are present, the following advanced imaging studies can be considered:
  - MRI Head without and with contrast\textsuperscript{1,2,3} (CPT\textsuperscript{®} 70553) or
  - CT Temporal bone\textsuperscript{3} without or without and with contrast (CPT\textsuperscript{®} 70480 or CPT\textsuperscript{®} 70482) or
  - MRI Head with attention to internal auditory canal\textsuperscript{3} without and with contrast (CPT\textsuperscript{®} 70553) or MRI Head and internal auditory canal\textsuperscript{3} without contrast (CPT\textsuperscript{®} 70551) or
  - Limited Study MRI with attention to internal auditory canal (CPT\textsuperscript{®} 70540, CPT\textsuperscript{®} 70541, CPT\textsuperscript{®} 70542, CPT\textsuperscript{®} 70543) can be approved in place of MRI Head with attention to internal auditory canal when requested by the provider
  - MRA Head without contrast (CPT\textsuperscript{®} 70544) and/or MRA Neck without contrast (CPT\textsuperscript{®} 70547) or MRA Neck with contrast (CPT\textsuperscript{®} 70498) or CTA Head (CPT\textsuperscript{®} 70496) and/or CTA Neck (CPT\textsuperscript{®} 70498) can be added if there is suspicion of vascular lesions
  - Head CT\textsuperscript{1,2} without contrast (CPT\textsuperscript{®} 70450) or Head CT without and with contrast (CPT\textsuperscript{®} 70470) can be approved for:
    - Suspected intracranial extension of a tumor
    - Patient is unable to have an MRI

**Practice Notes**

The history in patients with tinnitus should include a description of the tinnitus (episodic or constant, pulsatile or non-pulsatile, rhythmicity, pitch, quality of the sound), as well as inciting or alleviating factors. Continuous and pulsatile tinnitus are more concerning for an underlying and significant disorder.\textsuperscript{2} Audiometric assessment can be used as initial diagnostic testing\textsuperscript{1,2,3} particularly in patients with tinnitus that is unilateral, persistent (> 6 months) or associated with hearing difficulties.
References
http://www.ajnr.org/content/31/2/211
http://www.aafp.org/afp/2004/0101/p120.html
http://journals.sagepub.com/doi/10.1177/0194599814545325
**HD-32.1: Eye Disorders**

- MRI Head without and with contrast (CPT® 70553) and/or MRI Orbit without and with contrast (CPT® 70543) or MRI Head without contrast (CPT® 70551) and/or MRI Orbit without contrast (CPT® 70540). May be considered in the following scenarios*:
  - Anisocoria which is of new onset (e.g. not present in previous photographs) and ≥ 1 mm
  - Acute or progressive vision loss due to any cause, including suspected optic neuritis
  - Ophthalmoplegia
  - Binocular Diplopia
  - Horner’s Syndrome, for which CT Neck with contrast and/or CT Chest with contrast may be considered in addition to the head or orbital imaging
  - CT Head without contrast may be substituted for the MRI imaging if there has been a head injury

- Evaluation of a third nerve palsy may be accomplished with an MRI Head without and with contrast (CPT® 70553) and/or MRA Brain without contrast (CPT® 70544)
  - CT Head without and with contrast (CPT® 70470) and/or CT Orbit with contrast (CPT® 70481) can be approved if there is a clinical question of blood in the subarachnoid space

- If MRI is contraindicated or cannot be performed, CT Head without and with contrast (CPT® 70470), CT Orbit with contrast (CPT® 70481) or CT Orbit without and with contrast (CPT® 70482) may be considered as substitutes

*Advanced imaging of the brain and orbit are not routinely paired. Medical necessity for each region is needed to image both regions, based on suspicion of these disorders.

Orbital imaging alone may be sufficient unless other signs or symptoms suggest brain involvement. Signs or symptoms strongly suggestive and localizing to orbital disease include proptosis, conjunctival injection, chemosis, eye pain, enophthalmos, gaze-evoked amaurosis, eyelid retraction, unilateral optic disc swelling, choroidal and retinal folds, optociliary shunt vessels, and numb cheek syndrome.

Non-localizing symptoms and signs, for which both brain and orbit imaging may be indicated, include bilateral optic disc swelling, papilledema, diplopia, headache, relative afferent pupillary defect, visual field defects.
References


HD-33.1: Acoustic Neuroma and Other Cerebellopontine Angle Tumors

- Clinical information should include evaluation of hearing either by bedside testing or by formal audiology
- Initial diagnosis can be accomplished with MRI Head without and with contrast (CPT® 70553) which should be done with attention to the internal auditory canals. Clinical information provided should include evaluation of hearing either by bedside testing or by formal audiology
- MRI Head without contrast (CPT® 70551) may be approved if performed with FIESTA protocol
- MRI Orbits, Neck, or Face without and with contrast (CPT® 70543) may be considered with audiologic or clinical features of retrocochlear hearing loss and a negative head MRI and in the rare patient in whom a detailed search is indicated for both a lesion of the cerebellopontine angle and lesions of the cerebral hemispheres
- After surgical resection, MRI Head without and with contrast attention to the internal auditory canals (CPT® 70553) is performed at 6 to 12 months to document the completeness of tumor removal and to serve as a baseline for further follow-up. Assuming complete tumor removal, additional follow up is done at 5 and 10 years. If the findings at 10 years are normal, no further imaging should be performed unless new clinical symptoms occur
- Following stereotactic radiation therapy or continued observation without treatment: MRI Head without and with contrast with attention to the internal auditory canals (CPT® 70553) is performed at 6 months and then annually

References
HD-34: Pineal Cysts

See Pediatric Head Guidelines, PEDHD-13.2: Pineal Cysts
HD-35: Arachnoid Cysts

See Pediatric Head Guidelines, **PEDHD-13.1: Arachnoid Cysts**
Nuclear Medicine studies may be used in the evaluation of some head/brain disorders, and other rare indications as well:

- **Brain Scintigraphy with or without vascular flow (any one of CPT® 78600, CPT® 78601, CPT® 78605, or CPT® 78606)**
  - Establish brain death (rarely done in outpatient setting)
- **Brain Imaging SPECT with Technetium-99m or thallium-201 (CPT® 78607)**
  - Immunocompromised patients with mass lesion detected on CT or MRI for differentiation between lymphoma and infection
  - In distinguishing recurrent brain tumor from radiation necrosis
- **Brain Imaging Vascular Flow (CPT® 78610)**
  - Cerebral ischemia
  - Establish brain death
- **CSF Leakage Detection (CPT® 78650)**
  - Evaluation of CSF rhinorrhea, otorrhea, or refractory post-lumbar puncture headache
- Suspected normal pressure hydrocephalus with gait disturbance and either dementia or urinary incontinence
- **Radiopharmaceutical Dacryocystography (CPT® 78660)**
  - Suspected obstruction of nasolacrimal duct due to excessive tearing
- **Cisternogram (CPT® 78630)** can be approved for the following:
  - Known hydrocephalus with worsening symptoms
  - Suspected obstructive hydrocephalus
- **Cerebrospinal Ventriculography (CPT® 78635)** can be approved for the following:
  - Evaluation of internal shunt, porencephalic cyst, or posterior fossa cyst
- **Nuclear Medicine Shunt Evaluation (CPT® 78645) and CSF Flow SPECT (CPT® 78647)** can be approved for the following:
  - Suspected malfunction of ventriculoperitoneal, ventriculopleural, or ventriculovenous shunts.
- Imaging SPECT with Ioflupane I-23 (CPT® 78607) can be approved for differentiation of Parkinsonian syndrome (PS) and non-neurodegenerative disorders, such as essential tremor (ET) or drug-induced tremor, due to the overlap of clinical symptoms. DAT-SPECT has significant impact on clinical diagnosis and management of diagnostic uncertainty in cases of PS. See [HD-15: Movement Disorders](#) for more information.

Reference

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**HD 37.1: General Guidelines Sleep-Related Requests**

- **Oral Appliance:** There is a lack of published case-controlled clinical studies in Sleep literature validating the use of advanced imaging with respect to oral appliance therapy (pretreatment assessment). Previous literature has demonstrated support for cephalometric studies (x-ray)\(^1\) in predicting treatment success. Nasoendoscopy (sedated and non-sedated with provocative maneuvers such as Mueller maneuver) has been helpful as well in this regard.\(^2\) Routine use of advanced is not supported at this time.

- **Hypersomnolence:** MRI Brain with and without contrast (CPT\(^\circledast\) 70553) may be indicated when there are focal neurologic signs or suspicion for an inflammatory neurologic process as the etiology. Recognition and treatment of a comorbid sleep disorders is paramount, and a complete neurologic history and examination should precede any request for advanced imaging\(^3\).

- **Central Sleep Apnea:** MRI Brain with and without contrast (CPT\(^\circledast\) 70553) may be indicated for unexplained central sleep apnea syndrome when a primary CNS etiology is suspected; i.e., unassociated with CHF, COPD or other potential etiology. Specific etiologies should be stated for imaging requests, including but not limited to, suspected Chiari malformation, stroke, CNS demyelinating disease, posterior fossa lesion, anoxia or infection\(^4\).

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MS-1: General Guidelines

Before advanced diagnostic imaging can be considered, there must be an initial face-to-face clinical evaluation as well as a clinical re-evaluation after a trial of failed conservative treatment; the clinical re-evaluation may consist of a face-to-face evaluation or other meaningful contact with the provider’s office such as email, web or telephone communications.

A face-to-face clinical evaluation is required to have been performed within the last 60 days before advanced imaging can be considered. This may have been either the initial clinical evaluation or the clinical re-evaluation.

The initial face-to-face clinical evaluation should include a relevant history and physical examination, appropriate laboratory studies, and non-advanced imaging modalities. Other forms of meaningful contact (e.g., telephone call, electronic mail or messaging) are not acceptable as an initial evaluation.

Prior to advanced imaging consideration, the results of plain X-rays performed after the current episode of symptoms started or changed is required for all musculoskeletal conditions, unless otherwise noted in the guidelines.

Clinical re-evaluation is required prior to consideration of advanced diagnostic imaging to document failure of significant clinical improvement following a recent (within 3 months) six week trial of provider-directed conservative treatment. Clinical re-evaluation can include documentation of a face-to-face encounter or documentation of other meaningful contact with the requesting provider’s office by the patient (e.g. telephone call, electronic mail or messaging).

Provider-directed conservative treatment may include rest, ice, compression, and elevation (R.I.C.E.), non-steroidal anti-inflammatories (NSAIDs), narcotic and non-narcotic analgesic medications, oral or injectable corticosteroids, viscosupplementation injections, a provider-directed home exercise program, cross-training, and/or physical/occupational therapy or immobilization by splinting/casting/bracing.

Orthopedic specialist evaluation can be helpful in determining the need for advanced imaging.

- The need for repeat advanced imaging should be carefully considered and may not be indicated if prior imaging has been performed.
- Serial advanced imaging, whether CT or MRI, for surveillance of healing or recovery from musculoskeletal disease is not supported by the medical evidence in the majority of musculoskeletal conditions.

References
### MS-2: Imaging Techniques

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**MS-2.1: Plain X-Ray**

- The results of an initial plain X-ray are required prior to advanced imaging in all musculoskeletal conditions/disorders, unless otherwise noted in the guidelines, to rule out situations that do not often require advanced imaging, such as osteoarthritis, acute/healing fracture, dislocation, osteomyelitis, acquired/congenital deformities, and tumors of bone amenable to biopsy or radiation therapy (in known metastatic disease), etc.

**MS-2.2: MRI or CT**

- Magnetic Resonance Imaging (MRI) is often the preferred advanced imaging modality in musculoskeletal conditions because it is superior in imaging the soft tissues and can also define physiological processes in some instances [e.g. edema, loss of circulation (AVN), and increased vascularity (tumors)].
- Computed Tomography (CT) is preferred for imaging cortical bone anatomy; thus, it is useful for studying complex fractures (particularly of the joints), dislocations, and assessing delayed union or non-union of fractures, if plain X-rays are equivocal. CT may be the procedure of choice in patients who cannot undergo an MRI, such as those with pacemakers.

**Positional MRI:**
Positional MRI is also referred to as dynamic, weight-bearing or kinetic MRI. Currently, there is inadequate scientific evidence to support the medical necessity of this study. As such, it should be considered experimental or investigational.

**dGEMRIC Evaluation of Cartilage**
Delayed gadolinium enhanced Magnetic Resonance Imaging of Cartilage (dGEMRIC) is a technique where an MRI estimates joint cartilage glycosaminoglycan content after penetration of the contrast agent in order to detect cartilage breakdown. Currently, there is inadequate scientific evidence to support the medical necessity of this study. As such, it should be considered experimental or investigational for the diagnosis and surveillance of, or preoperative planning related to chondral pathology.

**MS-2.3: Ultrasound**

- Ultrasound (US) uses sound waves to produce images that can be used to evaluate a variety of musculoskeletal disorders. As with US in general, musculoskeletal US is highly operator-dependent, and proper training and experience are required to perform consistent, high quality evaluations.

**MS-2.4: Contrast Issues**

- Most musculoskeletal imaging (MRI or CT) is without contrast; however, the following examples may be considered with contrast:
  - Tumors, osteomyelitis, and soft tissue infection (without and with contrast)
  - MRI arthrography (with contrast only)
  - MRI for rheumatoid arthritis and inflammatory arthritis (contrast as requested)
For patients with a contrast contraindication, if the advanced imaging recommendation specifically includes contrast, the corresponding advanced imaging study without contrast may be approved as an alternative, although the non-contrast study may not provide an adequate evaluation of the condition of concern.

**MS-2.5: Positron Emission Tomography (PET)**

At the present time, there is inadequate evidence to support the medical necessity of PET for the routine assessment of musculoskeletal disorders. It should be considered experimental or investigational and will be forwarded to Medical Director review.

See also: **MS-16: Post-Operative Joint Replacement Surgery**

**References**


**MS-3: 3D Rendering**

- Indications for musculoskeletal 3-D image post-processing for preoperative planning when conventional imaging is insufficient for:
  - Complex fractures/dislocations (comminuted or displaced) of any joint.
  - Spine fractures, pelvic/acetabulum fractures, intra-articular fractures.
  - Preoperative planning for other complex surgical cases.

- The code assignment for 3-D rendering depends upon whether the 3-D post-processing is performed on the scanner workstation (CPT® 76376) or on an independent workstation (CPT® 76377).
  - 2-D reconstruction (i.e. reformatting axial images into the coronal plane) is considered part of the tomography procedure, is not separately reportable, and does not meet the definition of 3-D rendering.
  - It is not appropriate to report 3-D rendering in conjunction with CTA and MRA because those procedure codes already include the post-processing.
  - In addition to the term “3-D,” the following terms may also be used to describe 3-D post-processing:
    - Maximum intensity projection (MIP)
    - Shaded surface rendering
    - Volume rendering

- The 3-D rendering codes require concurrent supervision of image post-processing 3-D manipulation of volumetric data set and image rendering. Certain health plan payors do not reimburse separately for 3-D rendering while others may have differing indication/limitation criteria. In these cases, individual plan coverage policies may take precedence over eviCore guidelines.

**References**

MS-4: Avascular Necrosis (AVN)/Osteonecrosis

MS-4.1: AVN
MS-4.1: AVN

Classification systems use a combination of plain radiographs, MRI, and clinical features to stage avascular necrosis. MRI of the area of concern without contrast can be performed when plain X-ray findings are negative or equivocal and clinical symptoms warrant further investigation for suspected avascular necrosis.

Advanced imaging for AVN confirmed by plain X-ray is appropriate in the following situations:

- Femoral head collapse:
  - MRI Hip without contrast (CPT® 73721) or CT Hip without contrast (CPT® 73700) for preoperative planning. See: **MS-24: Hip**.

- Distal Femur:
  - MRI Knee without contrast (CPT® 73721) if needed for treatment planning. See: **MS-25: Knee**.

- Talus:
  - MRI Ankle without contrast (CPT® 73721) if needed for treatment planning. See: **MS-26: Ankle**.

- Tarsal navicular (Kohler Disease):
  - MRI Foot without contrast (CPT® 73718) if needed for treatment planning. See: **MS-27: Foot**.

- Humeral head:
  - For preoperative planning prior to shoulder replacement: CT Shoulder without contrast (CPT® 73200) and/or MRI Shoulder without contrast (CPT® 73221). See: **MS-19: Shoulder**.

- Lunate (Kienbock's Disease)/Scaphoid (Preiser's Disease):
  - CT Wrist without contrast (CPT® 73200) or MRI Wrist without contrast (CPT® 73221). See **MS-21: Wrist**.

Patients with acute lymphoblastic leukemia and known or suspected osteonecrosis should be imaged according to guidelines in: **PEDONC-3.2: Acute Lymphoblastic Leukemia**

Known or suspected osteonecrosis in long-term cancer survivors should be imaged according to guidelines in: **PEDONC-19.4: Osteonecrosis in Long Term Cancer Survivors**
**References**


## MS-5: Fractures

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**MS-5.1: Acute**

- CT or MRI without contrast if ANY of the following:
  - Complex (comminuted or displaced) fracture with or without dislocation on plain X-ray.
    - CT is preferred unless it is associated with neoplastic disease when MRI without/with contrast is preferred unless MRI contraindicated.
  - Patient presents initially to the requesting provider with a documented history of an acute traumatic event at least two weeks prior with a negative plain X-ray at the time of this face-to-face encounter and a clinical suspicion for an occult/stress/insufficiency fracture see: **MS-5.2: Suspected Occult/ Stress/Insufficiency Fracture/ Stress Reaction and Shin Splints**.
- MRI without contrast, MRI with contrast (arthrogram), or CT with contrast (arthrogram) of the area of interest if:
  - Plain X-rays are negative and an osteochondral fracture is still suspected, OR
  - Plain X-ray and clinical exam suggest an unstable osteochondral injury. See also **MS-13.1: Chondral/ Osteochondral Lesions, Including Osteochondritis Dissecans and Fractures**.

**MS-5.2: Suspected Occult/Stress/Insufficiency Fracture/Stress Reaction and Shin Splints**

- MRI without contrast can be performed for suspected hip/femoral neck, tibia, pelvis/sacrum, tarsal navicular, proximal fifth metatarsal, or scaphoid occult/stress/insufficiency fractures, and suspected atypical femoral shaft fractures related to bisphosphonate use if the initial evaluation of history, physical exam and plain X-ray fails to establish a definitive diagnosis.
- CT without contrast can be performed as an alternative to MRI for suspected insufficiency fractures of the pelvis/hip and suspected atypical femoral shaft fractures related to bisphosphonate see: **MS-23: Pelvis** and **MS-24: Hip**, and suspected occult fractures of the scaphoid see: **MS-21: Wrist**.
- Tc-99m Bone scan whole body (CPT® 78306) with SPECT of the area of interest (CPT® 78320) is indicated for suspected fractures if MRI cannot be performed see: **MS-28: Nuclear Medicine**.
- Tc-99m Bone scan Foot (CPT® 78315) is indicated for suspected occult or stress fractures of the tarsal navicular if MRI cannot be performed see: **MS-27: Foot**.
- MRI or CT without contrast can be performed for all other suspected occult/stress/insufficiency fractures with either of the following:
  - Repeat plain X-rays remain non-diagnostic for fracture after a minimum of 10 days of provider-directed conservative treatment, or
  - Initial plain X-rays obtained a minimum of 14 days after the onset of symptoms are non-diagnostic for fracture
- MRI of the lower leg without contrast (CPT® 73718) for suspected shin splints when BOTH of the following are met:
  - Initial plain X-ray
Failure of a 6-week trial of provider-directed conservative treatment.

- For stress reaction, advanced imaging is not medically necessary for surveillance or "return to play" decisions regarding a stress reaction identified on an initial imaging study.
- MRI without contrast of the area of interest for stress fracture follow-up imaging for "return to play" evaluation at least 3 months after the initial imaging study for stress fracture. Any additional requests for stress fracture advanced imaging will be forwarded for Medical Director review.

**MS-5.3: Other Indications**

- CT or MRI without contrast is appropriate after recent (within 30 days) plain X-ray if ONE of the following is present:
  - Concern for delayed union or non-union of fracture or joint fusions.
  - As part of preoperative evaluation for a planned surgery of a complex fracture with or without dislocation.

**References**


**MS-6.1: Foreign Body - General**

- Ultrasound (CPT® 76881 or 76882) or CT without contrast or MRI without and with contrast or MRI without contrast of the area of interest can be approved after plain X-rays rule out the presence of radiopaque foreign bodies.
  - Ultrasound (CPT® 76881 or 76882) is the preferred imaging modality for radiolucent (non-radiopaque) foreign bodies (e.g. wood, plastic).
  - CT without contrast is recommended when plain X-rays are negative and a radiopaque foreign body is still suspected, as CT is favored over MRI for the identification of foreign bodies
  - MRI without and with contrast is an alternative to US and CT for assessing the extent of infection associated with a suspected foreign body

**References**

**MS-7.1: Ganglion Cysts – General**

- Plain X-ray is the initial imaging study for ganglion cysts.
- MRI without contrast or MRI without and with contrast or US (CPT® 76881 or 76882) is appropriate for occult ganglions (smaller cysts that remain hidden under the skin; suspected, but not palpable on physical examination) or cysts/masses in atypical anatomic locations.
- Advanced imaging is not indicated for ganglions that can be diagnosed by history and physical examination.

**References**

MS-8: Gout/Calcium Pyrophosphate Deposition Disease (CPPD)/ Pseudogout/ Chondrocalcinosis

MS-8.1: Gout-General 23
MS-8.2: CPPD (pseudogout /chondrocalcinosis)-General 23
MS-8.1: Gout-General

- CT without contrast, MRI without contrast, or MRI without and with contrast of the area of interest is indicated when BOTH of the following are met:
  - Initial plain X-ray has been performed to rule out other potential disease processes
  - Infection or neoplasm is in the differential diagnosis for soft-tissue tophi.

Practice Notes

- Early stages of gout can be diagnosed clinically since radiographic findings are not present early in the disease course.

MS-8.2: CPPD (Pseudogout /Chondrocalcinosis)-General

- CPPD can often be diagnosed from plain X-rays; advanced diagnostic imaging is generally not medically necessary.

References

### MS-9: Infection/Osteomyelitis

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**MS-9.1: Infection – General**

- MRI without and with contrast after plain X-ray(s) and:
  - Plain X-ray(s) are negative or do not suggest alternative diagnoses such as neuropathic arthropathy or fracture, and soft tissue or bone infection (osteomyelitis) is suspected; or
  - Plain X-ray(s) are positive for osteomyelitis, and the extent of infection into the soft tissues and any skip lesions require evaluation.
- CT without and with contrast can replace an MRI:
  - To assess the extent of bony destruction from osteomyelitis; CT can guide treatment decisions.
  - For preoperative planning
  - If MRI is contraindicated
- Patients with suspected spinal infections and diabetic foot infections are an exception to the above criteria
  - See: **SP-1.2: Red Flag Indications** for advanced imaging guidelines
  - See: **MS-27: Foot** for advanced imaging guidelines

**MS-9.2: Septic Joint**

- MRI of the joint, without and with contrast is appropriate when standard or image-guided arthrocentesis is contraindicated, unsuccessful, or non-diagnostic, and the clinical documentation satisfies ALL of the following criteria:
  - History and physical examination findings [One of the following]:
    - Development of an acutely hot and swollen joint (< 2 weeks)
    - Decreased range of motion due to pain
    - Documented fever
  - Laboratory tests [One of the following]:
    - Leukocytosis
    - Elevated ESR or C-reactive protein
    - Analysis of the joint fluid is non-diagnostic
  - Plain X-ray of the joint
- MRI without and with contrast is appropriate after plain X-rays if the arthrocentesis is diagnostic and if there is a confirmed septic joint, to evaluate the extent of infection into the soft tissues and any skip lesions that would require evaluation.
- CT with contrast can replace MRI without and with contrast if MRI is contraindicated.

**Practice Notes**

- Analysis of joint fluid is most often sufficient to diagnose a septic joint.
References


## MS-10: Soft Tissue Mass or Lesion of Bone

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MS-10.1: Soft Tissue Mass

- History and physical exam should include documentation of: location, size, duration, growing or stable, solid/cystic, fixed/not fixed to the bone, discrete or ill-defined, and an association with pain.
- US of the area of interest (CPT® 76881 or 76882) is appropriate for superficial or palpable soft tissue mass(es) after plain X-ray.
- MRI without and with contrast or without contrast is appropriate when EITHER of the following are met:
  - Soft tissue mass(es) after plain X-ray
  - Known or suspected soft tissue mass in a patient with a cancer predisposition syndrome if a recent ultrasound is inconclusive. Plain X-ray is not required for these patients. See: PEDONC-2: Screening Imaging in Cancer Predisposition Syndromes
- CT with contrast or CT without and with contrast is appropriate when MRI is contraindicated or after a metal limiting MRI evaluation.
- Advanced imaging is not indicated for:
  - Subcutaneous lipoma with no surgery planned
  - Ganglia see: MS-7: Ganglion Cysts
  - Sebaceous cyst

Practice Notes

- Plain X-rays can determine if an advanced imaging procedure is indicated, and if so, which modality is most appropriate. If non-diagnostic, these initial plain X-rays can provide complementary information if advanced imaging is indicated.

MS-10.2: Lesion of Bone

- History and physical exam should include documentation of: location, size, duration, growing or stable, discrete or poorly defined, and an association with pain.
- Complete radiograph of the entire bone containing the lesion of bone is required prior to consideration of advanced imaging. Many benign bone tumors have a characteristic appearance on plain X-ray and advanced imaging is not necessary.
- MRI without and with contrast, MRI without contrast, or CT without contrast may be indicated if ONE of the following applies:
  - Diagnosis uncertain based on plain X-ray appearance.
  - Imaging requested for preoperative planning.
- MRI without and with contrast or without contrast is appropriate when plain X-ray reveals an osteochondroma with clinical concern of malignant transformation.
- For Paget’s Disease:
  - Bone scan see: MS-28: Nuclear Medicine or MRI (contrast as requested) can be considered if the diagnosis (based on plain X-rays and laboratory studies) is in doubt.
MRI (contrast as requested) can be considered if malignant degeneration, which occurs in up to 10% of cases, is suspected.

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MS-11.1: Muscle/Tendon Unit Injuries/Diseases

- Plain X-ray is the initial imaging study for Muscle/Tendon Unit Injuries.
- MRI without contrast or US (CPT® 76881 or 76882) is supported for EITHER of the following:
  - Suspected partial tendon rupture of a specific (named) tendon
  - Complete tendon ruptures for preoperative planning (for example, Achilles tendon rupture, posterior tibial tendon rupture, humeral insertion of the pectoralis major rupture, proximal and distal biceps tendon rupture, patellar ligament/tendon rupture, proximal/distal hamstring tendon rupture).
- MRI is not medically necessary for muscle belly strains/muscle tears.
- See: MS-19: Shoulder for clinical suspicion of a partial or complete rotator cuff tear.
- See PN-6.2: Inflammatory Muscle Diseases and PEDMS-10.3: Inflammatory Muscle Diseases.

MS-11.2: Acute Compartment Syndrome

- Advanced imaging is not indicated. Diagnosis is made clinically and by direct measurement of compartment pressure and is a surgical emergency.

Practice Notes

- Noninvasive methods of measuring compartment pressures and diagnosing acute compartment syndrome are under study, but are currently experimental, investigational, and unproven.

MS-11.3: Chronic Exertional Compartment Syndrome

- Advanced imaging should only be considered when ruling out other potential causes of extremity pain following a plain X-ray and conservative treatment as indicated.

Practice Notes

- Direct measurement of compartment pressure remains the diagnostic standard. Noninvasive methods of measuring compartment pressures and diagnosing chronic exertional compartment syndrome are under study, but are currently experimental, investigational, and unproven.
References


**MS-12.1: Osteoarthritis**

- Plain X-rays should be performed initially and will reveal characteristic joint space narrowing, osteophyte formation, cyst formation, and subchondral sclerosis.
- CT without contrast is appropriate for treatment planning when congenital or significant atypical post-traumatic arthritic deformities are present in the shoulder, elbow, wrist, hip, knee, or ankle that would require further evaluation of the clinical significance of the deformity already identified on plain X-rays.
- Preoperative non-contrast CT/MRI requests (for either a diagnostic or unlisted CPT code) of the shoulder, elbow, wrist, hip, knee, or ankle to be utilized as part of treatment planning for customized-to-patient joint replacement surgery or as an integral part of surgical planning using intraoperative navigation for joint replacement surgery (e.g. MAKOplasty) are considered medically necessary once the joint replacement surgery has been approved or if the joint replacement surgery does not require prior authorization. See **Preface-4.3: Unlisted Procedures/Therapy**

**Treatment Planning**

- MRI arthrogram or CT arthrogram is appropriate when joint sparing/salvage reconstructive surgery is planned for the following:
  - Suspected concomitant rotator cuff tear of the shoulder - See: **MS-19: Shoulder**
  - Suspected concomitant labral tear of the shoulder - See: **MS-19: Shoulder**
  - Suspected concomitant labral tear of the hip - See: **MS-24: Hip**
  - Suspected concomitant internal derangement of the knee - See: **MS-25: Knee**

**Note:**

- MRI knee without contrast (CPT® 73721) is appropriate in a patient with osteoarthritis for clinical suspicion of a symptomatic degenerative meniscus tear following plain X-rays and conservative treatment. See **MS-25: Knee**
References


MS-13: Chondral/Osteochondral Lesions

MS-13.1: Chondral/Osteochondral Lesions, Including Osteochondritis Dissecans and Fractures
MS-13.1: Chondral/Osteochondral Lesions, Including Osteochondritis Dissecans and Fractures

- MRI without contrast, MRI with contrast (arthrogram), or CT with contrast (arthrogram) of the area of interest is indicated when EITHER of the following are met:
  - Plain X-rays are negative and an osteochondral fracture is still suspected
  - Plain X-ray and clinical exam suggest an unstable osteochondral injury
- If plain X-rays show a non-displaced osteochondral fragment, follow-up imaging should be with plain X-rays. Advanced imaging is not necessary.
- MRI without contrast or CT without contrast is indicated when healing cannot be adequately assessed on follow-up plain X-rays.

References
MS-14: Osteoporosis

- Plain X-ray is not required for **MS-14: Osteoporosis**.
- Quantitative CT (CPT® 77078) can be approved for screening when DXA scanner is unavailable or known to be inaccurate for ANY of the following populations:
  - Women age ≥65 years
  - Men age >70 years
  - Women age <65 years who have additional risk factors for osteoporosis based on medical history and other findings:
    - Estrogen deficiency
    - A history of maternal hip fracture that occurred after age 50 years
    - Low body mass (<127 lb or 57.6 kg)
    - History of amenorrhea (>1 year before age 42 years)
  - Women age <65 years or men age <70 years who have additional risk factors:
    - Current use of cigarettes
    - Loss of height, thoracic kyphosis
  - Individuals of any age with bone mass osteopenia or fragility fractures on imaging studies such as radiographs, CT, or MRI
  - Individuals age 50 years and older who develop a wrist, hip, spine, or proximal humerus fracture with minimal or no trauma, excluding pathologic fractures
  - Individuals of any age who develop 1 or more insufficiency fractures
  - Premenopausal females or males age 20 to 50 years with risk factors:
    - Individuals with medical conditions that could alter bone mineral density
      - Chronic renal failure
      - Rheumatoid arthritis and other inflammatory arthritides
      - Eating disorders, including anorexia nervosa and bulimia
      - Organ transplantation
      - Prolonged immobilization
      - Conditions associated with secondary osteoporosis, such as gastrointestinal malabsorption or malnutrition, sprue, osteomalacia, vitamin D deficiency, endometriosis, acromegaly, chronic alcoholism or established cirrhosis, and multiple myeloma
      - Individuals who have had gastric bypass for obesity
      - Individuals with an endocrine disorder known to adversely affect bone mineral density (e.g., hyperparathyroidism, hyperthyroidism, or Cushing syndrome)
    - Individuals receiving (or expected to receive) glucocorticoid therapy for >3 months
    - Hypogonadal men older than 18 years and men with surgically or chemotherapeutically induced castration
    - Individuals beginning or receiving long-term therapy with medications known to adversely affect BMD (e.g. anticonvulsant drugs, androgen deprivation therapy, aromatase inhibitor therapy, or chronic heparin)
Note: Repeat screening quantitative computed tomography (QCT) can be approved no sooner than every two years.

Quantitative CT scan (CPT® 77078) can be approved for non-screening/monitoring when DXA scanner is unavailable or known to be inaccurate for ANY of the following circumstances:

- Follow-up in cases where QCT was the original study
- Multiple healed vertebral compression fractures
- Significant scoliosis
- Advanced arthritis of the spine due to increased cortical sclerosis often with large marginal osteophytes. Obese patient over the weight limit of the dual-energy X-ray absorptiometry (DXA) exam table
- Severely obese patients (BMI >35kg/m2)
- Extremes in body height (i.e. very large and very small patients)
- Patients with extensive degenerative disease of the spine
- A clinical scenario that requires sensitivity to small changes in trabecular bone density (parathyroid hormone and glucocorticoid treatment monitoring).

Note: Repeat non-screening/monitoring QCT can be approved no earlier than one year following a change in treatment regimen, and only when the results will directly impact a treatment decision.

References
### MS-15: Rheumatoid Arthritis (RA) and Inflammatory Arthritis

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</tbody>
</table>
MS 15.1: Rheumatoid Arthritis (RA) and Inflammatory Arthritis

- Plain X-ray, physical exam and appropriate laboratory studies* are required prior to advanced imaging.
- MRI without contrast or MRI without and with contrast or US (CPT® 76881 or 76882) is appropriate for the most symptomatic joint, or of the dominant hand or wrist, in ALL of the following situations:
  - When diagnosis is uncertain prior to initiation of drug therapy.
  - To study the effects of treatment with disease modifying anti-rheumatic drug (DMARD) therapy.
  - To identify seronegative RA patients that might benefit from early DMARD therapy.
  - To determine change in treatment, such as:
    - Switching from standard DMARD therapy to tumor necrosis factor (TNF) therapy.
    - Changing to a different TNF drug therapy, then one MRI (contrast as requested) of a single joint can be performed.
    - Addition of other treatments, including joint injections
- MRI or US should NOT be considered for routine follow-up of treatment.

Practice Notes
- Examples of appropriate laboratory studies may include: Lyme titers, rheumatoid factor (RF), anti-cyclic citrullinated peptide (anti-CCP), sedimentation rate (ESR), C-reactive protein (CRP), and antinuclear antibody (ANA), joint fluid analysis

MS-15.2: Pigmented Villonodular Synovitis (PVNS)

- MRI of the affected joint without contrast, or CT of the affected joint with contrast (arthrogram) if MRI contraindicated is supported following plain X-rays.

References


MS-16.1: Post-Operative Joint Replacement Surgery - General

- CT without contrast or bone scan (CPT® 78315 or CPT® 78320)* may be indicated for the evaluation of suspected aseptic loosening of orthopaedic joint replacements when recent plain X-ray is nondiagnostic.
- CT shoulder without contrast (CPT® 73200) can be performed as additional imaging following plain X-rays regardless of plain X-ray findings. See MS-19: Shoulder. CT without contrast is appropriate with a high suspicion for a periprosthetic fracture and a negative plain X-ray.
  - CT shoulder without contrast (CPT® 73200) can be performed as additional imaging following plain X-rays regardless of plain X-ray findings. See MS-19: Shoulder.
- Joint aspiration is the initial evaluation after plain X-ray for a painful joint replacement when periprosthetic infection is suspected.
  - For suspected infection with negative or inconclusive joint aspiration culture see: MS-28: Nuclear Medicine.
- MRI hip without contrast (CPT® 73721) or ultrasound (CPT® 76881 or 76882) are both appropriate for EITHER of the following:
  - Diagnosis of ALVAL (aseptic lymphocytic-dominated vasculitis-associated lesion) pseudotumors surrounding metal-on-metal (MoM) hip prostheses. One of these two imaging modalities can be approved but not both. See: MS-10.1: Soft Tissue Mass or Lesion of Bone.
  - Metal-On-Metal (MoM) Hip Prostheses that are considered high risk for implant performance issues from THA cup-neck impingement and subsequent ALTR with Co and Cr ion levels greater than 10 ppb.
- CT hip without contrast (CPT® 73700) or MRI hip without contrast (CPT® 73721) is appropriate to evaluate suspected particle disease (aggressive granulomatous disease) of the hip when infection has been excluded.
- For specific joints post-operative from replacement surgery:
  - See MS-19: Shoulder
  - See MS-20: Elbow
  - See MS-24: Hip
  - See MS-25: Knee
  - See MS-26: Ankle

Practice Notes

- Complications following joint replacement surgery include (not limited to) periprosthetic fracture, infection, aseptic loosening, failure of fixation/component malposition, and wear.
- *The usefulness of bone scan for the evaluation of suspected aseptic loosening of a shoulder replacement may be limited as bone remodeling–related increased uptake can be seen at the site of joint replacement for up to 1 year following surgery.
References


**MS-17.1: Limb Length Discrepancy**

- Requests will be sent to Medical Director Review. Either plain radiographic or “CT scanogram,” both reported with CPT® 77073, is appropriate to radiographically evaluate limb length discrepancy due to congenital anomalies, acquired deformities, growth plate (physeal injuries or surgery), or inborn errors of metabolism.

**Reference**

### MS-18: Anatomical Area Tables – General Information

The imaging guidelines for each anatomical area are presented in table format. The table below includes a description of how each column header should be utilized for each guideline **MS-19: Shoulder** through **MS-27: Foot**.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Plain X-Ray?</th>
<th>Conservative Treatment</th>
<th>Advanced Imaging</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient's condition</td>
<td>Are the results of an initial plain X-ray required before advanced imaging can be approved? (Yes or No)</td>
<td>Is failure of 6 weeks of provider-directed conservative treatment within the past 12 weeks with clinical re-evaluation required? (Yes or No)</td>
<td>The appropriate advanced imaging indicated for this condition. In some scenarios, advanced imaging may not be indicated.</td>
<td>Additional comments related to the condition.</td>
</tr>
</tbody>
</table>
# MS-19: Shoulder

<table>
<thead>
<tr>
<th>Condition</th>
<th>Plain X-Ray?</th>
<th>Conservative Treatment</th>
<th>Advanced Imaging</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Shoulder Pain</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>MRI shoulder without contrast (CPT® 73221)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CT shoulder with contrast (arthrogram) (CPT® 73201) if MRI contraindicated</td>
</tr>
<tr>
<td>Symptomatic Loose Bodies</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td>MRI shoulder without contrast (CPT® 73221)</td>
</tr>
<tr>
<td>Impingement</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>MRI shoulder without contrast (CPT® 73221) or MRI shoulder with contrast (arthrogram) (CPT® 73222) or US shoulder (CPT® 76881 or 76882)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CT shoulder with contrast (CPT® 73201) if MRI is contraindicated</td>
</tr>
<tr>
<td>Tendonitis/ Bursitis</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>MRI shoulder without contrast (CPT® 73221) or US shoulder (CPT® 76881 or 76882)</td>
</tr>
<tr>
<td>Tendon Rupture (Biceps Long Head)</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td>MRI shoulder without contrast (CPT® 73221) or US shoulder (CPT® 76881 or 76882) when clinical exam is inconclusive due to inability to visualize a “Popeye” sign clinically or for preoperative planning</td>
</tr>
<tr>
<td>Tendon Rupture (Pectoralis Major/Minor)</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td>MRI Shoulder without contrast (CPT® 73221) or MRI Chest without contrast (CPT® 71550) when clinical exam is inconclusive or for preoperative planning</td>
</tr>
<tr>
<td>Shoulder Rotator Cuff Tear (Complete and Partial)</td>
<td>Yes</td>
<td>Yes*</td>
<td></td>
<td>MRI shoulder without contrast (CPT® 73221) or MRI shoulder with contrast (arthrogram) (CPT® 73222) or US shoulder (CPT® 76881 or 76882)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CT shoulder with contrast (arthrogram) (CPT® 73201) if MRI is contraindicated</td>
</tr>
</tbody>
</table>

*Conservative treatment is not required with an acute shoulder injury prior to the onset of symptoms and consideration of surgery. For surgery criteria, see CMM-315: Shoulder Surgery - Arthroscopic and Open Procedures.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>No</th>
<th>MRI shoulder with contrast (arthrogram) (CPT® 73222) or MRI shoulder without contrast (CPT® 73221) or CT shoulder with contrast (arthrogram) (CPT® 73201)</th>
<th>MRI is NOT needed for muscle belly strains/muscle tears.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial Tendon Rupture (Excluding Partial Rotator Cuff Tears)</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI shoulder without contrast (CPT® 73221) or US shoulder (CPT® 76881 or 76882) for a suspected partial tendon rupture of a specific named tendon not otherwise specified</td>
<td></td>
</tr>
<tr>
<td>Shoulders Labral Tear (e.g., SLAP, ALPSA, HAGL)</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI shoulder with contrast (arthrogram) (CPT® 73222) or MRI shoulder without contrast (CPT® 73221) or CT shoulder with contrast (arthrogram) (CPT® 73201)</td>
<td>For surgery criteria, see CMM-315: Shoulder Surgery-Arthroscopic and Open Procedures.</td>
</tr>
</tbody>
</table>
| Shoulder Dislocation/Subluxation/Instability, or Bankart/Hill-Sachs Lesions| Yes | Yes*| ▶ MRI shoulder with contrast (arthrogram) (CPT® 73222) or MRI shoulder without contrast (CPT® 73221) is medically necessary without conservative treatment in patients 40 years of age or younger with a first time dislocation and in patients with recurrent dislocations  
▶ CT shoulder with contrast (arthrogram) (CPT® 73201) or CT shoulder without contrast (CPT® 73200) if MRI is contraindicated | Conservative treatment is required in patients over age 40 with a first time dislocation.  
For surgery criteria, see CMM-315: Shoulder Surgery-Arthroscopic and Open Procedures. |
<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Yes</th>
<th>No</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen Shoulder/Adhesive Capsulitis</td>
<td>Yes</td>
<td>Yes</td>
<td>Advanced imaging is rarely indicated – in those rare situations, MRI shoulder without contrast (CPT® 73221) Requests will be forwarded to Medical Director review. For surgery criteria, see CMM-310: Manipulation Under Anesthesia and CMM-315: Shoulder Surgery-Arthroscopic</td>
</tr>
<tr>
<td>Avascular Necrosis (AVN) of the Humeral Head</td>
<td>Yes</td>
<td>No</td>
<td>MRI shoulder without contrast (CPT® 73221) when suspected and plain X-ray is negative or equivocal CT shoulder without contrast (CPT® 73200) and/or MRI shoulder without contrast (CPT® 73221) for preoperative planning prior to shoulder replacement See also MS-4.1: AVN</td>
</tr>
<tr>
<td>Acromioclavicular (AC) Separation</td>
<td>Yes</td>
<td>No</td>
<td>MRI shoulder without contrast (CPT® 73221) to rule out possible rotator cuff tear following AC separation</td>
</tr>
<tr>
<td>Sternoclavicular (SC) Dislocation</td>
<td>Yes</td>
<td>No</td>
<td>CT Chest without contrast (CPT® 71250) if posterior SC dislocation is evident or suspected</td>
</tr>
<tr>
<td>Post-Operative Shoulder Surgery for Impingement, Rotator Cuff Tear, and/or Labral Tear</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI shoulder without contrast (CPT® 73221) or MRI shoulder with contrast (arthrogram) (CPT® 73222) in symptomatic individuals US shoulder (CPT® 76881 or 76882) is also appropriate in symptomatic individuals following rotator cuff repair CT shoulder with contrast (arthrogram) (CPT® 73201) if MRI contraindicated Other requests for advanced imaging will be forwarded to Medical Director review.</td>
</tr>
<tr>
<td>Preoperative Shoulder (Glenohumeral) Replacement Surgery</td>
<td>Yes</td>
<td>Yes</td>
<td>CT shoulder without contrast (CPT® 73200) and/or MRI shoulder without contrast (CPT® 73221) for preoperative planning prior to shoulder replacement</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Post-Operative Shoulder (Glenohumeral) Replacement Surgery</td>
<td>Yes</td>
<td>No</td>
<td>CT shoulder without contrast (CPT® 73200) for suspected aseptic loosening or fracture as additional imaging following plain X-rays</td>
</tr>
</tbody>
</table>
|                                                          |     |     | ▶ In-111 WBC (CPT® 78805) and Tc-99m sulfur colloid scan shoulder (CPT® 78102 or 78103) for suspected infection with negative or inconclusive joint aspiration culture (see also **MS-28: Nuclear Medicine**)
▶ CT shoulder with contrast (arthrogram) (CPT® 73201) or US shoulder (CPT® 76881 or 76882) for possible rotator cuff tear
▶ MRI shoulder without contrast (CPT® 73221) or US shoulder (CPT® 76881 or 76882) for possible nerve injury |
References


## MS-20: Elbow

<table>
<thead>
<tr>
<th>Condition</th>
<th>Plain X-Ray?</th>
<th>Conservative Treatment</th>
<th>Advanced Imaging</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Elbow Pain</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI elbow without contrast (CPT® 73221)</td>
<td></td>
</tr>
<tr>
<td>Symptomatic Loose Bodies</td>
<td>Yes</td>
<td>No</td>
<td>MRI elbow without contrast (CPT® 73221) if effusion is present; or MRI elbow with contrast (arthrogram) (CPT® 73222) if no effusion is present</td>
<td></td>
</tr>
<tr>
<td>Tendonitis</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI elbow without contrast (CPT® 73221) or US elbow (CPT® 76881 or 76882)</td>
<td></td>
</tr>
<tr>
<td>Bursitis</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI elbow without and with contrast (CPT® 73223) or MRI elbow without contrast (CPT® 73221) or US elbow (CPT® 76881 or 76882)</td>
<td></td>
</tr>
<tr>
<td>Lateral (tennis elbow) or Medial (golfer’s elbow) Epicondylitis</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI elbow without contrast (CPT® 73221) or US elbow (CPT® 76881 or 76882)</td>
<td>Epicondylitis, caused by tendon degeneration and tear of the common extensor tendon laterally or of the common flexor tendon medially, is a common clinical diagnosis for which imaging is not medically necessary except as noted. Requests will be forwarded to Medical Director review.</td>
</tr>
<tr>
<td>Suspected Osteochondral Injury</td>
<td>Yes</td>
<td>No</td>
<td>MRI elbow without contrast (CPT® 73221) or MRI elbow with contrast (arthrogram) (CPT® 73222) or CT elbow with contrast (arthrogram) (CPT® 73201) if plain X-rays are negative and an osteochondral fracture is still suspected</td>
<td>See MS-13: Chondral/Osteochondral Lesions</td>
</tr>
<tr>
<td>Ruptured Biceps Insertion at Elbow</td>
<td>Yes</td>
<td>No</td>
<td>MRI elbow without contrast (CPT® 73221) or US elbow (CPT® 76881 or 76882) when clinical exam is inconclusive or for preoperative planning</td>
<td></td>
</tr>
<tr>
<td>Ruptured Triceps</td>
<td>Yes</td>
<td>No</td>
<td>MRI elbow without contrast (CPT® 73221) or US elbow (CPT® 76881 or 76882) when clinical exam is inconclusive or for preoperative planning</td>
<td></td>
</tr>
<tr>
<td><strong>Insertion at Elbow</strong></td>
<td></td>
<td><strong>clinical exam is inconclusive or for preoperative planning</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Partial Tendon Rupture</strong></td>
<td>Yes</td>
<td>No</td>
<td>MRI elbow without contrast (CPT® 73221) or US elbow (CPT® 76881 or 76882) for a suspected partial tendon rupture of a specific named tendon not otherwise specified</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MRI is NOT needed for muscle belly strains/muscle tears.</td>
<td></td>
</tr>
<tr>
<td><strong>Trauma</strong></td>
<td>Yes</td>
<td>No</td>
<td>MRI elbow without contrast (CPT® 73221) or CT elbow without contrast (CPT® 73200) when surgery is being considered</td>
<td></td>
</tr>
<tr>
<td><strong>Ulnar Collateral Ligament (UCL) Tear</strong></td>
<td>Yes</td>
<td>No</td>
<td>MRI elbow with contrast (arthrogram) (CPT® 73222) or MRI elbow without contrast (CPT® 73221) or US elbow (CPT® 76881 or 76882) following acute or repetitive elbow trauma</td>
<td></td>
</tr>
<tr>
<td><strong>Suspected Nerve Abnormality</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>MRI elbow without contrast (CPT® 73221) or US elbow (CPT® 76881 or 76882)</td>
<td></td>
</tr>
<tr>
<td><strong>Post-Operative</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>CT elbow without contrast (CPT® 73200) in symptomatic post-operative patients following surgical post-operative treatment of complex fractures; or MRI elbow without contrast (CPT® 73221) in symptomatic post-operative patients following soft-tissue surgery</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other requests for advanced imaging will be forwarded to Medical Director review.</td>
<td></td>
</tr>
<tr>
<td><strong>Preoperative Elbow Replacement Surgery</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>CT elbow without contrast (CPT® 73200) for preoperative planning prior to elbow replacement when congenital or post-traumatic deformities exist</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>See: <strong>MS-12: Osteoarthritis</strong></td>
<td></td>
</tr>
</tbody>
</table>
Post-Operative Elbow Replacement Surgery

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

- CT elbow without contrast (CPT® 73200) for suspected aseptic loosening or fracture replacement when recent plain X-ray is nondiagnostic
- IN-111 WBC (CPT® 78805) and Tc-99m sulfur colloid scan elbow (CPT® 78102 or 78103) for suspected infection with negative or inconclusive joint aspiration culture see: MS-28: Nuclear Medicine

Other requests for advanced imaging will be forwarded to Medical Director review.

References


<table>
<thead>
<tr>
<th>Condition</th>
<th>Plain X-Ray?</th>
<th>Conservative Treatment</th>
<th>Advanced Imaging</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Wrist Pain</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI wrist without contrast (CPT® 73221)</td>
<td></td>
</tr>
<tr>
<td>Tendonitis</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI wrist without contrast (CPT®73221) or US wrist (CPT® 76881 or 76882)</td>
<td></td>
</tr>
<tr>
<td>Kienbock’s Disease (Avascular Necrosis (AVN) of the Lunate)/ Preiser’s Disease (Avascular Necrosis (AVN) of the Scaphoid)</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI wrist without contrast (CPT® 73221) when suspected and plain X-ray is negative or equivocal&lt;br&gt;▶ If diagnosed on plain X-ray, CT wrist without contrast (CPT® 73200) or MRI wrist without contrast (CPT® 73221)</td>
<td>See also MS-4.1: AVN</td>
</tr>
<tr>
<td>Suspected Navicular/Scaphoid Fracture</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI wrist without contrast (CPT® 73221) or CT wrist without contrast (CPT® 73200) when suspected based on history and physical exam</td>
<td>See also MS-5.2: Suspected Occult/ Stress/ Insufficiency Fracture/ Stress Reaction and Shin Splints</td>
</tr>
<tr>
<td>Distal Radioulnar Joint (DRUJ) Instability</td>
<td>Yes</td>
<td>No</td>
<td>▶ CT of both wrists without contrast (CPT® 73200) (should include wrists in supination and pronation)</td>
<td></td>
</tr>
<tr>
<td>Complex Distal Radius/Ulna Fracture</td>
<td>Yes</td>
<td>No</td>
<td>▶ CT wrist without contrast (CPT®73200)</td>
<td></td>
</tr>
<tr>
<td>Carpal Tunnel Syndrome/Ulnar Tunnel Syndrome</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI wrist without contrast (CPT® 73221) or US wrist (CPT® 76881 or 76882) for surgical planning when a soft tissue mass is identified on physical examination</td>
<td>Clinical diagnosis is often confirmed with electrodiagnostic studies. Refer to PN-2: Focal Neuropathy</td>
</tr>
<tr>
<td>Intrinsic Ligament (e.g. scapholunate)/Triangular Fibrocartilage Complex (TFCC) Injuries</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI wrist with contrast (arthrogram) (CPT® 73222)</td>
<td></td>
</tr>
<tr>
<td>Complete Rupture of a Specific Named Tendon Not Otherwise Specified</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI wrist without contrast (CPT® 73221) or US wrist (CPT® 76881 or 76882) for preoperative planning</td>
<td></td>
</tr>
<tr>
<td>Partial Tendon Rupture</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI wrist without contrast (CPT® 73221) or US wrist (CPT® 76881 or 76882) for a suspected partial tendon rupture of a specific named tendon not otherwise specified</td>
<td></td>
</tr>
<tr>
<td>Post-Operative</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ CT wrist without contrast (CPT® 73200) in symptomatic patients following surgery for navicular/scaphoid fractures and complex distal radius/ulna fractures; or ▶ MRI wrist with contrast (arthrogram) (CPT® 73222) in symptomatic patients following DRUJ or TFCC surgery</td>
<td>MRI is NOT needed for muscle belly strains/muscle tears.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other requests for advanced imaging will be forwarded to Medical Director review.</td>
<td></td>
</tr>
</tbody>
</table>
### Preoperative Wrist Replacement Surgery

| Yes | Yes | CT wrist without contrast (CPT® 73200) for preoperative planning prior to wrist replacement when congenital or post-traumatic deformities exist | See: **MS-12: Osteoarthritis** |

### Post-Operative Wrist Replacement Surgery

| Yes | No | CT elbow without contrast (CPT® 73200) for suspected aseptic loosening or fracture replacement when recent plain X-ray is nondiagnostic | In-111 WBC (CPT® 78805) and Tc-99m sulfur colloid scan elbow (CPT® 78102 or 78103) for suspected infection with negative or inconclusive joint aspiration culture see: **MS-28: Nuclear Medicine** | Other requests for advanced imaging will be forwarded to Medical Director review. |

---

**References**


<table>
<thead>
<tr>
<th>Condition</th>
<th>Plain X-Ray?</th>
<th>Conservative Treatment</th>
<th>Advanced Imaging</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Hand Pain</td>
<td>Yes</td>
<td>Yes</td>
<td>&gt; MRI hand or finger without contrast (CPT® 73218)</td>
<td></td>
</tr>
<tr>
<td>Tendonitis</td>
<td>Yes</td>
<td>Yes</td>
<td>&gt; MRI hand or finger without contrast (CPT® 73218) or US hand or finger (CPT® 76881 or 76882)</td>
<td></td>
</tr>
<tr>
<td>Occult Fracture</td>
<td>Yes</td>
<td>No</td>
<td>&gt; Advanced imaging guided by <strong>MS-5.2: Suspected Occult/ Stress/ Insufficiency Fracture/ Stress Reaction and Shin Splints</strong></td>
<td></td>
</tr>
<tr>
<td>Complex Fracture</td>
<td>Yes</td>
<td>No</td>
<td>&gt; CT hand or finger without contrast (CPT® 73200) when plain X-ray shows a complex fracture</td>
<td></td>
</tr>
<tr>
<td>Ulnar Collateral Ligament (UCL) Thumb Injury</td>
<td>Yes</td>
<td>No</td>
<td>&gt; MRI thumb without contrast (CPT® 73218) or US thumb (CPT® 76881 or 76882) if rule out for Stener lesion or complete tear of UCL of the thumb MCP joint</td>
<td>Also called “Gamekeeper’s Thumb” or “Skier’s Thumb”</td>
</tr>
<tr>
<td>Complete Rupture of a Specific Named Tendon not Otherwise Specified</td>
<td>Yes</td>
<td>No</td>
<td>&gt; MRI hand or finger without contrast (CPT® 73218) or US hand or finger (CPT® 76881 or 76882) for preoperative planning</td>
<td></td>
</tr>
<tr>
<td>Partial Tendon Rupture</td>
<td>Yes</td>
<td>No</td>
<td>&gt; MRI hand or finger without contrast (CPT® 73218) or US hand or finger (CPT® 76881 or 76882) for a suspected partial tendon rupture of a specific named tendon not otherwise specified</td>
<td>MRI is NOT needed for muscle belly strains/muscle tears.</td>
</tr>
<tr>
<td>Post-Operative</td>
<td>Yes</td>
<td>Yes</td>
<td>&gt; CT hand or finger without contrast (CPT® 73200) or MRI hand or finger without contrast (CPT® 73218) in symptomatic post-operative patients following surgical treatment for complex hand or finger fractures or following soft-tissue surgery</td>
<td>Other requests for advanced imaging will be forwarded to Medical Director review.</td>
</tr>
</tbody>
</table>
References

<p>| Condition                                      | Plain X-Ray? | Conservative Treatment | Advanced Imaging                                                                 || Comments                                                                                                                                                                                                 |
|-----------------------------------------------|--------------|------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Pain-Pelvis                          | Yes          | Yes                    | &gt; MRI pelvis without contrast (CPT® 72195); or                                   | See also MS-5.2: Suspected Occult/ Stress/ Insufficiency Fracture/ Stress Reaction and Shin Splints for occult and stress fractures of the pelvis                                                                 |
| Tendonitis                                    | Yes          | Yes                    | &gt; MRI pelvis without contrast (CPT® 72195); or                                   |                                                                                                                                                                                                          |
| Insufficiency Fracture                        | Yes          | No                     | &gt; MRI pelvis without contrast (CPT® 72195) or CT pelvis without contrast (CPT® 72192) |                                                                                                                                                                                                          |
| Complex Fracture/Dislocation - Pelvis, Sacrum and Acetabulum | Yes          | No                     | &gt; CT pelvis without contrast (CPT® 72192)                                       | Additionally, 3D rendering may be appropriate for preoperative planning. See also MS-3: 3D Rendering                                                                                                      |
| Sacro-iliac (SI) Joint Pain, Sacroiliitis, Coccydynia | Yes          | Yes                    | &gt; Advanced imaging guided by: SP-10.1: Sacroiliac (SI) Joint Pain/Sacroiliitis and SP-5.2: Coccydynia without Neurological Features |                                                                                                                                                                                                          |
| Complete Rupture of a Specific Named Tendon   | Yes          | No                     | &gt; MRI pelvis without contrast (CPT® 72195) for preoperative planning             |                                                                                                                                                                                                          |
| Partial Tendon Rupture                        | Yes          | No                     | &gt; MRI Pelvis without contrast (CPT® 72195) for a suspected partial tendon rupture of a specific named tendon not otherwise specified | MRI is NOT needed for muscle belly strains/muscle tears.                                                                                                                                                   |
| Osteitis Pubis/Symphysis Pubis Diastasis      | Yes          | Yes                    | &gt; MRI pelvis without contrast (CPT® 72195)                                      |                                                                                                                                                                                                          |</p>
<table>
<thead>
<tr>
<th>Athletic Pubalgia (Sports Hernia)</th>
<th>Yes</th>
<th>Yes</th>
<th>MRI pelvis without contrast (athletic pubalgia protocol) (CPT® 72195) or dynamic pelvic ultrasound (CPT® 76857) are appropriate to evaluate for the cause of suspected athletic pubalgia.</th>
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</thead>
<tbody>
<tr>
<td>Post-Operative</td>
<td>Yes</td>
<td>Yes</td>
<td>CT pelvis without contrast (CPT® 72192) in symptomatic patients following surgery for complex pelvic ring/acetabular fractures</td>
</tr>
<tr>
<td></td>
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<td>Other requests for advanced imaging will be forwarded to Medical Director review.</td>
</tr>
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</table>

References

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>General Hip Pain</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI hip without contrast (CPT® 73721)</td>
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<tr>
<td>Symptomatic Loose Bodies</td>
<td>Yes</td>
<td>No</td>
<td>MRI hip without contrast (CPT® 73721)</td>
<td></td>
</tr>
<tr>
<td>Tendonitis/ Bursitis</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI hip without contrast (CPT® 73721) or US hip (CPT® 76881 or 76882)</td>
<td></td>
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<tr>
<td>Hip Abductor Tendon Tear/Avulsion</td>
<td>Yes</td>
<td>No</td>
<td>MRI hip without contrast (CPT® 73721) or US hip (CPT® 76881 or 76882)</td>
<td>MRI is NOT needed for muscle belly strains/muscle tears.</td>
</tr>
<tr>
<td>Complete Rupture of a Specific Named Tendon</td>
<td>Yes</td>
<td>No</td>
<td>MRI hip without contrast (CPT® 73721) or US hip (CPT® 76881 or 76882) for preoperative planning</td>
<td></td>
</tr>
<tr>
<td>Partial Tendon Rupture</td>
<td>Yes</td>
<td>No</td>
<td>MRI hip without contrast (CPT® 73721) or US hip (CPT® 76881 or 76882) for a suspected partial tendon rupture of a specific named tendon not otherwise specified</td>
<td>MRI is NOT needed for muscle belly strains/muscle tears.</td>
</tr>
<tr>
<td>Insufficiency Fracture</td>
<td>Yes</td>
<td>No</td>
<td>MRI hip without contrast (CPT® 73721) or CT hip without contrast (CPT® 73700)</td>
<td>See also MS-5.2: Suspected Occult/ Stress/ Insufficiency Fracture/ Stress Reaction and Shin Splints for occult and stress fractures of the hip</td>
</tr>
<tr>
<td>Avascular Necrosis (AVN) of the Femoral Head</td>
<td>Yes</td>
<td>No</td>
<td>MRI hip without contrast (CPT® 73721) when suspected and plain X-ray is negative or equivocal MRI hip without contrast (CPT® 73721) or CT hip without contrast (CPT® 73700) with femoral head collapse for preoperative planning</td>
<td>See also MS-4.1: AVN</td>
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<tr>
<td>Labral Tear</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI hip with contrast (arthrogram) (CPT® 73722) or CT hip with contrast (arthrogram) (CPT® 73701) or MRI hip without contrast (CPT® 73721)</td>
<td>For surgery criteria, see CMM-314: Hip Surgery- Arthroscopic and Open Procedures</td>
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<tr>
<td>Condition</td>
<td>Preoperative</td>
<td>Postoperative</td>
<td>Other requests for advanced imaging</td>
<td>Preoperative Hip Replacement Surgery</td>
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<tr>
<td>Post-Operative Hip Replacement Surgery</td>
<td>Yes</td>
<td>No*</td>
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<tr>
<td>CT hip without contrast (CPT® 73700) or bone scan (CPT® 78315 or CPT® 78320) for suspected aseptic loosening of hip replacement when recent plain X-ray is nondiagnostic</td>
<td></td>
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<tr>
<td>In-111 WBC (CPT® 78805) and Tc-99m sulfur colloid scan hip (CPT® 78102 or 78103) for suspected infection with negative or inconclusive joint aspiration culture (see MS-28: Nuclear Medicine)</td>
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<tr>
<td>CT hip without contrast (CPT® 73700) for suspicion of a periprosthetic fracture when recent plain X-ray is nondiagnostic</td>
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<tr>
<td>CT hip without contrast (CPT® 73700) to evaluate component malposition or heterotopic bone after plain X-ray</td>
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<tr>
<td>MRI hip without contrast (CPT® 73721) for possible nerve injury</td>
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<tr>
<td>MRI hip without contrast (CPT® 73721) or US hip (CPT® 76881 or 76882) for suspected tendinitis/bursitis (*requires conservative treatment)</td>
<td></td>
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</tbody>
</table>

**Coding Notes**
- Unilateral hip MRI is reported as CPT® 73721.
- Bilateral hip MRI can be identified in several different ways on the claim.
  - eviCore will approve two separate codes (CPT® 73721 x 2) with RT and LT modifiers.
  - However, providers are urged to check for individual payer preferences regarding bilateral modifier use.

See also **MS-16: Post-Operative Joint Replacement**
References

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<thead>
<tr>
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<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Knee Pain</td>
<td>Yes</td>
<td>Yes</td>
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<td>MRI knee without contrast (CPT® 73721)</td>
</tr>
<tr>
<td>Symptomatic Loose Bodies</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td>MRI knee without contrast (CPT® 73721) &lt;br&gt; CT knee with contrast (arthrogram) (CPT® 73701) if MRI cannot be performed</td>
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<tr>
<td>Tendonitis</td>
<td>Yes</td>
<td>Yes</td>
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<td>MRI knee without contrast (CPT® 73721) or US knee (CPT® 76881 or 76882)</td>
</tr>
<tr>
<td>Complex Knee Fracture</td>
<td>Yes</td>
<td>No</td>
<td>CT knee without contrast (CPT® 73700)</td>
<td>See: MS-5: Fractures</td>
</tr>
<tr>
<td>Meniscus Tear</td>
<td>Yes</td>
<td>Yes*</td>
<td>MRI knee without contrast (CPT® 73721) &lt;br&gt;*Conservative treatment is not required if at least 2 of following 4 criteria are met: &lt;br&gt; 1) Positive McMurray’s or positive Thessaly test &lt;br&gt; 2) twisting or acute injury of the knee &lt;br&gt; 3) locked knee/inability to fully extend the knee &lt;br&gt; 4) knee effusion</td>
<td>For surgery criteria, see: CMM-312: Knee Surgery- Arthroscopic and Open Procedures</td>
</tr>
<tr>
<td>Ligament Tear</td>
<td>Yes</td>
<td>Yes*</td>
<td>MRI knee without contrast (CPT® 73721) &lt;br&gt;*Conservative treatment is not required if any of the following signs are positive in comparison to the normal knee: &lt;br&gt; ♦ Anterior drawer &lt;br&gt; ♦ Lachman &lt;br&gt; ♦ Pivot shift &lt;br&gt; ♦ Posterior drawer &lt;br&gt; ♦ Posterior sag &lt;br&gt; ♦ Valgus stress &lt;br&gt; ♦ Varus stress</td>
<td>For surgery criteria, see: CMM-312: Knee Surgery- Arthroscopic and Open Procedures</td>
</tr>
<tr>
<td>Knee Joint Dislocation</td>
<td>Yes</td>
<td>No</td>
<td>MRI knee without contrast (CPT® 73721) and MRA knee without and with contrast (CPT® 73725) following significant trauma to evaluate for ligament and vascular injury</td>
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<tr>
<td>Condition</td>
<td>Yes</td>
<td>No</td>
<td>MRI Imaging Options</td>
<td>Surgery Criteria</td>
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<tr>
<td><strong>Patellar Dislocation/Subluxation</strong></td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI knee without contrast (CPT® 73721) with acute knee injury, consideration of surgery and concern for osteochondral fracture or loose osteochondral fracture fragment</td>
<td>For surgery criteria, see: CMM-312: Knee Surgery: Arthroscopic and Open Procedures</td>
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<tr>
<td><strong>Recurrent Patellar Instability</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI knee without contrast (CPT® 73721) if consideration for surgery</td>
<td>For surgery criteria, see: CMM-312: Knee Surgery: Arthroscopic and Open Procedures</td>
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<tr>
<td><strong>Patellofemoral Pain Syndrome/Anterior Knee Pain/Tracking Disorder</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI knee without contrast (CPT® 73721) if consideration for surgery</td>
<td>For surgery criteria, see: CMM-312: Knee Surgery: Arthroscopic and Open Procedures</td>
</tr>
<tr>
<td><strong>Suspected Osteochondral Injury</strong></td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI knee without contrast (CPT® 73721) or MRI knee with contrast (arthrogram) (CPT® 73722) or CT knee with contrast (arthrogram) (CPT® 73701) if plain X-rays are negative and an osteochondral fracture is still suspected</td>
<td>See MS-13: Chondral Osteochondral Lesions for other osteochondral injury scenarios. For surgery criteria, see: CMM-312: Knee Surgery: Arthroscopic and Open Procedures</td>
</tr>
<tr>
<td><strong>Avascular Necrosis (AVN) of the Distal Femur</strong></td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI knee without contrast (CPT® 73721) when suspected and plain X-ray is negative or equivocal or with AVN confirmed by plain X-ray if needed for treatment planning</td>
<td>See: MS-4.1: Avascular Necrosis</td>
</tr>
<tr>
<td><strong>Baker's Cyst (Popliteal Cyst)</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>▶ US knee (CPT® 76881 or CPT® 76882) is the initial imaging study</td>
<td>See also PVD-7.5: Lower Extremity Deep Venous Thrombosis (DVT) and/or Lower Extremity Edema</td>
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<td>▶ MRI knee without contrast (CPT® 73721) for preoperative planning</td>
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<tr>
<td>Condition</td>
<td>Active</td>
<td>Inactive</td>
<td>Exam/Imaging Recommendations</td>
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<tr>
<td>Plica (Symptomatic Synovial Plica/ Medial Synovial Shelf)</td>
<td>Yes</td>
<td>Yes</td>
<td>- MRI knee without contrast (CPT® 73721)</td>
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<tr>
<td>Hemarthrosis</td>
<td>Yes</td>
<td>No</td>
<td>- MRI knee without contrast (CPT® 73721) for clinical suspicion of cruciate ligament tear (requires a positive objective sign for ACL/PCL tear) or patellar dislocation (requires a positive apprehension sign)</td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td>- CT knee without contrast (CPT® 73700) for clinical suspicion of non-displaced intra-articular fracture</td>
<td></td>
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<tr>
<td>Complete Rupture of the Distal Quadriceps Tendon or Patellar Ligament/ Tendon</td>
<td>Yes</td>
<td>No</td>
<td>- MRI knee without contrast (CPT® 73721) or US knee (CPT® 76881 or 76882) for preoperative planning</td>
<td></td>
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<tr>
<td>Partial Tendon Rupture</td>
<td>Yes</td>
<td>No</td>
<td>- MRI knee without contrast (CPT® 73721) or US knee (CPT® 76881 or 76882) for a suspected partial tendon rupture of a specific named tendon not otherwise specified</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td>MRI is NOT needed for muscle belly strains/muscle tears.</td>
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<tr>
<td>Post-Operative</td>
<td>Yes</td>
<td>Yes</td>
<td>- MRI knee with contrast (arthrogram) (CPT® 73722) or MRI knee without contrast (CPT® 73721) in symptomatic patients following surgery for meniscus tears and reconstruction of the anterior cruciate ligament</td>
<td></td>
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<tr>
<td></td>
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<td>- CT knee without contrast (CPT® 73700) in symptomatic patients following surgery for fracture/dislocation</td>
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<td></td>
<td>Other requests for advanced imaging will be forwarded to Medical Director review.</td>
<td></td>
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<tr>
<td>Preoperative Knee Replacement Surgery</td>
<td>Yes</td>
<td>Yes</td>
<td>- CT knee without contrast (CPT® 73700) for preoperative planning prior to knee replacement when congenital or post-traumatic deformities exist of the patella, distal femur and/or proximal tibia</td>
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<td></td>
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<td>See also <strong>MS-12: Osteoarthritis</strong> For surgery criteria, see <strong>CMM-311: Knee Arthroplasty-Total and Partial</strong></td>
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<tr>
<td>Post-Operative Knee Replacement Surgery</td>
<td>Yes</td>
<td>No*</td>
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<tr>
<td>▶ CT knee without contrast (CPT® 73700) or bone scan (CPT® 78315 or CPT® 78320) for suspected aseptic loosening when recent plain X-ray is nondiagnostic</td>
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</tbody>
</table>
| ▶ Tc-99m 3-phase bone scan (CPT® 78315) and In-111 WBC scan knee (CPT® 78805) or In-111 WBC (CPT® 78805) and Tc-99m sulfur colloid scan knee (CPT® 78102 or 78103) for suspected infection with negative or inconclusive joint aspiration culture (see **MS-28: Nuclear Medicine**)
| ▶ CT knee without contrast (CPT® 73700) following plain X-ray for suspected periprosthetic fracture |
| ▶ CT knee without contrast (CPT® 73700) or MRI knee without contrast (CPT® 73721) for suspected osteolysis or component instability, rotation, or wear; |
| ▶ MRI knee without contrast (CPT® 73721) or US knee (CPT® 76881 or 76882) for suspected periprosthetic soft tissue abnormality unrelated to infection (e.g., tendinopathy, arthrofibrosis, patellar clunk syndrome, impingement of nerves or other soft tissue) *requires conservative treatment. |

Other requests for advanced imaging will be forwarded to Medical Director review. See also **MS-16: Post-Operative Joint Replacement Surgery**
References


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<tr>
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<tbody>
<tr>
<td>General Ankle Pain</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI ankle without contrast (CPT® 73721)</td>
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<tr>
<td>Symptomatic Loose Bodies</td>
<td>Yes</td>
<td>No</td>
<td>MRI ankle without contrast (CPT® 73721)</td>
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<tr>
<td>Complex Fracture</td>
<td>Yes</td>
<td>No</td>
<td>CT ankle without contrast (CPT® 73700)</td>
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<tr>
<td>Ankle Sprain, Including Avulsion Fracture</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI ankle without contrast (CPT® 73721) or CT without contrast (CPT® 73700)</td>
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<tr>
<td>High Ankle Sprain (Syndesmosis Injury)</td>
<td>Yes</td>
<td>No</td>
<td>MRI ankle without contrast (CPT® 73721)</td>
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<tr>
<td>Suspected Osteochondral Injury</td>
<td>Yes</td>
<td>No</td>
<td>MRI ankle without contrast (CPT® 73721) or MRI ankle with contrast (arthrogram) (CPT® 73722) or CT ankle with contrast (arthrogram) (CPT® 73701) if plain X-rays are negative and an osteochondral fracture is still suspected</td>
<td>See MS-13: Chondral/Osteochondral Lesions for other osteochondral injury scenarios</td>
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<tr>
<td>Avascular Necrosis (AVN) of the Talus</td>
<td>Yes</td>
<td>No</td>
<td>MRI ankle without contrast (CPT® 73721) when suspected and plain X-ray is negative or equivocal or with plain X-ray-confirmed AVN if needed for treatment planning</td>
<td>See: MS-4.1: AVN</td>
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<tr>
<td>Anterior Impingement</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI ankle with contrast (arthrogram) (CPT® 73722) or CT ankle with contrast (arthrogram) (CPT® 73701) or MRI ankle without contrast (CPT® 73721)</td>
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<tr>
<td>Anterior-Lateral Impingement (e.g., Os Trigonum Syndrome)</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI ankle without contrast (CPT® 73721) or US ankle (CPT® 76881 or 76882) for suspected posterior tibial dysfunction, peroneal tendon or subluxation, Achilles tendonitis</td>
<td></td>
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<tr>
<td>Tendonitis</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI ankle without contrast (CPT® 73721) or US ankle (CPT® 76881 or 76882) for preoperative evaluation</td>
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<tr>
<td>Ruptured Achilles Tendon</td>
<td>Yes</td>
<td>No</td>
<td>MRI ankle without contrast (CPT® 73721) or US ankle (CPT® 76881 or 76882) for preoperative evaluation</td>
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<tr>
<td>Musculoskeletal Imaging</td>
<td>Complete Rupture - Tear of a Specific Named Tendon</td>
<td>Yes</td>
<td>No</td>
<td>MRI ankle without contrast (CPT® 73721) or US ankle (CPT® 76881 or 76882) for preoperative planning</td>
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<tr>
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<td>Partial Tendon Rupture</td>
<td>Yes</td>
<td>No</td>
<td>MRI ankle without contrast (CPT® 73721) or US ankle (CPT® 76881 or 76882) for a suspected partial tendon rupture of a specific named tendon not otherwise specified</td>
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<td>Instability</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI ankle without contrast (CPT® 73721) or MRI ankle with contrast (arthrogram) (CPT® 73722) for preoperative evaluation</td>
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<td>Charcot Ankle</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI ankle without contrast (CPT® 73721)</td>
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<td>Post-Operative</td>
<td>Yes</td>
<td>Yes</td>
<td>MRI ankle without contrast (CPT® 73721) in symptomatic patients following surgery for ligament/tendon injuries</td>
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<tr>
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<td>Preoperative Ankle Replacement Surgery</td>
<td>Yes</td>
<td>Yes</td>
<td>CT ankle without contrast (CPT® 73700) for preoperative planning prior to ankle replacement when congenital or post-traumatic deformities exist</td>
</tr>
<tr>
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<td>Post-Operative Ankle Replacement Surgery</td>
<td>Yes</td>
<td>No</td>
<td>CT ankle without contrast (CPT® 73700) for suspected aseptic loosening or periprosthetic fracture when recent plain X-ray is nondiagnostic</td>
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</table>

**One Study/Area Only**
In foot and ankle advanced imaging, studies are frequently ordered of both areas. This is unnecessary since ankle MRI will image from above the ankle to the mid-metatarsal area. Only one CPT® code should be reported.
References

<table>
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<tr>
<th>Condition</th>
<th>Plain X-Ray</th>
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<tr>
<td>General Foot Pain</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI foot without contrast (CPT® 73718)</td>
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<tr>
<td>Complex Fractures</td>
<td>Yes</td>
<td>No</td>
<td>▶ CT foot without contrast (CPT® 73700)</td>
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<tr>
<td>Plantar Plate Disorders, Including Turf Toe Injuries</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI foot without contrast (CPT® 73718)</td>
<td></td>
</tr>
<tr>
<td>Sesamoid Disorders</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI foot without contrast (CPT® 73718) or CT foot without contrast (CPT® 73700)</td>
<td></td>
</tr>
<tr>
<td>Lisfranc Tarsometatarsal Fracture or Dislocation</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI foot without contrast (CPT® 73718) or CT foot without contrast (CPT® 73700)</td>
<td></td>
</tr>
<tr>
<td>Tarsal Navicular Stress/Occult Fracture</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI foot without contrast (CPT® 73718) or Tc-99m bone scan foot (CPT® 78315) if MRI cannot be performed or CT foot without contrast (CPT® 73700) for follow-up of healing fractures</td>
<td>See also MS-5.2: Suspected Occult/Stress/Insufficiency Fracture/Stress Reaction and Shin Splints</td>
</tr>
<tr>
<td>Avascular Necrosis (AVN) of the Tarsal Navicular (Kohler Disease)</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI foot without contrast (CPT® 73718) when suspected and plain X-ray is negative or equivocal or with AVN confirmed by plain X-ray if needed for treatment planning</td>
<td>See: MS-4.1: AVN</td>
</tr>
<tr>
<td>Tendonitis</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI foot without contrast (CPT® 73718) or US foot (CPT® 76881 or 76882)</td>
<td></td>
</tr>
<tr>
<td>Complete rupture/tear of a specific named tendon</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI foot without contrast (CPT® 73718) or US foot (CPT® 76881 or 76882) for preoperative planning</td>
<td></td>
</tr>
<tr>
<td>Partial Tendon Rupture</td>
<td>Yes</td>
<td>No</td>
<td>▶ MRI foot without contrast (CPT® 73718) or US foot (CPT® 76881 or 76882) for a suspected partial tendon rupture of a specific named tendon not otherwise specified</td>
<td>MRI is NOT needed for muscle belly strains/muscle tears.</td>
</tr>
<tr>
<td>Morton’s Neuroma</td>
<td>Yes</td>
<td>Yes</td>
<td>▶ MRI foot without and with contrast (CPT® 73720) or US foot (CPT® 76881 or 76882) for preoperative planning</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Requested</td>
<td>Directed</td>
<td></td>
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<td>----------------------------------------------</td>
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<tr>
<td>Plantar Fasciitis</td>
<td>Yes</td>
<td>Yes*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspected Plantar Fascia Rupture or Tear</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Diabetic Foot Infection</td>
<td>Yes*</td>
<td>No</td>
<td></td>
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<td>Tarsal Tunnel Syndrome</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<td>Tarsal Coalition</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Sinus Tarsi Syndrome</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Charcot Foot</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Post-Operative</td>
<td>Yes</td>
<td>Yes</td>
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- **MRI foot without contrast (CPT® 73718) or US foot (CPT® 76881 or 76882) for preoperative planning**
- **MRI foot without contrast (CPT® 73718) or US foot (CPT® 76881 or 76882)**
- **MRI foot without and with contrast (CPT® 73720) or MRI foot without contrast (CPT® 73718) for suspected osteomyelitis or soft tissue infection as a complement to plain X-ray (both plain X-ray and MRI are indicated)**
- **MRI ankle without contrast (CPT® 73721) or CT without contrast (CPT® 73700) for preoperative planning if mass/lesion is suspected as etiology of entrapment**
- **MRI ankle without contrast (CPT® 73721) if diagnosis is unclear or for preoperative evaluation**
- **MRI foot without contrast (CPT® 73718)**

---

**One Study/Area Only**

In foot and ankle advanced imaging, studies are frequently ordered of both areas. This is unnecessary since ankle MRI will image from above the ankle to the mid-metatarsal area. Only one CPT® code should be reported.
References
SPECT scan may be approved for any of the indications for which a bone scan can be approved. If the request is for CPT® 78300 and CPT® 78320, then only CPT® 78320 is to be approved if medical necessity is established. If the request is for CPT® 78305 or CPT® 78306 and CPT® 78320, then two CPT codes may be approved if medical necessity is established.

Nuclear Medicine

Nuclear medicine studies may be used in the evaluation of some musculoskeletal disorders, and other rare indications exist as well:

- Bone scan (CPT® 78315 or CPT® 78320) may be indicated for the evaluation of suspected aseptic loosening of orthopedic prostheses when recent plain X-ray is nondiagnostic (see MS-16: Post-Operative Joint Replacement Surgery).
- Nuclear medicine bone marrow imaging (CPT® 78102, CPT® 78103, or CPT® 78104) is indicated for detection of ischemic or infarcted regions in sickle cell disease.
- Triple phase bone scan (CPT® 78315) is indicated for evaluation of complex regional pain syndrome or reflex sympathetic dystrophy (For interventional pain criteria see: CMM-209: Regional Sympathetic Blocks and CMM-211: Spinal Cord Stimulators).
- Bone scan (CPT® codes: 78300, 78305, 78306, 78315, or 78320) is indicated for evaluation of suspected frostbite.
- Bone scan (CPT® codes: 78300, 78305, 78306, or 78320) is indicated for evaluation of Paget’s disease (see also MS-10: Soft Tissue Mass or Lesion of Bone).
- Tc-99m bone scan whole body (CPT® 78306) with SPECT of the area of interest (CPT® 78320) is indicated for suspected fractures if MRI cannot be performed. See also MS-5.2: Suspected Occult/Stress/Insufficiency Fracture/Stress Reaction and Shin Splints.
- Bone scan (CPT® 78315 or CPT® 78320) is indicated for the evaluation of suspected bone infection if MRI cannot be done and when infection is multifocal, or when the infection is associated with orthopedic hardware or chronic bone alterations from trauma or surgery. Combining bone scintigraphy with a labeled leukocyte scan enhances sensitivity. A labeled leukocyte scan (radiopharmaceutical inflammatory imaging - one of CPT® codes: 78805, 78806, or 78807) in concert with Tc-99m sulfur colloid marrow imaging (one of CPT® codes: 78102, 78103, or 78104) is particularly useful in cases with altered bone marrow distribution, such as joint prosthesis. See also MS-16: Post-Operative Joint Replacement Surgery.

For specific joints post-operative from replacement surgery:

- See MS-19: Shoulder
- See MS-20: Elbow
- See MS-24: Hip
- See MS-25: Knee
- See MS-26: Ankle
Radionuclide bone scan (CPT® codes: 78300, 78305, or 78306) may be indicated in setting of a non-focal exam, especially in younger and non-verbal children. Due to relatively high radiation exposure, bone scan is reserved for high suspicion cases with negative radiographs. It is a preferred examination in a child with implanted hardware or devices precluding MRI.

Bone scan (CPT® codes: 78300, 78305, 78306, or 78320) is complimentary to plain radiographs, and may be used when the skeletal survey is negative but clinical suspicion remains high.

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## Abbreviations For Neck Imaging Guidelines

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ALS</td>
<td>amyotrophic lateral sclerosis</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>ENT</td>
<td>Ear, Nose, Throat</td>
</tr>
<tr>
<td>FNA</td>
<td>fine needle aspiration</td>
</tr>
<tr>
<td>GERD</td>
<td>gastroesophageal reflux disease</td>
</tr>
<tr>
<td>GI</td>
<td>gastrointestinal</td>
</tr>
<tr>
<td>HIV</td>
<td>human immunodeficiency virus</td>
</tr>
<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
</tr>
</tbody>
</table>
**Neck-1: General**

- A current clinical evaluation (within 60 days), which includes a relevant history and physical examination and appropriate laboratory studies and non-advanced imaging modalities, such as plain x-ray or ultrasound, are required prior to considering advanced imaging. Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation.

- Advanced imaging of the neck covers the following areas:
  - Skull base (thus a separate CPT® code for head imaging in order to visualize the skull base is not necessary).
  - Nasopharynx
  - Upper oral cavity to the head of the clavicle
  - Parotid glands and the supraclavicular region

- Ultrasound of the soft tissues of the neck including thyroid, parathyroid, parotid and other salivary glands, lymph nodes, cysts, etc. is coded as CPT® 76536. This can be helpful in more ill-defined masses or fullness and differentiating adenopathy from mass or cyst, to define further advanced imaging.

- Neck CT
  - A Neck CT is usually obtained with contrast only (CPT® 70491).
    - Little significant information is added by performing a Neck CT without and with contrast (CPT® 70492), and there is the risk of added radiation exposure, especially to the thyroid.
    - CT Neck without contrast (CPT® 70490) can be difficult to interpret due to difficulty identifying the blood vessels.
    - Exception: Contrast is not generally used when evaluating the trachea with CT. Evaluate salivary duct stones in the appropriate clinical circumstance where intravenous contrast may obscure high attenuation stones.
    - Contrast enhanced CT is helpful in the assessment of cervical adenopathy and preoperative planning in the setting of thyroid carcinomas.
      - Contrast is recommended as an adjunct to US for patients with clinical suspicion for advanced disease, including invasive primary tumor, or clinically apparent multiple or bulky lymph node involvement.
      - Contrast may cause intense and prolonged enhancement of the thyroid gland which interferes with radioactive iodine nuclear medicine studies.
        - Use of IV contrast is an important adjunct because it helps to delineate the anatomic relationship between the primary tumor and metastatic disease. Iodine is generally cleared within four to eight weeks in most patients, so concern about iodine burden from IV contrast causing a clinically significant delay in subsequent whole-body scans (WBSs) or radioactive iodine (RAI) treatment after the imaging followed by surgery is generally unfounded. The benefit gained from improved anatomic imaging generally outweighs any potential risk of a several week delay in RAI imaging or therapy. Where there is concern, a urinary iodine to creatinine ratio can be measured.
Neck MRI

- MR Neck is used less frequently than Neck CT.
- MRI Neck without and with contrast (CPT® 70543) is appropriate if CT suggests the need for further imaging or if ultrasound or CT suggests any of the following:
  - Neurogenic tumor (schwannoma, neurofibroma, glomus tumor, etc.)
  - Vascular malformations
  - Deep neck masses
  - Angiofibromas

References

Neck-2: Cerebrovascular and Carotid Disease

- See these related topics in the Head Imaging Guidelines:
  - HD-1.5: General Guidelines – CT and MR Angiography: (CTA and MRA)
  - HD-12: Aneurysm and AVM
  - HD-21: Stroke/TIA
  - HD-22: Cerebral Vasculitis
  - HD-23: Dizziness, Vertigo and Syncope
  - HD-31: Tinnitus
  - HD-32: Eye Disorders

- See PVD-3: Cerebrovascular and Carotid Disease in Peripheral Vascular Disease Imaging Guidelines.
## Neck-3: Dysphagia and Esophageal Disorders

### Neck-3.1: Dysphagia and Esophageal Disorders
**Neck-3.1: Dysphagia and Esophageal Disorders**

- Gastroesophageal Reflux Disease (GERD)
  - Advanced imaging is generally not indicated for the evaluation of GERD, the diagnosis of which is usually made on the basis of clinical history, in conjunction with endoscopy, pH monitoring, and occasionally manometry. Exceptions would include the following:
    - Non-cardiac chest pain suspected of being GERD should be evaluated first to exclude cardiac and other etiologies. Refer to Section **CH-4.1: Non-Cardiac Chest Pain-Imaging**.
    - For patients with refractory GERD symptoms, and gastroparesis is being considered, a gastric emptying study (CPT® 78264) can be approved.
  - Suspected foreign body impaction and ingested foreign bodies:
    - Initial imaging is performed with appropriate plain films.
    - If imaging is negative, or there is suspicion of a radiolucent foreign body (such as fish or chicken bones, wood, plastic, thin metal objects, aluminum can pop-ups, etc.):
      - CT neck and/or chest with or without contrast
      - 3-D reconstruction (CPT® 76377) can be approved in this setting
    - The use of oral contrast is discouraged for acute dysphagia or foreign body impaction, as the contrast may not pass, may be aspirated, and can interfere with subsequent endoscopic intervention.
  - Oropharyngeal or esophageal dysphagia.
    - Oropharyngeal (difficulty in transferring food from the mouth to the pharynx)
      - Suspected neurologic causes: see appropriate sections in **Head Imaging Guidelines**
      - Video fluoroscopic swallowing study
    - Esophageal dysphagia (difficulty in transferring food down the esophagus in the retrosternal region, e.g. food sticking in the chest)
      - Initial barium esophagram or upper gastrointestinal endoscopy
      - Esophageal manometry if indicated
      - Structural lesions identified on esophagram or endoscopy requiring further evaluation (e.g. tumors, extrinsic compression):
        - CT neck (CPT® 70491), CT chest (CPT® 71260) and/or CT abdomen (CPT® 74160) depending on the level of the lesion.
  - Suspected perforation, abscess, or fistula
    - CT neck, chest, and/or abdomen, preferably with IV contrast, as requested, depending on location
  - Evaluation of structural abnormalities demonstrated on barium esophagram or endoscopy (e.g., external compression, tumor, stricture, diverticulum, etc.)
    - CT chest (CPT® 71260), CT neck (CPT® 70491), and/or CT abdomen (CPT® 71260) depending on location
  - Hiatal hernia
- Refer to Section **AB-12.3: Hiatal Hernia**

- **Globus Sensation**
  - Globus sensation is a feeling of a lump or foreign body in the throat. In general, laryngoscopy, endoscopy, and physical examination will rule out malignant causes and advanced imaging is usually not needed for evaluation.
    - If alarm symptoms are present (dysphagia, weight loss, odynophagia, throat pain, hoarseness, and lateralization of symptoms)
      - Laryngoscopy and upper endoscopy should be performed prior to advanced imaging.
      - If negative or equivocal findings on the above studies, or if there is a known history of upper aerodigestive or esophageal malignancy, or lymphoma, or a history of previous neck, esophageal, or gastric surgery, or a palpable abnormality on physical examination:
        - CT neck with contrast (CPT® 70491)

  - **Suspected Vascular Ring**
    - CT angiography Chest with contrast (CPT® 71275) can be used in the evaluation of suspected vascular ring
    - MRI Chest without contrast, or MRI Chest without and with contrast (CPT® 71550 or CPT® 71552), can be performed if vascular ring is suspected

**Practice Notes**

- A detailed history of the dysphagia symptoms is important to distinguish neurogenic, pharyngeal and esophageal disorders

- Dysphagia (difficulty swallowing) can be caused by a wide range of benign and malignant causes that affects the body’s ability to move food or liquid from the mouth to the pharynx and into the esophagus.

- A short duration (weeks to months) of rapidly progressive esophageal dysphagia with associated weight loss is highly suggestive of esophageal cancer.

- Advanced imaging for patients presenting with isolated globus rarely impacts clinical management. In a study of 148 neck CTs and 104 barium esophagrams done for the evaluation of globus sensation, there were no malignancies detected.

**References**


Neck-4: Cervical Lymphadenopathy

Neck-4.1: Imaging
Neck-4.1: Imaging

- Ultrasound (CPT® 76536) can be considered for any of the following:¹,²
  - Inflammatory, infective, or reactive adenopathy but has failed a 2 week trial of treatment or observation (including antibiotics if appropriate).
  - To further evaluate an ill-defined mass
  - High suspicion of malignancy

- Neck CT with contrast (CPT® 70491) can be considered if: ²
  - Carcinoma found in a lymph node or in an organ known not to be primary (See ONC-31.7: Carcinoma of Unknown Primary Site)
  - Ultrasound is indeterminate or suspicious for malignancy.

Practice Notes

- Chest x-ray is helpful to identify primary lung disease, involvement of mediastinal lymph nodes or other metastases.

- Inflammatory neck adenopathy is often associated with upper respiratory infection, pharyngitis, dental infection. Occasionally, it is associated with sarcoidosis, toxoplasmosis and HIV.

- Most common causes of neoplastic adenopathy are metastasis from head and neck tumors and lymphoma.

References

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<td>Neck-5: Neck Masses</td>
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<tr>
<td>Neck-5.1: Imaging</td>
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</tr>
</tbody>
</table>
Neck-5: Neck Masses

- See Pediatric Neck Imaging Guidelines, if under age 18.

Neck-5.1: Imaging

- Ultrasound (CPT® 76536) is the initial study for:
  - Anterior neck masses
  - Lateral or posterior neck masses that are tender and have been observed for 2 weeks under physician care and reassessed (generally an acute, infections, or inflammatory mass).
  - Otherwise ill-defined masses, fullness or asymmetry

- Neck CT with contrast (CPT® 70491) is supported for:
  - Lateral or posterior neck masses that are non-tender and discrete in the adult (> age 18)
  - History of malignancy that would be primary or metastatic to the neck
  - Suspected peritonsillar, retropharyngeal or other head and neck abscesses
  - If sarcoidosis is suspected the Neck CT with contrast (CPT® 70491) should be followed by biopsy.
  - Preoperative evaluations of any neck mass

- Neck MRI without and with contrast (CPT® 70543) if:
  - CT suggests the need for further imaging.
  - Ultrasound or CT suggests neurogenic tumor (schwannoma, neurofibroma, glomus tumor, etc.), vascular malformations, deep neck masses and angiofibromas.

- Uncomplicated Pharyngitis or Tonsillitis should undergo conservative therapy including antibiotics, if appropriate. Advanced imaging is not indicated.

Practice Notes

- Although CT is considered the preferred initial modality in neck mass in adults, the use of US is steadily increasing and should be considered when malignancy is not obvious.
- Most lateral neck masses are enlarged lymph nodes.
- Malignancy is a greater possibility in adults that are heavy drinkers and smokers.
- ENT evaluation can be helpful in determining the need for advanced imaging.
- Although CT and MRI can have characteristic appearances for certain entities, biopsy and histological diagnosis are the only way to obtain a definitive diagnosis.
References
2. Shulman ST, Bisno Al, Clegg HW, et al.
Neck-6: Malignancies Involving the Neck

- See the following in the Oncology Imaging Guidelines:
  - ONC-3: Squamous Cell Carcinomas of the Head and Neck
  - ONC-4: Salivary Gland Cancers
  - ONC-6: Thyroid Cancer
  - ONC-9: Esophageal Cancer
  - ONC-27: Non-Hodgkin Lymphoma
  - ONC-28: Hodgkin Lymphoma
Neck-7: Recurrent Laryngeal Palsy

See HD-7: Recurrent Laryngeal Palsy in the Head Imaging Guidelines
<table>
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Neck-8.1: Thyroid Nodule

- Serum thyrotropin (TSH) should be measured in the initial evaluation of thyroid nodule/mass/asymmetry/goiter. If the serum TSH is subnormal, a nuclear scan (CPT® 78013 or CPT® 78014) should be performed as the initial imaging study.

- Ultrasound (US) of the Neck (CPT® 76536) is the appropriate initial study for evaluation of suspected thyroid abnormalities, including goiter and thyroid mass(es) in the following clinical scenarios2,3,6 (See Neck-5.1: Imaging regarding nonthyroidal anterior neck masses):
  - Normal or High serum thyrotropin (TSH)1,3,6
  - Low TSH and nuclear scan shows non-functioning nodule.1,6,8
  - Incidentally found on CT, MRI, or PET (focal activity)2,3,6
  - Nodules ≤ 1 cm with very low suspicion US pattern including spongiform pattern and pure cysts do not require repeat US.6
  - For more suspicious or larger nodules, if Fine Needle Aspiration (FNA) is not performed or was not diagnostic for malignancy, US can be repeated:
    - If US features are highly suspicious: repeat US every 6 months for up to 24 months.
    - If US features are of low to intermediate suspicion: repeat US at 12 and 24 months.
    - If nodule is stable after 24 months, follow-up ultrasound exams (CPT® 76536) can be performed every 3 to 5 years for interval surveillance.12

- FNA should be considered for thyroid nodules using the American Thyroid Association criteria listed below. Note that FNA procedures do not require prior authorization.6

<table>
<thead>
<tr>
<th>Sonographic Pattern</th>
<th>US features</th>
<th>Estimated risk % of Malignancy</th>
<th>FNA size cutoff (largest dimension)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Suspicion</strong></td>
<td>Solid hypoechoic nodule or solid hypoechoic component of a partially cystic nodule with one or more of the following features: Irregular margins (infiltrative, microlobulated), microcalcifications, taller than wide shape, rim calcifications with small extrusive soft tissue component, evidence of ETE</td>
<td>&gt;70-90</td>
<td>Recommend FNA at ≥ 1 cm</td>
</tr>
<tr>
<td><strong>Intermediate Suspicion</strong></td>
<td>Hypoechoic solid nodule with smooth margins without microcalcifications, ETE, or taller than wide shape</td>
<td>10-20</td>
<td>Recommend FNA at ≥ 1 cm</td>
</tr>
<tr>
<td><strong>Low Suspicion</strong></td>
<td>Isoechoic or hypoechoic solid nodule, or partially cystic nodule with eccentric solid areas, without microcalcifications, irregular margin or ETE, or taller than wide shape</td>
<td>5-10</td>
<td>Recommend FNA at ≥ 1.5 cm</td>
</tr>
<tr>
<td><strong>Very Low Suspicion</strong></td>
<td>Spongiform or partially cystic nodule without any of the sonographic features described in low, intermediate, or high suspicion patterns</td>
<td>&lt;3</td>
<td>Consider FNA at ≥ 2 cm Observation without FNA is also a reasonable option</td>
</tr>
<tr>
<td><strong>Benign</strong></td>
<td>Purely cystic nodules (no solid component)</td>
<td>&lt;1</td>
<td>No biopsy</td>
</tr>
</tbody>
</table>
Neck Imaging

(Neck Imaging: 2015 American Thyroid Management Guideline for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer)

- Nuclear medicine thyroid scan (CPT® 78013 or CPT® 78014) is considered for any of the following:
  - Non-diagnostic or indeterminate FNA of thyroid nodule, e.g. follicular lesion of undetermined significance to see if hot (functioning) nodule that may be benign vs cold nodule for treatment planning.\(^3\)
  - Substernal goiter with any one of the following:
    - Dyspnea (including exertional)
    - Wheezing or stridor
    - Cough
    - Dysphagia
  - Evaluate eligibility for radioiodine therapy\(^3\)
  - Select nodules to biopsy in multinodular goiter even if TSH not low\(^1,6\)

- Nuclear medicine thyroid scan (CPT® 78013 or CPT® 78014) is considered if low serum thyrotropin (TSH) and any of the following:
  - Single or multiple thyroid nodules\(^3,6\)
  - Suspicion of ectopic thyroid tissue\(^3\)
  - Presence of thyroid nodule in the setting of Grave’s disease (to rule out cold nodule).\(^3\)

- CT Neck with contrast (CPT® 70491) or CT Neck without contrast (CPT® 70490), or MRI Neck without and with contrast (CPT® 70543). MRI and CT are not indicated for routine thyroid nodule evaluation and should only be considered for:
  - Evaluation of extent of known substernal goiter\(^3\)
  - Airway compression\(^3\)
  - Presence of pathologic lymph nodes in cervical regions not visualized on ultrasound\(^3\)
  - Clinically suspected advanced disease confirmed by FNA, including invasive primary tumor\(^3,6\)
  - Preoperative planning for any thyroid disease

- A thyroid nodule detected for the first time during pregnancy should be managed in the same way as in non-pregnant patients, except for avoiding the use of radioactive agents for diagnostic and therapeutic purposes\(^3\)

**Practice Notes**

- The basis of thyroid nodule management is the use of ultrasonography (US), thyrotropin (TSH, formerly thyroid-stimulating hormone) assay, and FNA biopsy, together with clinical findings.

- Patient Features Suggesting Increased Risk for Thyroid Malignancy.
  - History of head and neck irradiation
  - Family history of medullary thyroid carcinoma, multiple endocrine neoplasia type 2, or papillary thyroid carcinoma
Neck Imaging

- Age < 14 or > 70 years
- Male sex
- Growth of the nodule
- Firm or hard nodule consistency
- Cervical adenopathy
- Fixed nodule
- Persistent dysphonia, dysphagia, or dyspnea

- Iodinated CT contrast may interfere with diagnostic nuclear medicine thyroid scans (scintigraphy) and radioiodine treatment.
- There is insufficient evidence supporting the use of PET to distinguish indeterminate thyroid nodules that are benign from those that are malignant.
- ¹⁸FDG-PET imaging is not routinely recommended for the evaluation of thyroid nodules with indeterminate cytology. Routine preoperative ¹⁸FDG-PET scanning is not recommended.

**Neck-8.2: Hyperthyroidism**

- Hyperthyroidism suspected⁴ ⁷
  - Thyroid Uptake Study (CPT® 78012 or CPT® 78014) if one of the following:
    - TSH below normal range and elevated free T4 and/or free T3, OR
    - Subclinical hyperthyroidism with TSH < 0.1 mU/L and normal free T4 and free T3.

**Neck-8.3: Parathyroid Imaging**

- Primary Hyperparathyroidism suspected
  - Parathyroid Planar Imaging (CPT® 78070), Parathyroid Planar Imaging with SPECT (CPT® 78071), Parathyroid Planar Imaging with SPECT and CT (CPT® 78072) or Ultrasound(CPT® 76536) if either:
    - Elevated serum calcium and elevated serum parathyroid hormone level.
    - Serum calcium 1 mg/dL more over lab normal value
  - CT or MRI Neck without and with contrast (CPT® 70492 or CPT® 70543):
    - Very high calcium (≥ 13) suggesting parathyroid carcinoma
    - Preoperative localization including 4D Neck CT without and with contrast (CPT® 70492 or CPT® 77293).⁷
    - Recurrent or persistent hyperparathyroidism following neck exploration (MRI preferred).
  - Chest CT with contrast may be indicated in rare circumstances in the evaluation of ectopic mediastinal parathyroid adenomas.⁶

**Practice Notes**

- A thyroid nodule is distinct either on palpation or radiologically (incidentaloma). Nonpalpable nodules have the same risk of cancer as palpable. Nodules > 1 cm are evaluated, while smaller nodules are generally evaluated if suspicious, associated with adenopathy or a history of radiation or cancer exists.
Ultrasound is not used to screen: 1) the general population, 2) patients with normal thyroid on palpation with a low risk of thyroid cancer, 3) patients with hyperthyroidism, 4) patients with hypothyroidism or 5) patients with thyroiditis. Conversely, US can be considered in patients who have no symptoms but are high risk as a result of: history of head and neck irradiation, total body irradiation for bone marrow transplant, exposure to fallout from radiation during childhood or adolescence, family history, thyroid cancer syndromes such as MEN2, medullary or papillary thyroid cancer, Cowden’s disease, familial adenomatous polyposis, Carney complex, Werner syndrome/progeria.

Radionuclide thyroid scan can be considered to evaluate nodules when hyperthyroidism is present, for surveillance of thyroid cancer, or to detect non-palpable nodules. This scan is not useful for other nodules since hyper functioning nodules rarely harbor malignancy. Thyroid nodules > 4 cm may be considered for thyroid lobectomy due to a high incidence of both false negative FNA biopsies and malignancy (26%).

FNA may be repeated after an initial non-diagnostic cytology result, because repeat FNA with US guidance will yield a diagnostic cytology specimen in 75% of solid nodules and 50% of cystic nodules. However, up to 7% of nodules continue to yield non-diagnostic cytology results despite repeated biopsies and may be malignant at the time of surgery.

Thyroid nodules may be stratified as to risk of thyroid cancer based on sonographic findings of microcalcification, hypervascularity on Doppler ultrasound, solid or cystic nature of mass and margins of mass.

Incidental focal FDG-PET uptake often corresponds to a clinically relevant thyroid nodule and ultrasound is recommended; incidentally noted diffuse thyroid FDG-PET uptake most often corresponds to inflammatory uptake, however, ultrasound should be done to ensure that there is no evidence of clinically relevant nodularity.

Elastography provides information about nodule stiffness that is complementary to gray scale ultrasound findings in nodules with indeterminate cytology or ultrasound findings. It should not be used as a substitute for gray scale ultrasound.

Use of ultrasound contrast medium is not recommended for the diagnostic evaluation of thyroid nodules and its current use is restricted to definition of size and limits of necrotic zones after minimally invasive nodule ablation techniques.
References

Thyroid


**Parathyroid**


## Neck-9: Trachea and Bronchus

### Neck-9.1: Imaging
Neck-9.1: Imaging

- Plain x-rays of the neck and chest and bronchoscopy are the initial imaging studies for evaluating patients with suspected tracheal and visualized bronchial pathology. Bronchoscopy can further evaluate the distal (endo) bronchial tree.
  - Suspected tracheal disease can be identified by inspiratory stridor and a characteristic flow-volume loop of PFTs.\(^1\)
- Neck CT with contrast (CPT® 70491) or without contrast (CPT® 70490) and/or Chest CT with contrast (CPT® 71260) or without contrast (CPT® 71250) can be performed to further evaluate abnormalities, which include tracheal or bronchial tumor, foreign bodies, or persistent segmental or lobar lung collapse seen on other imaging studies.\(^1,2\)
- Expiratory HRCT (CPT® 71250) is indicated in patients with obstructive physiology tracheomalacia.\(^1\)
- Trachea or bronchial “inspissation” without an abnormality described above, is not a risk for malignancy.\(^3\)

References
# Neck-10: Neck Pain

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<td>Torticollis and Dystonia</td>
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</table>
Neck-10.1: Neck Pain (Cervical)

- Neck pain is usually related to a specific process including pharyngitis, radiculopathy, adenopathy, mass, carotid dissection and torticollis, and therefore found elsewhere in these guidelines.¹

- For the evaluation of neck pain or other symptoms which may involve the cervical spine, including myelopathy and cervical radiculopathy¹ See Spine Imaging Guidelines

Neck-10.2: Torticollis and Dystonia

Newborn Infant:

- Ultrasound of the Neck is the initial study to determine if congenital muscular torticollis is present
  - Positive ➔ No further imaging is needed since the diagnosis is defined
  - Negative ➔ CT Neck with contrast (CPT® 70491) or MRI Neck without and with contrast (CPT® 70543) to potentially identify other etiologies

Older Child (beyond infancy) or Adult

- For trauma, CT Neck with contrast (CPT® 70491) and/or CT Cervical Spine without contrast (CPT® 72125) is the initial study to identify fracture or mal-alignment

- For no trauma, CT Neck with contrast (CPT® 70491), and/or MRI Cervical Spine without contrast (CPT® 72141), or CT Cervical Spine without contrast (CPT® 72125) is the initial study to locate a soft tissue or neurological cause
  - Positive ➔ Further advanced imaging is not required if CT Neck or CT Cervical Spine has identified local cause
  - Negative ➔ MRI Brain without and with contrast (CPT® 70553) to exclude CNS cause

Practice Notes

- Torticollis or cervical dystonia is an abnormal twisting of the neck with head rotated or twisted. Its causes are many and may be congenital or acquired and caused by trauma, infection/inflammation, neoplasm and those less defined and idiopathic. It occurs more frequently in children and on the right side (75%).

- Retropharyngeal space abscess could be associated with torticollis because child would not move neck freely.
References

   https://acsearch.acr.org/docs/69426/Narrative/.


   http://www.clinicalradiologyonline.net/article/S0009-7260(01)90679-8/fulltext.

Neck-11: Salivary Gland Disorders

- Xerostomia (Dry Mouth)
  - Salivary Gland Nuclear Imaging (one of CPT® 78230, CPT® 78231, or CPT® 78232) can be considered for any one of the following:
    - Dry mouth and either:
      - Sjögren’s syndrome
      - Sialadenitis
      - History of head or neck radiation therapy
      - History of cerebral palsy
      - Parotid mass to allow preoperative diagnosis of Warthin’s tumor

- Salivary Gland Stones:
  - For suspected salivary duct or gland stone, CT of the Neck without contrast (CPT® 70490) or CT of the Neck without and with contrast (CPT® 70492) or CT of the Maxillofacial area without and with contrast (usually CPT® 70488) or MRI Neck without and with contrast (CPT® 70543).
  - Sialography (contrast dye injection) under fluoroscopy, may be performed to rule out a stone, with post sialography CT (CPT® 70486), or post sialography MRI (CPT® 70540).

- Parotid or Salivary Gland Mass
  - Any one of the following can be approved:
    - MRI Orbits/Face/Neck without and with contrast (CPT® 70543)
    - CT Neck with contrast (CPT® 70491)
    - CT Neck without contrast (CPT® 70490)

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<td>Abbreviation</td>
<td>Definition/Description</td>
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<tr>
<td>ACOG</td>
<td>American College of Obstetricians and Gynecologists</td>
</tr>
<tr>
<td>AFI</td>
<td>amniotic fluid index</td>
</tr>
<tr>
<td>AFP</td>
<td>alpha-fetoprotein</td>
</tr>
<tr>
<td>CST</td>
<td>contraction stress test</td>
</tr>
<tr>
<td>B-mode</td>
<td>a two dimensional imaging procedure, B-mode ultrasound is the basis for all static and real time B-scan images</td>
</tr>
<tr>
<td>BPP</td>
<td><strong>Biophysical Profile</strong> includes the ultrasound variables: fetal breathing, muscle tone, and movement as well as amniotic fluid volume. BPP may be performed with or without a non-stress test (NST) which involves fetal heart rate (FHR) monitoring.</td>
</tr>
<tr>
<td>D &amp; C/D &amp; E</td>
<td>dilatation and curettage/ Dilation and Evacuation</td>
</tr>
<tr>
<td>dichorionic</td>
<td>twins having distinct chorions (membrane that forms the fetal part of the placenta), including monozygotic twins (from one oocyte [egg]) separated within 72 hours of fertilization and all dizygotic twins (from two oocytes fertilized at the same time</td>
</tr>
<tr>
<td>twins</td>
<td>Doppler involves measuring a change in frequency when the motion of vascular flow is measured</td>
</tr>
<tr>
<td>EDC</td>
<td>Estimated Date of Confinement; determined from the first day of the last menstrual cycle</td>
</tr>
<tr>
<td>FHR</td>
<td>fetal heart rate</td>
</tr>
<tr>
<td>hCG</td>
<td>human chorionic gonadotropin</td>
</tr>
<tr>
<td>IDDM</td>
<td>insulin-dependent diabetes mellitus</td>
</tr>
<tr>
<td>FGR</td>
<td>Fetal growth restriction; an estimated or actual weight of the fetus below 10&lt;sup&gt;th&lt;/sup&gt; percentile for gestational age</td>
</tr>
<tr>
<td>M-mode</td>
<td>an ultrasound imaging technique in which structure movement can be depicted in a wave-like manner; primarily used in cardiac and fetal cardiac imaging</td>
</tr>
<tr>
<td>macrosomia</td>
<td>estimated fetal weight of greater than 4000 or 4500 grams</td>
</tr>
<tr>
<td>monochorionic twins</td>
<td>twins developed from one oocyte (egg) developing with a single chorions (membrane that forms the fetal part of the placenta)</td>
</tr>
<tr>
<td>NICU</td>
<td>Neonatal Intensive Care Unit</td>
</tr>
<tr>
<td>NST</td>
<td>fetal non-stress test</td>
</tr>
<tr>
<td>oligohydramnios</td>
<td>diminished amniotic fluid volume (AFV) for gestational age; definitions include: 1.) maximum deepest pocket of ≤ 2cm, and, 2.) AFI of ≤ 5cm or &lt; the 5&lt;sup&gt;th&lt;/sup&gt; percentile for gestational age</td>
</tr>
<tr>
<td>polyhydramnios</td>
<td>1.) AFI ≥ 24cm, or maximum vertical pocket of ≥ 8 cm</td>
</tr>
<tr>
<td>PROM</td>
<td>preterm rupture of membranes</td>
</tr>
<tr>
<td>quad screen</td>
<td>alpha-fetoprotein (AFP), estriol, human chorionic gonadotropin (hCG), inhibin A</td>
</tr>
<tr>
<td>real time scan</td>
<td>considered the most common type of ultrasound; a 2-dimensional scan that reflects structure and motion over time, scanning and display of images are run at a sufficiently rapid rate so that moving structures can be viewed moving at their natural rate; frame rates ≥ 15 frames per second are considered “real time”</td>
</tr>
</tbody>
</table>
OB-GEN: Obstetrical Ultrasound Imaging
General Guidelines

OB-GEN.1: Required Documentation

► An evaluation of pregnancy with history and physical exam (an initial office visit) is necessary prior to obstetric ultrasound imaging requests
► The following information must be submitted with each request:
  ◆ Anticipated date of service
  ◆ Expected date of delivery
  ◆ Gestational age at date of service
  ◆ Results of prior ultrasound studies if available

OB-GEN.2: Inappropriate Use of OB Ultrasound

► Obstetrical ultrasound studies cannot be authorized for payment for individuals who do not have a positive pregnancy test or clinical evidence of a pregnancy (fetal heart tones)
► Obstetrical ultrasound is not appropriate for the following:
  ◆ Sex determination only
  ◆ To provide a keepsake or souvenir picture

Practice Note
In the absence of other specific indications, the optimal time for a single ultrasound examination is at 18 to 22 weeks of gestation. This timing allows for a survey of fetal anatomy in most women and an accurate estimation of gestational age.²

References
   http://journals.lww.com/greenjournal/Abstract/2016/12000/Practice_Bulletin_No__175_Summary_Ultrasound_in_50.aspx.
### OB-1: Vaginal Bleeding and/or Abdominal/Pelvic Pain/Cramping with or without Trauma

| OB-1.1: Abdominal Pain                          | 6 |
| OB-1.2: Trauma                                 | 6 |
| OB-1.3: Vaginal Bleeding and/or Abdominal/Pelvic Pain | 7 |
| OB-1.4: Ectopic Pregnancy                      | 7 |
| OB-1.5: Spontaneous Abortion                   | 8 |
| OB-1.6: Hydatidiform Mole                      | 8 |
**OB-1.1: Abdominal Pain**

For abdominal pain or trauma that presents without bleeding:

- Initially CPT® 76815 and/or CPT® 76817 for limited ultrasound when medically indicated
  - or
    - CPT® 76801 and/or CPT® 76817 when complete ultrasound has not yet been performed, if less than 14 weeks
    - CPT® 76805 (plus CPT® 76810 if more than one fetus) if equal to or greater than 14 weeks, when complete fetal anatomic scan CPT® 76805 is planned and has not yet been performed.

**OB-1.2: Trauma**

**Trauma**

- Blunt trauma in the first trimester (prior to 13 weeks) generally does not cause pregnancy loss with the exception of profound hypotension:
  - No imaging is indicated unless there is cramping and/or bleeding.

- Blunt trauma between 13-20 weeks gestation:
  - CPT® 76801 and/or CPT® 76817 when complete ultrasound has not yet been performed, if less than 14 weeks
  - Initially CPT® 76815 and/or CPT® 76817 for limited ultrasound when medically indicated
  - CPT® 76805 (plus CPT® 76810 if more than one fetus) if equal to or greater than 14 weeks, when complete fetal anatomic scan CPT® 76805 is planned and has not yet been performed.

**Management of outpatient trauma implies that the trauma was not serious enough to be treated as inpatient. The major risk is abruptio placentae:**

- Monitor for uterine contractions for those > 20 weeks
- CPT® 76805 (plus CPT® 76810 if more than one fetus) when complete fetal anatomic scan CPT® 76805 is planned and has not yet been performed, or
- CPT® 76815 or
- CPT® 76816 (if a complete anatomy ultrasound was done previously)
  - Additionally, if greater than 24 weeks, BPP CPT® 76818 or CPT® 76819 or CPT® 76815 for AFI can be considered
- Other advanced imaging may be indicated, send for Medical Director review

**Reference**

**OB-1.3: Vaginal Bleeding and/or Abdominal/Pelvic Pain**

### First Trimester
- Initially CPT® 76815 and/or CPT® 76817 for limited ultrasound when medically indicated or CPT® 76801 when complete ultrasound has not yet been performed, if less than 14 weeks and/or CPT® 76817 may be performed once when medically indicated for complete ultrasound.

### Second and Third Trimesters
- CPT® 76815 and/or CPT® 76817 or CPT® 76816 if a complete ultrasound was done previously and/or CPT® 76817
- Additionally, if greater than 24 weeks, BPP CPT® 76818 or CPT® 76819 or CPT® 76815 for AFI can be considered

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### Reference

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**OB-1.4: Ectopic Pregnancy**

<table>
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<th>Ectopic Pregnancy</th>
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<td><strong>First Trimester</strong></td>
</tr>
<tr>
<td>- Signs and symptoms of ectopic pregnancy include pain and/or bleeding</td>
</tr>
<tr>
<td>- Initially CPT® 76815 and/or CPT® 76817 for limited ultrasound when medically indicated or CPT® 76801 when complete ultrasound has not yet been performed, if less than 14 weeks and/or CPT® 76817 may be performed once when medically indicated for complete ultrasound</td>
</tr>
<tr>
<td>- If patient has a history of ectopic pregnancy with non-doubling hCG without pain and bleeding, ultrasound can be performed (CPT® 76801 and/or CPT® 76817) to confirm an intrauterine pregnancy</td>
</tr>
<tr>
<td>- If ectopic pregnancy is being treated non-surgically with Methotrexate, imaging may be required per <strong>OB-1: Vaginal Bleeding and/or Abdominal/Pelvic Pain/Cramping with or without Trauma</strong> or the imaging guidelines above for ectopic pregnancy</td>
</tr>
</tbody>
</table>

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### Reference
### OB-1.5: Spontaneous Abortion

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<thead>
<tr>
<th>Spontaneous Abortion</th>
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<tbody>
<tr>
<td>▶ For spontaneous abortion (miscarriage), ultrasound can be performed to evaluate threatened or missed abortion (with or without vaginal bleeding prior to 20 weeks)</td>
</tr>
<tr>
<td>♦ Initially CPT® 76815 and/or CPT® 76817 for limited ultrasound when medically indicated or</td>
</tr>
<tr>
<td>♦ CPT® 76801 when complete ultrasound has not yet been performed, if less than 14 weeks and/or CPT® 76817 may be performed once when medically indicated for complete ultrasound</td>
</tr>
<tr>
<td>♦ Repeat ultrasound (CPT® 76815 or CPT® 76816 if a complete anatomic ultrasound was done previously and/or CPT® 76817) is appropriate in the setting of rising or non-falling serum hCG levels at weekly intervals</td>
</tr>
<tr>
<td>♦ Ultrasound imaging can be repeated earlier than seven days if there are new symptoms</td>
</tr>
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</table>

| ▶ For complete spontaneous abortion, ultrasound is generally not indicated if there is no pain, no ongoing bleeding, and hCG levels are decreasing |

#### Reference


### OB-1.6: Hydatidiform Mole

<table>
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<th>Hydatidiform Mole</th>
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<tr>
<td>▶ See also: PV-16.1: Molar Pregnancy and GTN</td>
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<table>
<thead>
<tr>
<th>First, Second and Third Trimester</th>
</tr>
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<tbody>
<tr>
<td>▶ Ultrasound can be performed for diagnosis of hydatidiform mole</td>
</tr>
<tr>
<td>♦ Initially CPT® 76815 and/or CPT® 76817 for limited ultrasound when medically indicated or</td>
</tr>
<tr>
<td>♦ CPT® 76801, when complete ultrasound has not yet been performed, if less than 14 weeks, and/or CPT® 76817 may be performed once when medically indicated for complete ultrasound</td>
</tr>
<tr>
<td>▶ Following treatment with D &amp; C and/or Methotrexate, serial serum hCG values are measured until they become negative</td>
</tr>
<tr>
<td>♦ Ultrasound may be necessary for follow-up (CPT® 76830 and CPT® 76856 or CPT® 76856 if hCG titers are not decreasing as expected, are increasing following treatment, or if there is onset of pain despite falling hCG titers.</td>
</tr>
</tbody>
</table>

#### References

OB-2.1: Abnormal Fetal Position or Presentation

Confirmation of suspected abnormal fetal position or presentation (transverse or breech presentation):
- An ultrasound can be performed at 36 weeks gestation or greater to determine fetal position to allow for external cephalic version
- Ultrasound to determine fetal position is not necessary prior to 36 weeks gestation unless delivery is imminent

Coding Notes

Report one of the following:
- CPT® 76805 (plus CPT® 76810 if more than one fetus) for complete fetal anatomic scan when complete fetal anatomic scan CPT® 76805 is planned and has not yet been performed or
- CPT® 76815 for limited ultrasound

Practice Note
Fetal presentation should be assessed by abdominal palpation at 36 weeks or later, when presentation is likely to influence the plans for the birth. Routine assessment of presentation by abdominal palpation should not be offered before 36 weeks because it is not always accurate and may be uncomfortable. Suspected fetal malpresentation should be confirmed by an ultrasound assessment.

Reference
   doi:10.1097/aog.0000000000001305
### OB-3: Alloimmunization/ Rh Isoimmunization/ Other Causes of Fetal Anemia/ Parvo/ Hydrops

| OB-3.1: Alloimmunization/ RH Isoimmunization/ Other Causes of Fetal Anemia | 12 |
| OB-3.2: Exposure to Parovirus B-19 | 13 |
| OB-3.3: Twin Anemia Polycythemia Sequence | 13 |
| OB-3.4: Fetal Hydrops Associated with Polyhydramnios | 13 |
| OB-3.5: Sustained Fetal Tachycardia | 13 |
OB-3.1: Alloimmunization/ RH Isoimmunization/ Other Causes of Fetal Anemia

Fetal anemia and hydrops may be a result of immune conditions, such as red-cell or Kell alloimmunization, non-immune hydrops caused by parvovirus B19 infection or any other known acquired or congenital causes of fetal anemia.

**Imaging for Alloimmunization/ RH Isoimmunization:**

- Ultrasound (CPT® 76816) every 2 to 4 weeks to assess fetal growth starting after performance of the fetal anatomic scan CPT® 76811 at 16 weeks or greater. If less than 16 weeks, send to MD Review
- Weekly BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST starting at 32 weeks or sooner depending on fetal condition
- 3a. Weekly fetal middle cerebral artery MCA Doppler (CPT® 76821) starting at 20 weeks or sooner depending on fetal condition when any one of the following maternal antibody titers are ≥ 1:8
  - Rhesus antibodies (Cc/Dd/Ee)
  - Anti-Duffy (anti-fya) antibody and/or
  - Anti-Kidd antibody
- 3b. With Anti-Kell antibody (any antibody titer) MCA Doppler (CPT® 76821) once weekly
- 3c. Evidence of fetal hydrops on previous imaging once weekly MCA Doppler (CPT® 76821)
- 3d. Prior pregnancy associated with HDFN (hemolytic disease of the fetuses and newborn) once weekly MCA Doppler (CPT® 76821)

Because MCA-PSV increases across gestation, results should be adjusted for gestational age. Measurements can be initiated as early as 16 weeks of gestation if there is a past history of early severe fetal anemia or very high titers. The optimal interval between examinations has not been determined, but should be one to two weeks based on clinical experience and what is known about progression of fetal anemia in this setting

**Practice Note**

Other antigens not listed above, may be associated with hemolytic disease of the fetus and newborn and may require fetal assessment as in OB-3.1 if maternal antibody titers are ≥1:8. Please send these cases to medical review. Some of these antigens include MNSsM, MNSsS, MNSs, MNSsU, MNSsMi, MSSsMT, Diego D1, Diego Di, PPPTj, Public antigen Yt, Public antigen En, Public antigen Co2. Private antigens-Biles, Good, Heibel, Radin, Wright, and ZD. Dia, Dib ,PP1Pk, Far, Good, Lan, LW, Mta, U ,Wr a.
OB-3.2: Exposure to Parvovirus B-19

- Parvovirus B-19 (Fifth Disease):
  - Ultrasound (CPT® 76816) every 2 to 4 weeks to assess fetal growth starting at time of known exposure and continuing for 8 to 10 weeks post-exposure
  - Weekly BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST starting at time of known exposure if ≥ 24 weeks gestation and continuing for 8 to 12 weeks post-exposure
  - Fetal middle cerebral artery (MCA) Doppler (CPT® 76821) every 1 to 2 weeks, starting at time of known exposure, if 16 weeks or greater and continuing for 8 to 12 weeks post-exposure

OB-3.3: Twin Anemia Polycythemia Sequence

- See: OB-16.3: For Known monochorionic-diamniotic or monochorionic-monoamniotic multiple pregnancies

OB-3.4: Fetal Hydrops Associated with Polyhydramnios

- Fetal hydrops associated with Polyhydramnios: if diagnosed with hydrops, image according to OB-3.1: Alloimmunization/RH Isoimmunization/Other Causes of Fetal Anemia

OB-3.5: Sustained Fetal Tachycardia

- Sustained fetal tachycardia with a structurally normal fetal echocardiogram and fetal anemia is suspected as the cause of the tachycardia, may have CPT® 76821 one time

Practice Notes

Rhesus isoimmunization/alloimmunization is the process through which fetal Rh+ red blood cells enter the circulation of an Rh negative mother causing her to produce antibodies which can cross the placenta and destroy the red blood cells of the current Rh+ fetus in subsequent Rh+ pregnancies.

Twin anemia polycythemia sequence (TAPS) may occur spontaneously in up to 5% of monochorionic twins and may also develop after incomplete laser treatment in twin-twin transfusion syndrome (TTTS) cases. As with TTTS the underlying mechanism is thought to be abnormal placental vascular anastomoses. One twin develops anemia and the other polycythemia. One of the features suggesting towards the diagnosis is discordance in fetal middle cerebral artery peak systolic velocity (MCA-PSV) measurements

Peak systolic velocity (PSV) of the fetal middle cerebral artery can be used as a substitute for amniocentesis to evaluate a fetus at risk for anemia due to Rhesus isoimmunization/alloimmunization
References


## OB-4.1: Amniotic Fluid Abnormalities

### For suspected polyhydramnios or oligohydramnios:

* One ultrasound is appropriate

- CPT® 76805 (plus CPT® 76810 if more than one fetus) for complete fetal anatomic scan when complete fetal anatomic scan CPT® 76805 is planned and has not yet been performed or
- If complete fetal anatomic scan CPT® 76805 was previously performed:
  - CPT® 76815 for limited ultrasound or
  - CPT® 76816 for complete ultrasound (if complete anatomy ultrasound was done previously)

### For confirmed diagnosis of polyhydramnios: AFI ≥ 24 cm or maximum deepest vertical pocket ≥ 8 cm.

- Detailed Fetal Anatomic Scan (CPT® 76811) upon diagnosis if not already performed
- One ultrasound (CPT® 76816)
  - Starting at ≥ 23 weeks, every 3 to 4 weeks for mild polyhydramnios; AFI ≥ 24 cm to 30 cm or maximum deepest vertical pocket ≥ 8 cm to 10 cm
  - Starting at ≥ 23 weeks, every 2 weeks for severe polyhydramnios; AFI > 30 or maximum deepest vertical pocket is > 10 cm
- Starting at 26 weeks, weekly BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST, if maximum vertical pocket is ≥ 8 cm or if AFI ≥ 24 cm.
- Starting at 26 weeks, twice-weekly BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST, if maximum deepest vertical pocket is > 10 cm or an AFI > 30
- One time fetal echo if initial echo has not already been performed (CPT® 76825 and/or CPT® 76827 and/or CPT® 93325). All requests for follow-up echo go to Medical Director review.

### For confirmed diagnosis of oligohydramnios: AFI ≤ 5 cm or maximum vertical pocket ≤ 2 cm

- May have CPT® 76811 if not already performed
- Starting at ≥ 23 weeks, one ultrasound (CPT® 76816) every 2 to 4 weeks for fetal growth
- Starting at 26 weeks, weekly biophysical profile (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST, if maximum vertical pocket ≤ 2 cm or AFI ≤ 5 cm. If less than 26 weeks send to Medical director review
- Starting at time of diagnosis, weekly umbilical artery Doppler (CPT® 76820)

### Practice Notes

Polyhydramnios refers to excessive amniotic fluid volume. It is determined with AFI ≥ 24 cm or (greater than the 95th percentile by gestational age), or maximum deepest vertical pocket ≥ 8 cm.

Oligohydramnios refers to diminished amniotic fluid volume. At 30 weeks or greater, it is determined with AFI ≤ 5 cm by measuring fluid in each of the four quadrants or by the maximum single deepest vertical pocket ≤ 2 cm (is the best definition of oligohydramnios). At less than 30 weeks, oligohydramnios is determined by a gestation age cut off of ≤ 5 percentile
Polyhydramnios can be an early presenting finding of fetal hydrops associated with fetal anemia. Middle cerebral artery Doppler is commonly used to diagnose whether this fetal anemia is present or not. See: OB-3.1: Alloimmunization/RH Isoimmunization/Other Causes of Fetal Anemia.

Polyhydramnios may also present as a finding of cardiac dysfunction, fetal arrhythmias or cardiac malformation. Fetal echocardiography is commonly performed to determine if any other conditions are present or not. See: OB-7: Fetal Echocardiography (ECHO).

References
<table>
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<tr>
<th>OB-5: Fetal Anatomic Scan</th>
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<tr>
<td>OB-5.1: Initial Screening for Fetal Anomalies</td>
<td>19</td>
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<tr>
<td>OB-5.2: Follow-Up</td>
<td>19</td>
</tr>
</tbody>
</table>
**OB-5.1: Initial Screening for Fetal Anomalies**

- A fetal anatomic scan to screen for anomalies is ideally performed at 18 to 20 weeks, but may be performed after week ≥ 16. If less than 16 weeks gestation, send to MD review.
  - CPT® 76817 transvaginal ultrasound can be considered if the cervical length is less than or equal to 3.0 cm with transabdominal ultrasound measurement.
  - Reported as CPT® 76805 if the patient is not high risk.
  - If pregnancy is high risk report as (CPT® 76811). A detailed fetal anatomic scan (CPT® 76811) is performed by a Maternal Fetal Medicine (MFM)/Perinatologist Radiologist, or AIUM or ACR accredited facilities as the screening anatomic study. See: **OB-11: High Risk Pregnancy**

**OB-5.2: Follow-Up**

- Follow-up ultrasounds (CPT® 76816) can be performed every 3 to 6 weeks to evaluate fetal growth if pregnancy is high risk see **OB-11: High Risk Pregnancy**
- Follow-up ultrasound (CPT® 76815 or CPT® 76816 can be performed if indeterminate, incomplete or equivocal finding on initial fetal anatomic scan once. A limited ultrasound CPT® 76815 if limited to a follow up of a single item.
- Detailed anatomy ultrasound CPT® 76811 can be performed if not previously performed when initial fetal anatomic scan CPT® 76805 is abnormal see: **OB-11: High risk Pregnancy**

**Coding Notes**

<table>
<thead>
<tr>
<th>Fetal Anatomic Scan - Coding Notes</th>
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<tbody>
<tr>
<td>CPT® 76805</td>
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<tr>
<td>CPT® 76810</td>
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<tr>
<td>CPT® 76805 CPT® 76810</td>
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<tr>
<td>CPT® 76811 CPT® 76812</td>
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<tr>
<td>CPT® 76812</td>
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<tr>
<td>CPT® 76811</td>
</tr>
<tr>
<td>CPT® 76815</td>
</tr>
</tbody>
</table>
CPT® 76816 describes a follow-up ultrasound (eg, re-evaluation of fetal size by measuring standard growth parameters and amniotic fluid volume, re-evaluation of organ system(s) suspected or confirmed to be abnormal on a previous scan), trans-abdominal approach, per fetus.

- The use of this CPT code is reserved for subsequent follow up ultrasound only; i.e. An ultrasound must have been performed previously.
- Components include: Focused assessment of fetal size by measuring BPD, abdominal circumference, femur length, or other appropriate measurement; and amniotic fluid volume
- Detailed re-examination of a specific organ or system known or suspected to be abnormal
- (there is no interval requirement when ordered as follow-up for an indeterminate anatomy scan)

References

OB-6: No Fetal Heart Tone/Decreased Fetal Movement

OB-6.1: No Fetal Heart Tone/Decreased Fetal Movement
OB-6.1: No Fetal Heart Tone/Decreased Fetal Movement

Ultrasound is appropriate to confirm suspected fetal demise

### The following is supported during the first trimester:

- Prior to considering ultrasound for absence of fetal heart tone at less than 12 weeks, fetal heart tone assessment should be repeated at 12 weeks gestation.
- Ultrasound imaging is supported, prior to 12 weeks gestation, in the setting of absent fetal heart tones accompanied by other maternal signs or symptoms (such as cramping, vaginal bleeding, etc.) or if fetal heart tones that have previously been heard are now unable to ascertain, regardless of symptoms. Report one of the following:
  - CPT® 76801 (plus CPT® 76802 if more than one fetus) and/or CPT® 76817 if a complete ultrasound has not yet been performed; or
  - CPT® 76815 for limited ultrasound and/or CPT® 76817

### The following is supported during the second and third trimester:

- If less than 24 weeks gestation, report one of the following:
  - CPT® 76805 if a complete fetal anatomic scan is planned and has not yet been performed during this pregnancy (plus CPT® 76810 if more than one fetus); or
  - CPT® 76816 if a complete ultrasound was done previously; or
  - CPT® 76815 for limited ultrasound; and/or
  - CPT® 76817 for a transvaginal ultrasound

- If pregnancy is greater than or equal to 24 weeks, initial evaluation is usually done with: (CPT® 76815) to document fetal heart activity or BPP (CPT® 76818 or CPT® 76819). No further imaging is necessary if:
  - NST is reactive and AFI is normal or
  - CST is negative

- If NST is non-reactive or CST is positive:
  - CPT® 76805 if a complete fetal anatomic scan is planned and has not yet been performed during this pregnancy (plus CPT® 76810 if more than one fetus) or
  - CPT® 76816 if a complete ultrasound was done previously or
  - CPT® 76815 for limited ultrasound

### Reference

OB-7: Fetal Echocardiography (ECHO)

OB-7.1: Indications for Fetal Conditions  24
OB-7.2: Indications for Maternal Conditions  25
OB-7.1: Indications for Fetal Conditions

- The minimal use of color Doppler alone, when performed for anatomical structure identification during a standard ultrasound procedure, is not separately reimbursable.

Fetal echocardiography (Initial study-CPT® 76825 or follow-up-CPT® 76826) (follow-up echo must go to MD review)

Doppler echocardiography (Initial study-CPT® 76827 or follow-up-CPT® 76828) (repeat echo must go to MD review) and

Doppler color flow velocity mapping (CPT® 93325) can be ordered together or separately for the following conditions:

- Transabdominal fetal echo is usually not performed prior to 16 weeks

- Abnormal or suspected abnormal fetal cardiac evaluation on fetal anatomic scan.
  - There must be documentation (provided as hard copy or acknowledged verbally by provider) that the four chamber cardiac study was abnormal or suspected abnormal on the anatomic scan in order for fetal echo to be indicated

- If a heart abnormality is found, a fetal ECHO (CPT® 76825 and/or CPT® 76827) may be approved for preparation of delivery

- Suspected or known fetal arrhythmia (to define the rhythm and assess for possible structural cardiac anomalies)

- Known fetal extra-cardiac anomaly, excluding cardiac echogenic foci and choroid plexus cyst
  - see: OB-11.2.b: High Risk Group Two b

- Congenital heart disease (CHD) or cardiac anomaly in a 1st degree relative of the fetus (maternal, paternal, or sibling)

- As a screening study typically performed at 22 to 26 weeks gestation (may be performed earlier if anomaly is suspected on prior ultrasound)
  - if maternal non-diet-controlled diabetes is present (See: OB-11: High Risk Pregnancy)

- Known fetal chromosomal abnormalities (fetal aneuploidy) or ultrasound findings of a suspected chromosomal abnormality.

- Single umbilical artery (two vessel cord), abnormality of umbilical cord, placenta or intraabdominal venous anomaly (persistent right umbilical vein)

- Fetal hydrops
  - see: OB-3: Alloimmunization/Rh Isoimmunization/Other Causes of Fetal Anemia/Parvo/Hydrops

- Monochorionic twins/TTTS

- IVF pregnancies

- Exposure of fetus to:
  - Lithium
  - Excessive alcohol
  - Anti-seizure medication, e.g. hydantoin
  - Paroxetine
  - Birth control pills
  - Ace inhibitors
  - Folate antagonists (methotrexate)
  - Anticonvulsants
  - Retinoic acid
  - Thalidomide
  - Amphetamines
  - Cocaine
  - NSAIDS (Ibuprofen, Indomethacin) 2nd and 3rd trimester
  - Vitamin A greater than 10,000 units per day
  - Opiates
  - Benzodiazepines
  - Other teratogen exposure to the fetus with a known association for cardiac anomalies
Abnormal Fetal Nuchal Translucency scan (≥ 3.0mm) during current pregnancy.
- Can also perform CPT® 76811 if not previously performed or if patient is being referred to another specialist (MFM/Perinatologist or Radiologist) for a second opinion.
- Polyhydramnios

OB-7.2: Indications for Maternal Conditions

<table>
<thead>
<tr>
<th>For Maternal Conditions:</th>
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<tbody>
<tr>
<td>All diabetes except gestational diabetes mellitus not on medication unless HbA1C is &gt; 6.5% Connective tissue diseases (SLE [Lupus], Sjogrens, RA, Scleroderma etc.) with Anti-Ro/SSA or anti-La/SSB antibodies present</td>
</tr>
<tr>
<td>Rubella infection</td>
</tr>
<tr>
<td>Phenylketonuria</td>
</tr>
<tr>
<td>Presence of other maternal conditions associated with cardiac anomalies (such as parvovirus, CMV, Coxsackie virus, Toxoplasmosis)</td>
</tr>
<tr>
<td>Family history of a first degree relative to the fetus with a congenital heart defect or genetic conditions associated with CHD (such as family history of Marfan syndrome or Noonan syndrome)</td>
</tr>
<tr>
<td>Seizure disorder</td>
</tr>
</tbody>
</table>

Coding Notes

- Requests for repeat fetal echo will be forwarded to Medical Director review
- CPT® 76825 and CPT® 76827 are performed only once per fetus
- Follow-up echocardiograms are reported as CPT® 76826
- Follow-up Doppler fetal echocardiograms are reported as CPT® 76828
- If a Fetal Echo is ordered for an individual who has not had a previous echo in the pregnancy, and the clinical criteria are met, then the Fetal Echo may be approved using the following CPT® codes for the initial echo:
  - CPT® 76825 and/or CPT® 76827 and/or CPT® 93325 (add on code for color mapping)
- Requests for follow-up studies CPT® 76826 and/or CPT® 76828 (limited/follow-up study) will be forwarded to Medical Director for review.

Practice Note

There are no formal guidelines for the type or the frequency of testing to detect fetal heart block, but performing weekly pulsed Doppler fetal echocardiography (CPT® 76828) from the 18th through the 26th week of pregnancy and then every other week until 32 weeks should be strongly considered. The most vulnerable period for the fetus is during the period from 18 to 24 weeks gestation. Normal sinus rhythm can progress to complete block in seven days during this high-risk period. New onset of heart block is less likely during the 26th through the 30th week, and it rarely develops after 30 weeks of pregnancy.
References


<table>
<thead>
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<th>OB-8: Fetal Growth Problems</th>
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<tr>
<td>OB-8.1: Fetal Growth Restriction - Small for dates Current Pregnancy</td>
</tr>
<tr>
<td>OB-8.2: Macrosomia - Large for Dates Current Pregnancy</td>
</tr>
</tbody>
</table>
### OB-8.1: Fetal Growth Restriction Current Pregnancy

- The ACOG definition of Fetal Growth Restriction (FGR): Estimated or actual weight of the fetus < 10th percentile for gestational age. “Abdominal Circumference < 10th percentile” also defines FGR.

#### For Suspected FGR:
- One ultrasound can be performed if there is more than a 3 week difference in fundal height and gestational age report one of the following:
  - CPT® 76805 (plus CPT® 76810 if more than one fetus) if a complete ultrasound has not yet been performed during this pregnancy or
  - CPT® 76816 if a complete ultrasound was performed previously

- In order to evaluate fetal growth and confirm the diagnosis of FGR following the initial ultrasound, one follow-up ultrasound (CPT® 76816) can be performed 2 to 4 weeks following the initial ultrasound

- For clinical situations that have a higher probability of FGR such as maternal hypertension, maternal diabetes, previous stillbirth, etc. See: **OB-11: High Risk Pregnancy**, or the specific guidelines for these clinical entities for guidance regarding follow-up ultrasounds to assess fetal growth

#### For Known FGR:
- Detailed Fetal Anatomic Scan (CPT® 76811) upon diagnosis if not already performed
- Ultrasound (CPT® 76816) every 2 to 4 weeks to assess fetal growth starting at 23 to 24 weeks
- Starting at 23 to 24 weeks, weekly BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST
- Starting at 23 to 24 weeks, weekly umbilical artery Doppler (CPT® 76820); if umbilical artery dopplers are abnormal, then more frequent BPPs (CPT® 76818 or CPT® 76819) may be considered (2x per week, or even daily)
- MCA Doppler (CPT® 76821) start at 34 weeks, weekly if the doppler CPT® 76820 is normal

#### Practice Notes
- In the preterm SGA/FGR fetus, middle cerebral artery (MCA) Doppler has limited accuracy to predict acidemia and adverse outcome; it should not be used to time delivery. Most studies investigating MCA Doppler as a predictor of adverse outcome in preterm SGA/FGR fetuses have reported low predictive value, especially when umbilical artery Doppler is abnormal. In the largest study of predictors of neonatal outcome in SGA/FGR neonates of less than 33 weeks gestational age (n = 604), it was not a statistically significant predictor of outcome on logistic regression, although MCA PI < –2 SDs was associated with neonatal death (LR 1.12, 95% CI 1.04–1.21) and major morbidity (LR 1.12, 95% CI 1.1–1.33).

- In addition it has been found that umbilical artery Doppler studies are less reliable after 34 weeks as IUGR at 34 weeks or greater is typically characterized my milder placental dysfunction.
In the near-term SGA/FGR fetus with normal umbilical artery Doppler, an abnormal middle cerebral artery Doppler (PI <5th centile) has moderate predictive value for acidosis at birth and should be used to time delivery. MCA Doppler may be a more useful test in SGA/FGR fetuses detected after 34 weeks of gestation when umbilical artery Doppler is normal. Based on this evidence it is reasonable to use MCA Doppler to time delivery in the near term-term (34 weeks gestation or greater) SGA/FGR fetus with normal umbilical artery Doppler.

**OB-8.2: Macrosomia-Large for Dates Current Pregnancy**

- The ACOG definition of macrosomia: Estimated fetal weight of greater than 4000 grams (DM) or 4500 grams (non-DM); ≥ 90th percentile or greater for gestational age
- See also: **OB-11.4.a: Prior Pregnancy with Macrosomia**

<table>
<thead>
<tr>
<th>For Suspected Macrosomia:</th>
</tr>
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<tbody>
<tr>
<td>- In a low risk pregnancy, ultrasound is generally not indicated to estimate fetal weight before 30 weeks gestation</td>
</tr>
<tr>
<td>- At 30 weeks gestation or greater, if there is more than a 3 week difference in fundal height and gestational age, one ultrasound can be performed to evaluate for macrosomia if clinically indicated report one of the following:</td>
</tr>
<tr>
<td>- CPT® 76805 [plus CPT® 76810 if more than one fetus] if a complete fetal anatomic scan is planned and has not yet been performed or</td>
</tr>
<tr>
<td>- CPT® 76816 if a complete ultrasound was done previously</td>
</tr>
<tr>
<td>- See also: <strong>OB-22.1: Unequal Fundal Size and Dates</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>For Known Macrosomia ≥ 90th percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Repeat imaging is generally not necessary unless needed to plan for delivery or if there are other high risk indications. At &gt; 30 weeks gestation, (CPT® 76816) every 2 to 4 weeks only if other high risk indication(s) are present</td>
</tr>
<tr>
<td>- Imaging recommendations are usually guided by the cause of the fetal macrosomia (obesity, DM, etc.) See appropriate GL for indication</td>
</tr>
<tr>
<td>- If no other high risk indication present, one CPT® 76816 at 37 weeks to plan for delivery</td>
</tr>
</tbody>
</table>

**Practice Notes**

Ultrasound is imprecise in predicting fetal macrosomia. Prospective studies have shown that clinical estimates of macrosomia may be as predictive as estimates derived by ultrasonography.
References


### OB-9: Placental or Cord Abnormalities

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| OB-9.6: Placenta Accreta/Placenta Percreta | 34 |
|   OB-9.6.a: Suspected             | 34 |
|   OB-9.6.b: Known                | 34 |
OB-9.1: Vasa Previa

- Vasa previa occurs when fetal blood vessels that are unprotected by the umbilical cord or placenta run through the amniotic membranes and cross over the internal cervical os. Vasa previa can occur when there is a velamentous cord insertion, or with a succenturiate or multilobed placenta.
- Ultrasound (CPT® 76817 and/or CPT® 76815 or CPT® 76816) every 2 to 4 weeks to assess cervical length starting at 28 weeks. If earlier, requests will be sent to Medical Director review.
- Amniocentesis is no longer required or recommended for lung maturity.

OB-9.2: Placental or Cord Abnormalities

- For the following conditions, ultrasound (CPT® 76817 and/or CPT® 76815 or CPT® 76816) every 2 to 4 weeks starting at 28 weeks until delivery and weekly BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST starting at 32 weeks. If earlier, requests will be sent for Medical Director review.
  - Placental infarction
  - Circumvallate shape
  - Placental hemangioma
  - Succenturiate placenta or accessory lobe
  - Chorioangioma
  - Marginal Cord Insertion
  - Velamentous insertion of the umbilical cord
  - Umbilical cord varix
  - Umbilical cord cyst

OB-9.3: Subchorionic Hematoma or Placental Hematoma

<table>
<thead>
<tr>
<th>Subchorionic Hematoma or Placental Hematoma</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First, Second and Third Trimester</strong></td>
</tr>
<tr>
<td>➢ Ultrasound can be performed for follow-up of a known subchorionic hematoma or placental hematoma (CPT® 76815, or CPT® 76816 if a complete fetal anatomic scan was done previously, and/or CPT® 76817) if the last ultrasound was performed greater than seven days ago.</td>
</tr>
<tr>
<td>➢ Ultrasound imaging may be repeated earlier than seven days if there are new or worsening symptoms such as an increasing amount of vaginal bleeding or increasing cramping or pain.</td>
</tr>
<tr>
<td>➢ No further ultrasound is needed if the follow-up ultrasound 7 days following the hemorrhage shows that the hemorrhage has resolved, and there is no further cramping and/or bleeding, and the fetus is growing as determined by size equal dates, in the first trimester.</td>
</tr>
<tr>
<td>➢ If pregnancy is in second or third trimester follow OB-9.4: Suspected Abruptio Placentae</td>
</tr>
</tbody>
</table>

OB-9.4: Suspected Abruptio Placentae
### OB-9.4: Suspected Abruptio Placentae

<table>
<thead>
<tr>
<th>Suspected Abruptio Placentae</th>
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<tbody>
<tr>
<td><strong>Second and Third Trimesters</strong></td>
</tr>
<tr>
<td>Ultrasound is appropriate for <strong>suspected</strong> abruptio placentae CPT® 76805 [plus CPT® 76810 if more than one fetus] and/or CPT® 76817 if a complete fetal anatomic scan has not yet been performed during this pregnancy, or</td>
</tr>
<tr>
<td>- CPT® 76815 for limited ultrasound and/or CPT® 76817, or</td>
</tr>
<tr>
<td>- CPT® 76816 if a complete fetal anatomic scan was done previously, and/or CPT® 76817 for a transvaginal ultrasound</td>
</tr>
<tr>
<td>Ultrasound is appropriate to follow-up a <strong>known</strong> abruption (CPT® 76815 or CPT® 76816 and/or CPT® 76817).</td>
</tr>
<tr>
<td>- The number and frequency of follow-up ultrasounds will depend on the degree of abruption and the presence or absence of ongoing signs and symptoms</td>
</tr>
</tbody>
</table>

### OB-9.5: Placenta Previa

<table>
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<tr>
<th>Placenta Previa</th>
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</thead>
<tbody>
<tr>
<td><strong>Second and Third Trimesters</strong></td>
</tr>
<tr>
<td>For <strong>suspected</strong> placenta previa ultrasound can be performed (CPT® 76805 [plus CPT® 76810 if more than one fetus] and/or CPT® 76817) if a complete fetal anatomic scan has not yet been performed during this pregnancy <strong>or</strong></td>
</tr>
<tr>
<td>- CPT® 76815 for limited ultrasound and/or CPT® 76817 <strong>or</strong></td>
</tr>
<tr>
<td>- CPT® 76816 if a complete fetal anatomic scan was done previously <strong>and/or</strong></td>
</tr>
<tr>
<td>- CPT® 76817 for a transvaginal ultrasound</td>
</tr>
<tr>
<td>For <strong>known</strong> placenta previa, one routine follow-up ultrasound can be performed at 28 to 32 weeks (CPT® 76815 or CPT® 76816 and/or CPT® 76817)</td>
</tr>
<tr>
<td>- If placenta previa is still present, one follow-up ultrasound (CPT® 76815 or CPT® 76816 and/or CPT® 76817) can be performed at 35 to 37 weeks. Amniocentesis is no longer required or recommended for lung maturity</td>
</tr>
<tr>
<td>- If persistent placenta previa, BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST weekly, starting at 32 weeks</td>
</tr>
<tr>
<td>- Follow-up ultrasound can be performed at any time if bleeding occurs BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 or CPT® 76816 <strong>and/or</strong> CPT® 76817</td>
</tr>
</tbody>
</table>

**Practice Note**

“For pregnancies beyond 16 weeks, if the placental edge is 2 cm or greater away from the internal os, the placental location should be reported as normal.

If the placental edge is less than 2 cm from the internal os but not covering the internal os, it should be labeled as low lying, and a follow-up ultrasound examination is recommended at 32 weeks’ gestation.

If the placental edge covers the internal cervical os, the placenta should be labeled as a placenta previa, and a follow-up ultrasound examination is recommended at 32 weeks’ gestation.”
At the follow-up examination at 32 weeks, if the placental edge is still less than 2 cm from the internal os (low lying) or covering the cervical os (placenta previa), follow-up transvaginal imaging at 36 weeks’ gestation is recommended.”


**OB-9.6: Placenta Accreta/Placenta Percreta**

**OB-9.6.a: Suspected**
- For suspected placenta accreta, ultrasound can be performed (CPT® 76805 [plus CPT® 76810 if more than one fetus] (and/or CPT® 76817) if a complete fetal anatomic scan has not yet been performed or
  - CPT® 76815 for limited ultrasound and/or, CPT® 76817, or
  - CPT® 76816 if a complete fetal anatomic scan was done previously, and/or CPT® 76817 for a transvaginal ultrasound)
- If the ultrasound is inconclusive or equivocal, send to MD review

**OB-9.6.b: Known**
- For known placenta accrete/percreta, follow-up growth ultrasounds can be performed every 2 to 4 weeks (CPT® 76816 and/or CPT® 76817)
- BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST weekly, starting at 32 weeks or sooner if indicated (other high-risk concerns)
- Follow-up ultrasound can be performed at any time if bleeding occurs (CPT® 76815 and/or CPT® 76817)
- MD can approve Pelvic MRI without contrast (CPT® 72195) if the ultrasound is indeterminate or advanced imaging is needed for surgical planning. MRI pelvis without contrast (CPT® 72195) is the appropriate code if only placenta or maternal pelvis is imaged without fetal imaging

*Practice Note*
When there are ambiguous ultrasound findings or suspicion of a posterior placenta accreta, with or without placenta previa, ultrasound may be insufficient. MRI is able to outline the anatomy of the invasion and relate it to the regional anastomotic vascular system and enable confirmation of parametrial invasion and possible ureteral involvement.
References


OB-10: Fetal Aneuploidy and Anomaly Screening

OB-10.1: First Trimester Screening  37
OB-10.2: Second Trimester Screening  38
OB-10.1: First Trimester Screening

- First trimester nuchal translucency is not necessary if cfDNA is done
  - First trimester screening includes biochemical markers and fetal nuchal translucency (FNT) (CPT® 76813). Conducted together, these screenings can identify risk for specific chromosomal abnormalities (e.g. Down’s syndrome, Trisomy-18)
  - Nuchal translucency is completed between 11 and 13 6/7 weeks (CRL between 44 and 83 mm) but can be performed if the crown rump length (CRL) measures between 44-83mm regardless of gestational age. An abnormal Fetal Nuchal Translucency scan, with a nuchal translucency measurement of ≥ 3.0 mm, may indicate an increased risk for cardiac defects, abdominal wall defects, diaphragmatic hernia, and genetic syndromes in euploid fetuses; whereas, a nuchal translucency ≥ 2.5mm may indicate an increased risk for aneuploidy (imaging should be based upon the MOM for NT and biochemical markers).
  - “… the use of ultrasound codes CPT® 76801/ CPT® 76802 should be indication driven and should not be routinely done whenever an ultrasound for nuchal translucency (CPT® 76813/ CPT® 76814) is requested. In cases where there is either a maternal and/or fetal indication then the CPT® 76801 code can indeed be billed along with the nuchal translucency screening (CPT® 76813/ CPT® 76814).” (Society for Maternal-Fetal Medicine)

**First Trimester Screening:**

- Ultrasound is the initial imaging for the first trimester screening, to evaluate fetal nuchal translucency

  | If the nuchal translucency is abnormal (≥ 2.5mm), the following tests can be performed: |
  | - Fetal anatomic ultrasound (CPT® 76811) at 16 weeks or greater |
  | - Amniocentesis |
  | - CVS |
  | - Fetal echocardiogram (NT ≥ 3.0 mm) |

  | Abnormal FNT with normal aneuploidy screen and normal chromosomes (as measured by chorionic villus sampling or amniocentesis) should be evaluated with a fetal echo (CPT® 76825 and/or CPT® 76827 and/or CPT® 93325) and fetal ultrasound (CPT® 76811) |

**Coding Notes**

- CPT® 76813 and CPT® 76814 should be performed only by those certified by the Fetal Medicine Foundation or Nuchal Translucency Quality Review Program (NTQR)
- Report as CPT® 76813 (plus CPT® 76814 if more than one fetus)
- CPT® 76813 can be performed once per pregnancy if the pregnancy is 11 to 13 6/7 weeks (44mm – 83mm) but can be performed if the CRL measures between 44-83mm regardless of gestational age
- If FNT is abnormal, CPT® 76811 is usually performed by a Maternal Fetal Medicine (MFM)/Perinatologist, Radiologist, or facility/physician with AIUM certification (with advanced training in fetal imaging) after 16 weeks
The use of ultrasound codes (CPT® 76801/CPT® 76802) should be indication driven and should not be routinely done whenever an ultrasound for nuchal translucency (CPT® 76813/CPT® 76814) is requested. In cases where there is either a maternal and/or fetal indication, then the CPT® 76801 code can indeed be billed along with the nuchal translucency screening (CPT® 76813/CPT® 76814).

**OB-10.2: Second Trimester Screening**

See also: [OB-5.1: Initial Screening for Fetal Anomalies](#)

<table>
<thead>
<tr>
<th>Two studies, a quad screen and ultrasound, are done during the second trimester to detect fetal aneuploidy, neural tube defects, and other anatomical defects.</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ A fetal anatomic scan to screen for anomalies is ideally performed at 18 to 20 weeks but may be performed after week ≥ 16. If less than 16 weeks, send to MD review.</td>
</tr>
<tr>
<td>▶ If the quad screening is abnormal, an ultrasound (CPT® 76811) may also be performed.</td>
</tr>
</tbody>
</table>

**Practice Notes**

Multiple marker screening is used in the second trimester (15 to 20 weeks) to screen for trisomies 21 and 18 as well as open neural tube defects (ONTD).

The “quad” screen is the most commonly used test for the second trimester.

The quad screen measures four substances:

1. AFP (alpha-fetoprotein)
2. hCG (human chorionic gonadotropin)
3. uE (Unconjugated estriol)
4. dimeric inhibin-A

A penta screen may be done in lieu of a quad screen, the penta screen includes hyperglycosylated hCG in addition to the quad screen markers.

The “penta” screen measures five substances:

1. AFP
2. hCG
3. hyperglycosylated hCG
4. uE
5. dimeric inhibin-A

Maternal serum alpha-fetoprotein (MSAFP) can be done at 15 to 20 weeks to screen for neural tube defects if quad or penta is not performed. (Those that have had cfDNA or NT screen will need MSAFP tested separately in the mid-trimester to screen for open neural tube defect).

Combined, integrated or sequential screening (first and second trimester screening) may also be used and provides a higher detection rate than a single screening.

Providers often wait for the results of the quad screen before ordering CPT® 76805. If the quad screen is abnormal, they may request CPT® 76811 in lieu of CPT® 76805.
**Cell-Free DNA Testing-cfDNA**

First trimester nuchal translucency screening is not necessary if cfDNA is performed as they are both screenings for fetal aneuploidy.

Cell-free fetal DNA (cfDNA) has been noted to be the most sensitive test for Down syndrome per the American College of Medical Genetics and Genomics.

Testing can be offered as early as the 10th week of pregnancy.

With a negative cfDNA test, it is very unlikely the fetus has trisomy 21, 13 or 18. Other chromosomal abnormalities may also be identified. The sex and Rh status of the baby may be included. The American College of Medical Genetics and Genomics (ACMG) recommends against using this test to screen for microdeletions or any autosomal aneuploidies other than 13, 18 and 21.

A woman with a positive cfDNA should be offered diagnostic testing (amniocentesis or CVS). A detailed anatomy scan 76811 is indicated at 16 weeks or greater. See: OB-11.1: High Risk Group One-Risk Factors.

A “no call” or indeterminate result can occur (risk is higher with maternal obesity), but this has a higher risk of chromosomal abnormality than a normal result. The patient should be offered amniocentesis or CVS testing.

Note that cfDNA does not screen for neural tube defects. Patients should be offered screening for open neural tube defects with maternal serum AFP (MSAFP) or ultrasound (usual anatomy scan- CPT® 76805 or CPT® 76811 depending on risk factors).
References


2. Society for Maternal and Fetal Medicine (SMFM), coding committee, October 2017. SMFM’s white paper on billing combination of 76801 and 76813.


### OB-11: High Risk Pregnancy

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OB-11.01: High Risk Pregnancy Special Considerations

For the following conditions, please follow the links for appropriate imaging:

- Abnormal nuchal translucency - thickened nuchal fold ≥ 5 mm at 16 to 20 weeks or ≥ 6 mm at 20 to 22 weeks (if CPT® 76811 shows adequate heart views, then no indication for echo) See: OB-10.1: First Trimester Screening
- Fetal Growth Restriction and Macrosomia see: OB-8: Fetal Growth Problems
- History of late fetal death (greater than or equal to 20 weeks) See: OB-11.11: History of Stillbirth
- History of Prior C-section See: OB-17: Previous C-section or History of Uterine Scar
- Multiple Gestations see: OB-16: Multiple Pregnancies
- Oligohydramnios or polyhydramnios see: OB-4: Amniotic Fluid Abnormalities/Oligohydramnios/Polyhydramnios
- Premature rupture of membranes (PROM) See: OB-19.1: Current Preterm Prelabor Rupture of Membranes (PPROM)
- Rh sensitization/isoimmunization See: OB-3: Alloimmunization/Rh Isoimmunization, Other Causes of Fetal Anemia/Parvo/Hydrops
- Vasa previa/placenta accrete/placental abnormalities see: OB-9: Placental or Cord Abnormalities

OB-11.1: High Risk Group One-Risk Factors

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<th>HIGH RISK PREGNANCY – Risk Factors</th>
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<td>Age greater than or equal to 35 years of age at the estimated date of confinement (EDC)</td>
</tr>
<tr>
<td><strong>OB-11.1.b: Lifestyle Related Risk Factors</strong></td>
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<tr>
<td>Recreational drug or alcohol use during current pregnancy (excluding marijuana) See: OB-25: High Risk Medications and Substances</td>
</tr>
<tr>
<td>10 or more cigarettes a day (1/2 pack a day)</td>
</tr>
<tr>
<td>Maternal history of IV drug abuse</td>
</tr>
<tr>
<td><strong>OB-11.1.c: Health Condition Related Risk Factors</strong></td>
</tr>
<tr>
<td>Anemia severe, less than 8 grams Hgb or 24% HCT</td>
</tr>
<tr>
<td>Antiphospholipid Syndrome/Autoimmune disease</td>
</tr>
<tr>
<td>Asthma (poorly controlled or steroid dependent)</td>
</tr>
<tr>
<td>Bariatric surgery</td>
</tr>
<tr>
<td>Cholestasis of pregnancy (abnormal bile acids &gt; 10umol/L)</td>
</tr>
<tr>
<td>Chronic liver disease</td>
</tr>
<tr>
<td>Chronic medical condition that may affect fetal growth due to utero-placental insufficiency</td>
</tr>
<tr>
<td>Connective tissue disorders (lupus, RA, scleroderma, Sjogren’s)</td>
</tr>
<tr>
<td>Cystic Fibrosis/ Known carrier of Spinal Muscular Atrophy (SMA), CF, Tay-Sachs genetic diseases</td>
</tr>
<tr>
<td>Heart disease (Maternal) – New York Heart Association class III or IV greater or arrhythmia</td>
</tr>
<tr>
<td>Hemoglobinopathies (e.g. sickle cell disease, sickle cell trait, thalassemia etc)</td>
</tr>
<tr>
<td>History of endometrial ablation or Uterine Artery embolization</td>
</tr>
</tbody>
</table>
- Hyperthyroidism
- Hypothyroidism (poorly controlled)
- Maternal malnutrition (BMI < 18.5), for poor weight gain, send to MD Review
- Maternal blood clotting disorder/thrombophilia (Antiphospholipid Syndrome, Factor V Leiden mutation, Antithrombin III deficiency, Protein C/Protein S deficiency, etc.)
- PKU
- Renal disease such as pyelonephritis, glomerulonephritis, or persistent protein in the urine renal insufficiency
- Seizure disorders
- Systemic malignancy
- Fetal Ventriculomegaly

### OB-11.1.d: Previous pregnancy related risk factors
- If no known cause of miscarriages < 20 weeks:
  - 2 or more miscarriages and currently ≥ 35 years old; or
  - 3 or more miscarriages and currently < 35 years old
- Prior pregnancy with placental abnormality (Infarcts, Accreta)
- Prior pregnancy with SGA (baby weighing < 2500 grams at term or FGR less than the 10th percentile of expected weight)
- Prior pregnancy with adverse outcome (early onset preeclampsia ≤ 34 weeks, abruptio, or FGR at any gestational age, nonimmune hydrops)
- Rh sensitization/Isoimmunization in prior pregnancy. In current pregnancy see: **OB-3: Alloimmunization/Rh Isoimmunization/Other Causes of Fetal Anemia/Parvo/Hydrops**

### OB-11.1.e: Current pregnancy related risk factors
- Abnormal MSAFP/Low PAPP_A/Known chromosomal abnormalities/abnormal FNT, or abnormal cfDNA
- Any 'significant' congenital anomaly or fetal congenital heart disease
- Gastroschisis in current pregnancy
- ART Conception with assisted reproductive technologies/ART
- Grand multiparity: must have completed 5 or more pregnancies of greater than 20 weeks gestation, living or stillbirth (does not include current pregnancy; twins count as 1 pregnancy)
- Thickened nuchal fold ≥ 5 mm at 16 to 20 weeks; ≥ 6mm at 20 to 22 weeks (if CPT® 76811 shows adequate heart views, then no indication for echo)
- No prenatal care prior to 28 weeks

### OB-11.1.f: Maternal Infections
- Acquired Immune Deficiency Syndrome/HIV Positive
- Cytomegalovirus (CMV)
- Malaria
- Known parvovirus in current pregnancy post fetal treatment. See: **OB-3.2: Exposure to Parvovirus B-19**
- Rubella
- Syphilis, untreated
- Toxoplasmosis
- Tuberculosis
**OB-11.1.g: Imaging For Above Conditions**

- Perform one ultrasound in the first trimester to establish dates, and report one of the following:
  - CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, and/or
  - CPT® 76817 for a transvaginal ultrasound indicated.

- Detailed Fetal Anatomic Scan CPT® 76811 ideally performed between 18 to 20 weeks, but be performed after 16 weeks when criteria is met:
  - Performance of the specialized fetal anatomic evaluation should be limited to those with special skills to perform this study, such as Maternal-Fetal Medicine specialists, Perinatologists, and Radiologists (with advanced training in fetal imaging)
  - There is no prior approval for a CPT® 76811 for the current pregnancy

- Starting at 23 to 24 weeks, follow-up growth scans (CPT® 76816) every 3 to 6 weeks

- Starting at 32 weeks, weekly BPP (CPT® 76818 or CPT® 76819) or AFI (CPT® 76815) with NST

**OB-11.2: High Risk Group Two – Findings on Ultrasound That May Require Further Imaging**

**OB-11.2.a: High Risk Group Two a.**

- If the following conditions are found upon routine imaging:
  - Shortened femur identified in fetus of current pregnancy
  - Shortened humerus identified in fetus of current pregnancy
  - Pyelectasis of > 4 mm at 20 weeks identified in fetus of current pregnancy
  - Echogenic bowel identified in fetus of current pregnancy
  - Hypoplastic nasal bone in current pregnancy

- Fetal anatomic scan is ideally performed at 18 to 20 weeks but must be performed after 16 weeks (CPT® 76811)

- One follow-up scan (CPT® 76816) in third trimester

**OB-11.2.b: High Risk Group Two b.**

- If the following conditions are found upon routine imaging:
  - Choroid plexus cyst (present in 30% to 50% of all Trisomy 18 fetuses). Follow-up imaging not needed if targeted scan is normal
  - Echogenic intracardiac foci (present in 15% to 30% of all Down syndrome fetuses). Fetal echo or follow-up ultrasound are not warranted
  - Prior pregnancy with a congenital anomaly
  - Chromosomal abnormalities with previous pregnancy

- Fetal anatomic scan is ideally performed at 18 to 20 weeks but must be performed after 16 weeks (CPT® 76811)
**OB-11.3: High Risk Group Three – BMI**

**OB-11.3.a: Pre-pregnancy BMI 30 to 34**

**Obesity (BMI 30-34)**
- Perform one ultrasound in the first trimester to establish dates and report one of the following:
  - CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, and/or
  - CPT® 76817 for a transvaginal ultrasound indicated
- Fetal anatomic scan is ideally performed at 18 to 20 weeks but must be performed after 16 weeks (CPT® 76811)
- One follow-up scan (CPT® 76816) between 32 to 36 weeks

**OB-11.3.b: Pre-pregnancy BMI 35-39**

**Obesity (BMI 35-39)**
- Perform one ultrasound in the first trimester to establish dates, and report one of the following:
  - CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, and/or
  - CPT® 76817 for a transvaginal ultrasound indicated
- Fetal anatomic scan is ideally performed at 18 to 20 weeks but must be performed after 16 weeks (CPT® 76811)
- Growth scan (CPT® 76816) at 32 and 36 weeks, and CPT® 76818 or CPT® 76819 or CPT® 76815 for AFI with NST weekly starting at 36 weeks

**OB-11.3.c: Pre-pregnancy BMI ≥ 40**

**Obesity (BMI ≥ 40)**
- Perform one ultrasound in the first trimester to establish dates, and report one of the following:
  - CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, and/or
  - CPT® 76817 for a transvaginal ultrasound indicated
- Fetal anatomic scan is ideally performed at 18 to 20 weeks but must be performed after 16 weeks (CPT® 76811)
- Growth scan (CPT® 76816) at 32 and 36 weeks
- CPT® 76818 or CPT® 76819 or CPT® 76815 for AFI with NST weekly starting at 32 weeks
- If A1C is greater than 6.5: fetal echo CPT® 76825 and/or CPT® 76827 and/or CPT® 93325 after 18 weeks
Practice Note
The obesity protocol that was introduced in 2011 included recommendations for early gestational diabetes mellitus screening and an overall pregnancy weight gain of 11 to 20 pounds in all classes of obesity. A baseline 24-hour urine protein collection was recommended for class II and class III obese patients based on their increased risk of developing gestational diabetes mellitus and preeclampsia in addition to serial growth scans and nonstress tests also being utilized. Delivery by the estimated due date was recommended for each class of obesity meeting the following criteria: (1) class III obese (pre-pregnancy body mass index of 40 kg/m² or greater) alone, (2) class II obese (pre-pregnancy body mass index of 35 to 39.9 kg/m²) and a diagnosis of gestational diabetes mellitus or large for gestational age, or (3) class I obese (pre-pregnancy body mass index of 30 to 34.9 kg/m²) plus a diagnosis of gestational diabetes mellitus and large for gestational age fetus. Large for gestational age/macrosomia was defined as an estimated fetal weight of greater than the 95th percentile.

OB-11.4: High Risk Group Four

OB-11.4.a: Prior Pregnancy with Macrosomia

<table>
<thead>
<tr>
<th>Prior pregnancy with macrosomia (baby weighing &gt; 4000 grams at term or greater than the 90th percentile of expected weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>➤ Perform one ultrasound in the first trimester to establish dates, and report one of the following:</td>
</tr>
<tr>
<td>➤ CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, or CPT® 76815 for limited ultrasound if complete ultrasound has already been performed, and/or CPT® 76817 for a transvaginal ultrasound, indicated if less than 14 weeks.</td>
</tr>
<tr>
<td>➤ One targeted scan (CPT® 76811) in second-trimester ≥ 16 weeks</td>
</tr>
<tr>
<td>➤ One growth scan (CPT® 76816) at &gt; 30 weeks</td>
</tr>
</tbody>
</table>

OB-11.4.b: Current Pregnancy with Suspected or Known Macrosomia

### OB-11.5: High Risk Group Five: Zika Virus

**Suspected exposure without symptoms:**
- CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, or CPT® 76815 for limited ultrasound if complete ultrasound has already been performed, and/or CPT® 76817 for a transvaginal ultrasound indicated if less than 14 weeks.
- Anatomy scan CPT® 76805 (plus CPT® 76810 if more than one fetus) if a complete ultrasound has not yet been performed during this pregnancy.
- Starting at 16 weeks, Growth scan (CPT® 76816) every 3 to 4 weeks to monitor for findings such as intracranial calcifications and microcephaly.

**Suspected exposure with symptoms or known disease:**
- CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, or CPT® 76815 for limited ultrasound if complete ultrasound has already been performed, and/or CPT® 76817 for a transvaginal ultrasound, indicated if less than 14 weeks.
- Detailed fetal anatomic scan (CPT® 76811) may be performed at 16 weeks gestation or greater.
- Growth scan, (CPT® 76816) every 3 to 4 weeks to monitor for findings such as intracranial calcifications and microcephaly, starting at 16 weeks.
- If diagnosed FGR or abdominal circumference ≤ 10 percentile then follow FGR imaging **OB-8.1: Fetal Growth Restriction Current Pregnancy**.

- If intracranial calcifications, microcephaly or other abnormalities emerge, send to MD review. In these cases, imaging would follow the algorithm of other viruses that cause congenital infection **OB 11.1.f: Maternal Infections**.

### OB-11.6: High Risk Group 6 – Pre-Gestational Diabetes on Oral Medications or Insulin

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<th>When</th>
<th>Frequency</th>
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<td>&lt; 14 weeks</td>
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<tr>
<td>Fetal anatomic scan</td>
<td>16 to 20 weeks</td>
<td>Once</td>
<td>CPT® 76811</td>
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<tr>
<td>Fetal echo (initial) Requests for</td>
<td>Starting at 18 to</td>
<td>Once</td>
<td>CPT® 76825 and/or CPT® 76827 and/or CPT® 93325</td>
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<tr>
<td>follow-up go to MD review</td>
<td>24 weeks</td>
<td></td>
<td></td>
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<tr>
<td>Ultrasound (for fetal growth)</td>
<td>Starting at viability 23 to 24 weeks</td>
<td>Every 2 to 4 weeks</td>
<td>CPT® 76816*</td>
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<tr>
<td>Biophysical Profile (BPP) or AFI</td>
<td>If complicated by additional risk factors, perform between 26 and 28 weeks</td>
<td>Up to twice weekly</td>
<td>CPT® 76818 or CPT® 76819 or CPT® 76815 for AFI with NST*</td>
</tr>
<tr>
<td>or AFI with NST*</td>
<td></td>
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<tr>
<td>Biophysical Profile* (BPP) or AFI</td>
<td>Starting at 32 weeks</td>
<td>Up to twice weekly</td>
<td>CPT® 76818 or CPT® 76819 (BPP) or CPT® 76815 for AFI with NST*</td>
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<td>or AFI with NST**</td>
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<td>Upon diagnosis of FGR</td>
<td>Weekly</td>
<td>CPT® 76820</td>
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</tbody>
</table>
For a poorly controlled diabetic, requests for a repeat fetal echocardiogram will be sent to MD review. (HbA1C > 6.5 is associated with fetal anomalies and adverse outcomes. Reference Table 1 below)

Starting at 32 weeks, AFI CPT® 76815 can be substituted for BPP but not for the same day of service.

NST is not currently prior authorized by eviCore healthcare for any health plan.

If there has not been a prior anatomical scan, this can be done at greater than 20 weeks.

**Practice Note**

**Table 1**

<table>
<thead>
<tr>
<th>A1C (%)</th>
<th><strong>z</strong> score (SD &gt; mean)</th>
<th>Number of patients</th>
<th>Congenital malformation (%)</th>
<th>RR (95% CI) vs. background population</th>
<th>Perinatal mortality (%)</th>
<th>RR (95% CI) vs. background population</th>
<th>Serious adverse outcome (%)</th>
<th>RR (95% CI) vs. background population</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 10.4</td>
<td>≥10</td>
<td>55</td>
<td>10.9</td>
<td>3.9 (1.8 to 7.8)†</td>
<td>5.5</td>
<td>7.3 (2.5 to 19.8)†</td>
<td>16.3</td>
<td>4.7 (2.5 to 8.1)†</td>
</tr>
<tr>
<td>8.9 to 10.3</td>
<td>7.0 to 9.9</td>
<td>128</td>
<td>3.9</td>
<td>1.4 (0.6 to 3.1)</td>
<td>6.3</td>
<td>8.3 (4.2 to 15.9)†</td>
<td>7.8</td>
<td>2.2 (1.2 to 3.9)†</td>
</tr>
<tr>
<td>7.9 to 8.8</td>
<td>5.0 to 6.9</td>
<td>182</td>
<td>5.0</td>
<td>1.8 (0.9 to 3.3)</td>
<td>3.3</td>
<td>4.4 (2.0 to 9.4)†</td>
<td>7.7</td>
<td>2.2 (1.3 to 3.6)†</td>
</tr>
<tr>
<td>6.9 to 7.8</td>
<td>3.0 to 4.9</td>
<td>284</td>
<td>4.9</td>
<td>1.8 (1.0 to 2.9)</td>
<td>2.8</td>
<td>3.8 (1.9 to 7.3)†</td>
<td>7.7</td>
<td>2.2 (1.5 to 3.3)†</td>
</tr>
<tr>
<td>&lt; 6.9</td>
<td>&lt; 3.0</td>
<td>284</td>
<td>3.9</td>
<td>1.4 (0.8 to 2.4)</td>
<td>2.1</td>
<td>2.8 (1.3 to 6.1)†</td>
<td>5.6</td>
<td>1.6 (1.0 to 2.6)</td>
</tr>
<tr>
<td>Background population</td>
<td>(n = 70,089)</td>
<td>2.8</td>
<td>1.0</td>
<td>0.75</td>
<td>1.0</td>
<td>3.5</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

*Standard reference 5.4 ± 1.0 (mean ± 2 SD) in the nondiabetic background population.

*Significantly higher than background population at significance level of 0.05 relative risk (Jensen DM et al, 2017)
OB-11.7: High Risk Group Seven Gestational Diabetes

OB-11.7.a: Gestational Diet-Controlled

<table>
<thead>
<tr>
<th>Test</th>
<th>When</th>
<th>Frequency</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal anatomic scan</td>
<td>16 to 20 weeks***</td>
<td>Once</td>
<td>CPT® 76805</td>
</tr>
<tr>
<td>Ultrasound (for fetal growth)</td>
<td>Starting at 32 weeks</td>
<td>Every 4 weeks</td>
<td>CPT® 76816*</td>
</tr>
<tr>
<td>Biophysical Profile* (BPP) or AFI with NST**</td>
<td>Starting at 34 to 36 weeks</td>
<td>Once weekly if diet controlled.</td>
<td>CPT® 76818 or CPT® 76819 or CPT® 76815 for AFI with NST**</td>
</tr>
</tbody>
</table>

Maternal diet-controlled diabetes refers to patients that have a diagnosis of any type of diabetes (including diet-controlled gestational diabetes mellitus (GDM) and diet controlled pre-gestational diabetes mellitus) but require no medication for their diabetes. If HbA1C is > 6.5%, then they are not controlled and should follow guidelines for medication utilized for control see also OB-11.6: High Risk Group 6- Pre-Gestational Diabetes On oral medications or insulin

*Starting at 35 weeks, AFI CPT® 76815 can be substituted for BPP but not for the same day of service.
**NST is not currently prior authorized by eviCore healthcare for any health plan.
***If there has not been a prior anatomical scan, this can be done at greater than 20 weeks.
### OB-11.7.b: Gestational Diabetes on Oral Medications or Insulin

<table>
<thead>
<tr>
<th>Test</th>
<th>When</th>
<th>Frequency</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal anatomic scan</td>
<td>16 to 20 weeks***</td>
<td>Once</td>
<td>CPT® 76811</td>
</tr>
<tr>
<td>Fetal echo (initial) Requests for</td>
<td>Starting at 18 to 24</td>
<td>Once</td>
<td>CPT® 76825 and/or</td>
</tr>
<tr>
<td>follow-up go to MD review</td>
<td>weeks</td>
<td></td>
<td>CPT® 76827 and/or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CPT® 93325</td>
</tr>
<tr>
<td>Ultrasound (for fetal growth)</td>
<td>Starting at viability 23</td>
<td>Every 2 to 4</td>
<td>CPT® 76816*</td>
</tr>
<tr>
<td></td>
<td>to 24 weeks</td>
<td>weeks</td>
<td></td>
</tr>
<tr>
<td>Biophysical Profile (BPP) or</td>
<td>If complicated by</td>
<td>Up to twice</td>
<td>CPT® 76818 or</td>
</tr>
<tr>
<td>AFI with NST*</td>
<td>additional risk factors</td>
<td>weekly</td>
<td>CPT® 76819 or</td>
</tr>
<tr>
<td></td>
<td>perform between 26 and 28</td>
<td></td>
<td>CPT® 76815 for</td>
</tr>
<tr>
<td></td>
<td>weeks</td>
<td></td>
<td>AFI with NST**</td>
</tr>
<tr>
<td>Biophysical Profile* (BPP) or AFI</td>
<td>Starting at 32 weeks</td>
<td>Up to twice</td>
<td>CPT® 76818 or</td>
</tr>
<tr>
<td>with NST**</td>
<td></td>
<td>weekly</td>
<td>CPT® 76819 or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CPT® 76815 for</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AFI with NST**</td>
</tr>
<tr>
<td>Umbilical artery Doppler (if FGR</td>
<td>Upon diagnosis of FGR</td>
<td>Weekly</td>
<td>CPT® 76820</td>
</tr>
<tr>
<td>diagnosed)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For a poorly controlled diabetic, requests for a repeat fetal echocardiogram will be sent to MD review. (If HbA1C is > 6.5%, fetal echo can be performed in the third trimester to assess for ventricular hypertrophy)

*Starting at 32 weeks, AFI CPT® 76815 can be substituted for BPP but not for the same day of service.

**NST is not currently prior authorized by eviCore healthcare for any health plan.

***If there has not been a prior anatomical scan, this can be done at greater than 20 weeks.
## OB-11.8: Hypertension

### Current chronic hypertension, on and not on prescribed medications, and/or History of preeclampsia, and/or History of FGR:

- One time uterine artery Doppler (CPT® 93976) evaluation prior to < 16 weeks gestation. Uterine artery Doppler is not indicated > 16 weeks.
- If test is abnormal at less than 16 weeks, a repeat test can be considered at 20 to 22 weeks gestation after starting baby aspirin. (CPT® 93976) (See: **OB-24.10: Duplex Scan (Uterine Artery)**)

### If patient has one of the following hypertension-related conditions:

#### Chronic hypertension **not on** prescribed hypertension medication:

- Perform one ultrasound in the first trimester to establish dates, and report one of the following:
  - CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, or CPT® 76815 for limited ultrasound if complete ultrasound has already been performed, and/or CPT® 76817 for a transvaginal ultrasound indicated if less than 14 weeks.
  - One US at 16 to 20 weeks (CPT® 76811- Detailed fetal anatomic section); and one US (CPT® 76816) at 30 to 34 weeks only.

  (If blood pressure is elevated from baseline, see Gestational Hypertension(GH) below)

#### Chronic hypertension **on** prescribed hypertension medication:

- Perform one ultrasound in the first trimester to establish dates, and report one of the following:
  - CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, or CPT® 76815 for limited ultrasound if complete ultrasound has already been performed, and/or CPT® 76817 for a transvaginal ultrasound indicated if less than 14 weeks.

<table>
<thead>
<tr>
<th>Ultrasound Type</th>
<th>CPT Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Detailed Fetal Anatomic Scan at 16 weeks gestation or greater</td>
<td>CPT® 76811</td>
</tr>
<tr>
<td>US every 3 to 4 weeks starting at viability 23 to 24 weeks gestation</td>
<td>CPT® 76816</td>
</tr>
<tr>
<td>Starting at 32 weeks, weekly biophysical profile (BPP) or AFI with NST*</td>
<td>CPT® 76818 or CPT® 76819 or CPT® 76815 for AFI</td>
</tr>
<tr>
<td>If other risk factors are present, may start at 26 to 28 weeks.</td>
<td></td>
</tr>
<tr>
<td>If diagnosed FGR, weekly umbilical artery Doppler (See: <strong>OB-8.1: Fetal Growth Restriction Current Pregnancy</strong>)</td>
<td>CPT® 76820</td>
</tr>
</tbody>
</table>

#### Gestational Hypertension (GH, preeclampsia, toxemia):

- Starting at time of diagnosis, growth US every 3 to 4 weeks
- If FGR, Oligohydramnios, or Severe preeclampsia, growth US every 2 to 4 weeks.

<table>
<thead>
<tr>
<th>Ultrasound Type</th>
<th>CPT Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting at time of diagnosis, weekly BPP or AFI with NST*</td>
<td>CPT® 76818 or CPT® 76819 or CPT® 76815 for AFI</td>
</tr>
<tr>
<td>If FGR or Oligohydramnios is also present, twice weekly BPP or AFI with NST*</td>
<td></td>
</tr>
<tr>
<td>Only if FGR or Oligohydramnios is present, twice weekly umbilical artery Doppler</td>
<td>CPT® 76820</td>
</tr>
<tr>
<td>MCA Doppler (CPT® 76821), starting at 34 weeks. Once weekly only following a normal 76820 Doppler</td>
<td></td>
</tr>
</tbody>
</table>

*NST (CPT® 59025) is not currently prior authorized by eviCore health care for any health plan
**OB-11.9: Single Umbilical Artery**

If single umbilical artery is found on initial imaging:

- Detailed anatomic ultrasound at 16 weeks or greater [CPT® 76811]
- Fetal echocardiogram at 23 to 24 weeks [CPT® 76825 and/or CPT® 76827 and/or CPT® 93325]
- Follow-up ultrasound to evaluate fetal growth at 28 to 32 weeks and then every 3 to 6 weeks if more than one clinical high-risk factors are documented [CPT® 76816]
- Weekly BPP or AFI with NST starting at 36 weeks [CPT® 76818 or CPT® 76819 (BPP) or CPT® 76815 (AFI) with NST]

**OB-11.10: History of Pre-Term Delivery/History of PPROM**

**OB-11.10.a: Preterm Delivery ≤ 34 Weeks; History of PPROM ≤ 34 weeks**

- Ultrasound CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed once in first trimester and/or CPT® 76817 for transvaginal ultrasound once in first trimester (less than 14 weeks) to establish dates
- Ultrasound is supported at 16 weeks or greater: CPT® 76811 [plus CPT® 76812 if more than one fetus] and/or CPT® 76817 if a complete detailed fetal anatomic scan has not yet been performed during this pregnancy for any one of the above conditions
  - Starting after the fetal anatomic scan at 23 weeks or greater, ultrasound (CPT® 76816) can be performed every 3 to 6 weeks until delivery
  - (CPT® 76815 and/or CPT® 76817) every 2 weeks, starting at 16 weeks or greater until 24 weeks
  - Starting at 32 weeks, weekly BBP CPT® 76818 or CPT® 76819 or CPT® 76815 for AFI

**OB-11.10.b: History of Preterm Delivery > 34 weeks < 37**

- CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed and/or CPT® 76817 for a transvaginal ultrasound indicated if less than 14 weeks to establish dates
- (CPT® 76815 and/or CPT® 76817) every 2 weeks, starting at 16 weeks or greater until 24 weeks
- An anatomy ultrasound is supported at 16 weeks or greater: CPT® 76805 [plus CPT® 76810 if more than one fetus] and/or CPT® 76817 if a complete fetal anatomic scan has not yet been performed during this pregnancy.
OB-11.11: History of Stillbirth

Women with a history of stillbirth:

- CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, or CPT® 76815 for limited ultrasound if complete ultrasound has already been performed, and/or CPT® 76817 for a transvaginal ultrasound indicated if less than 14 weeks
- Fetal anatomic scan at 16 weeks or greater (CPT® 76811)
- Ultrasound (CPT® 76816) every 2 to 4 weeks to assess fetal growth starting at 23 to 24 weeks or two weeks before prior pregnancy loss.
- Weekly BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST starting at 32 weeks or two weeks before prior pregnancy loss

References

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http://www.bmj.com/content/349/bmj.g5887


### OB-12: History of Infertility

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<thead>
<tr>
<th>Section</th>
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</tr>
</thead>
<tbody>
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<td>OB-12.1: History of Infertility</td>
<td>58</td>
</tr>
<tr>
<td>OB-12.2: Present Pregnancy with Use of Fertility Drugs and Treatment (ART)</td>
<td>58</td>
</tr>
</tbody>
</table>
OB-12.1: History of Infertility

- Ultrasound imaging is supported if there is a history of infertility treatment (CPT® 76801 [plus CPT® 76802 if more than one fetus] and/or CPT® 76817 for transvaginal ultrasound
- Repeat ultrasound is not usually necessary unless there are new clinical indications

OB-12.2: Present Pregnancy with use of Fertility Drugs and Treatment (ART)

- Follow high risk imaging, see OB-11: High Risk Pregnancy
### OB-13: Cervical Insufficiency/Current Preterm Labor

<table>
<thead>
<tr>
<th>OB-13.1: Cervical Insufficiency</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>OB-13.2: Cerclage in place in current pregnancy</td>
<td>60</td>
</tr>
<tr>
<td>OB-13.3: Current Preterm Labor</td>
<td>60</td>
</tr>
</tbody>
</table>
For history of pre-term labor see: **OB-11.10: History of Pre-Term Delivery/History of PPROM**

### OB-13.1: Cervical Insufficiency

- For any of the following:
  - History of prior precipitous delivery
  - Presence of uterine anomaly (See: **OB-23.3: Uterine Anomalies**)
  - History of cerclage in prior pregnancy
  - Over dilation of cervix during a termination of pregnancy
  - Cervical obstetrical laceration from a previous delivery
  - Surgical trauma to cervix (e.g. conization [CKC—cold-knife conization] or Loop Electrosurgical Excision Procedure [LEEP])

  - Perform one ultrasound in the first trimester to establish dates, and report one of the following; CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, and/or CPT® 76817 for a transvaginal ultrasound indicated
  - Ultrasound is supported at 16 weeks or greater: CPT® 76805 [plus CPT® 76810 if more than one fetus] and/or CPT® 76817 once if a complete fetal anatomic scan has not yet been performed during this pregnancy.
  - Starting after the fetal anatomic scan at 16 weeks or greater, ultrasound (CPT® 76815) every 2 to 4 weeks and/or transvaginal ultrasound (CPT® 76817) every 2 weeks until 24 weeks

  If funneling or abnormally shorten cervix ≤ 25 mm (2.5 cm) is found on a transvaginal ultrasound in a singleton pregnancy, an ultrasound (CPT® 76816 or CPT® 76817) every 2 to 4 weeks for the duration of the pregnancy and/or (CPT® 76817) for transvaginal ultrasound every 1 to 2 weeks until 32 weeks.

### OB-13.2: Cerclage in place in current pregnancy

- Ultrasound CPT® 76801[plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed once in first trimester, or CPT® 76815 for limited ultrasound if a complete ultrasound 76801 has already been performed and/or CPT® 76817 for transvaginal ultrasound once in first trimester (less than 14 weeks) for any one of the following:
  - Ultrasound is supported at 16 weeks or greater: CPT® 76811 [plus CPT® 76812 if more than one fetus] and/or CPT® 76817 once, if a complete detailed fetal anatomic scan has not been done.
  - Starting after the fetal anatomic scan at 16 weeks or greater, ultrasound (CPT® 76815 or CPT® 76816) can be performed every 3 to 6 weeks.
  - Transvaginal (CPT® 76817) every 2 weeks, starting at 16 weeks or greater until 30 weeks if a rescue cerclage was placed.

### OB-13.3: Current Preterm Labor

- Known preterm labor in current pregnancy (contractions with cervical change) CPT® 76805 [plus CPT® 76810 if more than one fetus] and/or CPT® 76817 if a complete fetal anatomic scan has not yet been performed during this pregnancy; if a complete fetal anatomic scan was performed previously, CPT® 76815 or CPT® 76816 (76816 no more than every 2 weeks) when symptomatic
CPT® 76817 once or when symptomatic

- Once or when symptomatic, biophysical profile (BPP) (CPT® 76818 or CPT® 76819) or AFI CPT® 76815 with NST, starting at 30 weeks; if less than 30 weeks send to MD review

**References**


<table>
<thead>
<tr>
<th>OB-14: Intrauterine Device (IUD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OB-14.1: Locate an Intrauterine Device</td>
</tr>
</tbody>
</table>
OB-14.1: Locate an Intrauterine Device

- Ultrasound can be performed to locate an intrauterine device (IUD) (CPT® 76801 and/or CPT® 76817 if a complete ultrasound has not yet been performed)
- CPT® 76815 for limited ultrasound, if complete ultrasound has already been performed, and/or CPT® 76817 for a transvaginal ultrasound
OB-15: Macrosomia

- See: OB-8.2: Macrosomia-Large for Dates Current Pregnancy
- See: OB-11.4: High Risk Group Four
<table>
<thead>
<tr>
<th>OB-16: Multiple Pregnancies</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OB-16.1: For Suspected multiple pregnancies:</td>
<td>66</td>
</tr>
<tr>
<td>OB-16.2: For Known dichorionic multiple pregnancies</td>
<td>66</td>
</tr>
<tr>
<td>OB-16.3: For Known monochorionic-diamniotic or monochorionic-monoamniotic multiple pregnancies:</td>
<td>67</td>
</tr>
</tbody>
</table>
OB-16.1: For Suspected multiple pregnancies:

For Suspected multiple pregnancies:
- Ultrasound is appropriate to confirm suspected multiple pregnancy (CPT® 76801[plus CPT® 76802 if more than one fetus]) if less than 14 weeks.

OB-16.2: For Known dichorionic multiple pregnancies:

For Known dichorionic multiple pregnancies:
- CPT® 76811[plus CPT® 76812 if more than one fetus] if greater than 14 weeks if a complete detailed anatomic scan CPT® 76811 has not yet been performed during this pregnancy
- Follow-up ultrasounds for all known dichorionic multiple pregnancies:
  - Ultrasound (CPT® 76816) every 4 to 6 weeks to assess fetal growth starting at 23 to 24 weeks gestation
  - Transvaginal ultrasound (CPT® 76817) is recommended only in twin gestations with significant cervical shortening ≤ 1.5 cm on a transabdominal evaluation ONLY if rescue cerclage is being considered. Send all these requests to MD Review
  - Weekly BPP (CPT® 76818 or CPT® 76819) or 76815 for AFI with NST, starting at 32 weeks or sooner if additional risk factors
  - Twice weekly BPP can be considered in rare clinical circumstances. These requests will be forwarded for Medical Director review
  - If discordant twins ≥ 20%. See practice note below. Twice weekly BPP plus ultrasound (CPT® 76816) every 2 to 4 weeks, and umbilical artery Doppler (CPT® 78620) weekly; for twice weekly imaging send to MD review
  - If FGR is diagnosed, weekly umbilical artery Doppler and/or Middle Cerebral Artery Doppler (CPT® 76820 and/or CPT® 76821)
  - If IVF dichorionic twins, report initial fetal echo as CPT® 76825 and/or CPT® 76827 and/or CPT® 93325. Transabdominal fetal echo is usually not performed prior to 16 weeks. Follow-up echo requests will be sent to Medical Director review
  - If other high risk factors, see: OB-11: High Risk Pregnancy
**OB-16.3: For Known monochorionic-diamniotic or monochorionic-monoamniotic multiple pregnancies**

<table>
<thead>
<tr>
<th>For Known monochorionic-diamniotic or monochorionic-monoamniotic multiple pregnancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT® 76811 [plus CPT® 76812 if more than one fetus] if greater than 14 weeks if a complete detailed anatomic scan CPT® 76811 has not yet been performed during this pregnancy.</td>
</tr>
<tr>
<td>Ultrasound (CPT® 76816) every 2 to 4 weeks to assess fetal growth starting at 16 weeks gestation</td>
</tr>
<tr>
<td>Transvaginal ultrasound (CPT® 76817) is recommended only in twin gestation with significant cervical shortening ≤ 1.5 cm on a transabdominal evaluation if rescue cerclage is a consideration. Send all these requests to MD Review</td>
</tr>
<tr>
<td>Weekly BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST, starting at 32 weeks, sooner if additional risk factors are present.</td>
</tr>
<tr>
<td>Fetal middle cerebral artery (MCA) Doppler (CPT® 76821) every 2 to 3 weeks starting at 16 weeks to monitor for twin-twin transfusions syndrome (TTTS) and may be continued every 2 to 3 weeks to monitor for twin anemia polycythemia sequence (TAPS) until delivery. If Twin to Twin Transfusion syndrome is suspected due to one twin failing to grow compared with the other twin, daily evaluation (CPT® 76815), and/or CPT® 76818 or CPT® 76819) and/or umbilical artery Doppler (CPT® 76820) can be performed to aid in planning intervention and/or imminent delivery</td>
</tr>
<tr>
<td>If discordant twins ≥ 20%. See practice note below Twice weekly BPP plus ultrasound (CPT® 76816) every 2 to 4 weeks, and umbilical artery Doppler (CPT® 76820) weekly.</td>
</tr>
<tr>
<td>Daily fetal testing may be indicated if umbilical Doppler is abnormal. These requests will be forwarded for Medical Director for review.</td>
</tr>
<tr>
<td>Fetal echo CPT® 76825 and/or CPT® 76827 and/or CPT® 93325 for initial echo. Transabdominal fetal echo is usually not performed prior to 16 weeks. For follow-up echo, send to MD review.</td>
</tr>
<tr>
<td>If FGR is diagnosed, weekly umbilical artery Doppler CPT® 76820 and/or weekly Middle Cerebral Artery Doppler (CPT® 76821)</td>
</tr>
<tr>
<td>If other high risk factors, see OB-11.1: High Risk Group One-Risk Factors</td>
</tr>
<tr>
<td>Triplet or higher Multiple Pregnancy receive same imaging as monochorionic-diamniotic- and monochorionic-monoamniotic- twins.</td>
</tr>
<tr>
<td>These requests will be forwarded for Medical Director review.</td>
</tr>
</tbody>
</table>

**Practice Notes**

**Discordant twins**
Birth weight discordance = (larger twin weight minus smaller twin weight) divided larger twin weight × 100.

**Cervical Length Screening**
Cervical length screening is not recommended in twin gestation. The use of a rescue cerclage when cervical dilation is present has been shown to be beneficial. For this reason, a cervical length under 1.5 cm is required for evaluation. In select cases, a TV ultrasound may be indicated. These require approval from the Medical Director. Cerclage is used in some cases of TTTS due to polyhydramnios causing the short cervix. Also, rescue cerclage is still used in those with a dilated cervix.
Surviving fetus(es) in multifetal pregnancy complicated by demise of one fetus/fetal reduction:

- Fetal loss of one twin during the first trimester does not appear to increase the risk of FGR or preterm delivery in the surviving twin.
- Loss for one fetus after 17 weeks gestation increases the risk of low birth weight and preterm delivery (compared to singleton pregnancies.). Multiple pregnancies affected by loss of one or more fetus(es) after 17 weeks or by fetal reduction should be imaged according to OB 16.
- Monochorionic twin pregnancies with demise of one twin after 17 weeks have 17% chance of major morbidity or mortality for the remaining fetus, these cases should be sent for Medical Director review.

References


OB-17: Previous C-section or History of Uterine Scar

OB-17.1: Previous C-section or History of Uterine Scar
### OB-17.1: Previous C-section or history of uterine scar

<table>
<thead>
<tr>
<th>If patient has had a previous Cesarean section and/or uterine scar</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ One ultrasound can be performed to confirm dates</td>
</tr>
<tr>
<td>➢ CPT® 76801 [plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed, OR CPT® 76815 for limited ultrasound if complete ultrasound has already been performed, and/or CPT® 76817 for a transvaginal ultrasound indicated if less than 14 weeks</td>
</tr>
<tr>
<td>➢ CPT® 76805 for fetal anatomic scan is ideally performed between 18 to 20 weeks but must be performed after 16 weeks, if earlier send to MD Review</td>
</tr>
<tr>
<td>➢ One growth scan (CPT® 76816) at 32 weeks and one growth scan between 36 and 38 weeks (CPT® 76816)</td>
</tr>
</tbody>
</table>

**References**

OB-18.1: Late-Term/Postterm Pregnancy

Follow-up ultrasound (CPT® 76816) every 2 weeks (≥ 40 weeks gestation) to evaluate fetal growth

- Weekly biophysical profile (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST, starting at 40 weeks
- Then twice weekly, BPP (CPT® 76818 or CPT® 76819) or CPT® 76815 for AFI with NST at 41 weeks or greater

Practice Note
In post-date pregnancy, uterine artery Doppler velocimetry (CPT® 93976) has not been found to be useful.

Reference
OB-19: Preterm/Prelabor Rupture of Membranes

OB-19.1: Current Preterm Prelabor Rupture of Membranes (PPROM) 75

OB-19.2: Current Prelabor Rupture of Membranes (PROM) 75

See also: OB-4: Amniotic Fluid Abnormalities/ Oligohydramnios/ Polyhydramnios

See also: OB-13.2: Cerclage in place in current pregnancy
OB-19.1: Current Preterm Prelabor Rupture of Membranes (PPROM)

- Less than or equal to 36 6/7 weeks. Requests will be forwarded to Medical Director review.
  - This is likely a hospital admission for evaluation and monitoring until delivery.
  - In rare cases, outpatient monitoring has been performed (refer to Medical Director for review)

OB-19.2: Current Prelabor Rupture of Membranes (PROM)

- Greater than or equal to 37 weeks. Requests will be forwarded to Medical Director for review.
  - This will likely result in a hospital admission for delivery

References

OB-20.1: Third Trimester Imaging – Ultrasound

Imaging in the third trimester is indicated for bleeding, pain, absent fetal heart tone, decreased fetal movement and/or other high-risk indications. (see: OB-11: High Risk Pregnancy)

For suspected breech position, see: OB-2: Abnormal Fetal Position or Presentation

Reference
OB-21.1: Uncertain Dates/Unknown Last Menstrual Period (LMP)

- The **low-risk pregnancy** that has no other indications for ultrasound should have a fetal anatomic ultrasound (CPT® 76805) performed at 16 weeks or greater. The timing can be determined by fundal height. (See: **OB-5: Fetal Anatomic Scan**).

- If there is a difference between the clinical size of the uterus on pelvic exam and the projected gestational age **and** the date of the last menstrual period is uncertain or there have been irregular periods in the past year, one ultrasound can be performed to confirm dates:
  - (CPT® 76801) [plus CPT® 76802 if more than one fetus] and/or CPT® 76817 for a transvaginal ultrasound if less than 14 weeks and a complete ultrasound has not yet been performed
  - CPT® 76805 (plus CPT® 76810 if more than one fetus) if equal to or greater than 14 weeks when complete fetal anatomic scan CPT® 76805 is planned and has not yet been performed.
  - CPT® 76815

References

   [http://journals.lww.com/greenjournal/Abstract/2016/12000/Practice_Bulletin_No__175_Summary_Ultrasound_in.50.aspx](http://journals.lww.com/greenjournal/Abstract/2016/12000/Practice_Bulletin_No__175_Summary_Ultrasound_in.50.aspx).

   [http://journals.lww.com/obgynsurvey/Abstract/2014/08000/Fetal_Imaging___Executive_Summary_of_a_Joint.4.aspx](http://journals.lww.com/obgynsurvey/Abstract/2014/08000/Fetal_Imaging___Executive_Summary_of_a_Joint.4.aspx).
OB-22.1: Unequal Fundal Size and Dates

First trimester early second trimester

- If there is a difference between the clinical size of the uterus on pelvic exam and the projected gestational age.
  - In the first trimester: (CPT® 76801) [plus CPT® 76802 if more than one fetus] and/or CPT® 76817 for a transvaginal ultrasound if less than 14 weeks and a complete ultrasound has not yet been performed or 76815
  - Between 14 and 23 weeks: CPT® 76805 (plus CPT® 76810 if more than one fetus) if equal to or greater than 14 weeks when complete fetal anatomic scan CPT® 76805 is planned and has not yet been performed.

Unequal fundal size is defined as more than a 3 week difference in fundal height and gestational age at 23 weeks gestation or greater.

- One ultrasound can be performed (CPT® 76805) if complete fetal anatomic scan is planned and has not been performed or CPT® 76816 if CPT® 76805 complete anatomic scan or detailed ultrasound CPT® 76811 has been done previously.

References

<table>
<thead>
<tr>
<th>OB-23: Adnexal mass/Uterine Fibroids and Uterine Anomalies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OB-23.1: Uterine Anomalies or Adnexal/Pelvic Masses</strong> 83</td>
</tr>
<tr>
<td><strong>OB 23.2: Uterine fibroids in pregnancy</strong> 83</td>
</tr>
<tr>
<td><strong>OB 23.3: Uterine anomalies in pregnancy</strong> 84</td>
</tr>
</tbody>
</table>
OB-23.1: Adnexal Mass

Ultrasound can be performed for a known or suspected adnexal/pelvic mass.

- **First trimester:** CPT® 76801 [plus CPT® 76802 if more than one fetus] and/or CPT® 76817 for a transvaginal ultrasound to establish dates
- If a complete ultrasound was done previously CPT® 76815 and/or CPT® 76817 for a transvaginal ultrasound.

- **Second or third trimester:** CPT® 76805 [plus CPT® 76810 if more than one fetus] if a complete fetal anatomic scan has not yet been performed, or CPT® 76815 or CPT® 76816 if a complete fetal anatomic scan was done previously.

- Following the initial ultrasound, follow up can be done once in each trimester,
  - CPT® 76805 [plus CPT® 76810 if more than one fetus] if a complete fetal anatomic scan has not yet been performed, **or**
  - CPT® 76815 or CPT® 76816 if a complete fetal anatomic scan was done previously.

- MRI pelvis (CPT 72195) without contrast can be done if additional imaging is needed due to indeterminate findings of possible dermoid or endometrioma on ultrasound, or for suspected malignancy.

- See PV-5: Adnexal Mass/Ovarian Cysts

**Practice note:**

the majority of adnexal mass in pregnancy are benign, the most common diagnoses are mature teratomas and corpus luteum or paraovarian cysts. Malignancy is reported in only 1.2-6.8% of pregnant patients with persistent mass.

Levels of CA-125 are elevated in pregnancy, a low-level elevation in pregnancy is not typically associated with malignancy.

**OB 23.2: Uterine fibroids in pregnancy**

- If more than one fibroid, total size of all fibroids should be used, ie-one fibroid at 2 cm and one 3 cm is total of 5 cm and imaging would be indicated as below:
  - **Moderate** (over 5 cm) and **large** (over 10 cm) fibroid(s):
    - **First trimester:** CPT® 76801 [plus CPT® 76802 if more than one fetus] and/or CPT® 76817 for a transvaginal ultrasound to establish dates
    - **Fetal anatomic scan at 16 weeks or greater** (CPT® 76805 or if meets criteria in OB-11: High Risk Pregnancy— CPT® 76811)
    - **Starting after the fetal anatomic scan at 16 weeks or greater,** if the fibroid is in the lower uterine segment or cervical fibroid then ultrasound (CPT® 76815) every 2 to 4 weeks and/or transvaginal ultrasound (CPT® 76817) every 2 weeks until 24 weeks
    - Ultrasound (CPT® 76816) for growth at 24 weeks and then every 3 to 6 weeks.
**Practice Note**

The true incidence of fibroids during pregnancy is unknown. The reported rates vary from as low as 0.1% of all pregnancies to higher rates of 12.5%. It seems that pregnancy has little or no effect on the overall size of fibroids despite the occurrence of red degeneration in early pregnancy. Fibroids, however, affect pregnancy and delivery in several ways, with abdominal pain, miscarriage, malpresentation, and difficult delivery being the most frequent complications. The major concerns occur late in pregnancy. These complications relate to preterm labor, placental abruption, fetal growth restriction, and fetal compression syndromes. The risk of preterm labor appears to correlate with the size of the fibroid (over 600 cm$^3$) and/or the presence of multiple fibroids. Placental abruption has been reported to occur frequently in pregnancies complicated by fibroids.

Placentation over a fibroid appears to be a strong risk factor for abruption. There does not appear to be any association of fetal growth restriction with small fibroids. However, when the fibroid volume is $>200$ cm$^3$ fetal growth restriction appears more commonly. Fetal compression syndrome is a direct result of large fibroids and is not associated with commonly found small fibroids. Finally, malposition or obstructed labor is associated with fibroids of the lower uterine segment.

**OB 23.3: Uterine anomalies in pregnancy**

For uterine septum, uterine didelphys, unicornuate uterus, bicornuate uterus one ultrasound can be performed to confirm dates:

- Ultrasound CPT® 76801[plus CPT® 76802 if more than one fetus] if a complete ultrasound has not yet been performed once in first trimester, or CPT® 76815 for limited ultrasound if a complete ultrasound CPT® 76801 has already been performed and/or CPT® 76817 for transvaginal ultrasound once in first trimester (less than 14 weeks)
- Ultrasound is supported at 16 weeks or greater: CPT® 76805 [plus CPT® 76810 if more than one fetus] if a complete detailed fetal anatomic scan has not been done and/or CPT® 76817
- Starting after the fetal anatomic scan at 16 weeks or greater, ultrasound (CPT® 76815) every 2 to 4 weeks and/or transvaginal ultrasound (CPT® 76817) every 2 weeks until 24 weeks
- Starting at 23 to 24 weeks, follow-up growth scans (CPT® 76816) every 3 to 6 weeks
- Starting at 32 weeks, weekly BPP (CPT® 76818 or CPT® 76819) or AFI (CPT® 76815) with NST
References


## OB-24: Procedure Coding Basics for Established Pregnancy

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| OB-24.1: OB Ultrasound Code Selection | 88  |
| OB-24.2: Required Elements for First Trimester OB Ultrasound | 89  |
| OB-24.3: Required Elements for Second or Third Trimester Fetal Anatomic Evaluation OB Ultrasound | 90  |
| OB-24.4: Required Elements for a Detailed Fetal Anatomic Evaluation OB Ultrasound | 92  |
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| OB-24.8: Biophysical Profile (BPP) | 97  |
| OB-24.9 Fetal Doppler | 98  |
| OB-24.10: Duplex Scan (Uterine Artery) | 100 |
| OB-24.11: Fetal Echocardiography | 102 |
| OB-24.12: 3D and 4D Rendering | 103 |
Procedure Coding Basics for Established Pregnancy General Considerations

A Duplex scan describes:
1. An ultrasonic scanning procedure for characterizing the pattern and direction of blood flow in arteries and veins with the production of real-time images integrating B-mode two dimensional vascular structure, and
2. Doppler spectral analysis, and
3. Color flow Doppler imaging

The use of a hand-held or any Doppler device that does not create a hard-copy output is considered part of the physical examination and is not separately billable. This exclusion includes devices that produce a record that does not permit analysis of bi-directional vascular flow.

The minimal use of color Doppler alone, when performed for anatomical structure identification, during a standard ultrasound procedure, is not separately reimbursable.

- All obstetric ultrasound studies require permanently recorded images:
  - These images may be stored on film or in a Picture Archiving and Communication System (PACS).
  - Obstetric ultrasound services may not be billed without image recording.
  - The use of a hand-held or any Doppler device that does not create a hard-copy output is considered part of the physical examination and is not separately reimbursable.

- Ultrasound procedure codes include the preparation of a required final written report which should be included in the patient's medical record.
  - Each procedure code has specific required elements which are described in this section.
  - The report should document the results of the evaluation of each element or the reason any element is non-visualized.
  - Documentation of less than the required elements requires the billing of the "limited" code for that anatomic region.
  - Only one (1) limited exam may be billed per encounter.
OB-24.1: OB Ultrasound Code Selection

It is not appropriate to report non-obstetrical pelvic ultrasound procedure codes (CPT® 76830, CPT® 76856, and CPT® 76857) if pregnancy has already been diagnosed.

<table>
<thead>
<tr>
<th>CPT® Code Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The OB ultrasound CPT® codes should be selected based on the following criteria.</td>
</tr>
<tr>
<td>➤ The length of gestation:</td>
</tr>
<tr>
<td>♦ CPT® 76801 and CPT® 76802 are reported for complete studies performed during the first trimester (&lt; 14 weeks).</td>
</tr>
<tr>
<td>♦ CPT® 76801 and CPT® 76802 should only be used once per pregnancy unless the mother changes to a new medical caregiver at a new office and there is a medical indication for ultrasound.</td>
</tr>
<tr>
<td>♦ CPT® 76805 and CPT® 76810 are used to report complete studies (anatomy scan) performed during the second and third trimester.</td>
</tr>
<tr>
<td>♦ CPT® 76805 and CPT® 76810 should only be used once per pregnancy unless the mother changes to a new medical caregiver at a new office and there is a medical indication for ultrasound.</td>
</tr>
<tr>
<td>➤ The number of fetuses:</td>
</tr>
<tr>
<td>♦ CPT® 76802, CPT® 76810, CPT® 76812, and CPT® 76814 are “add-on” codes used to report each additional fetus.</td>
</tr>
<tr>
<td>➤ The imaging approach:</td>
</tr>
<tr>
<td>♦ CPT® 76817 is used to report a transvaginal ultrasound. The other OB ultrasound codes are used for transabdominal studies.</td>
</tr>
<tr>
<td>➤ Whether the study is Complete or Limited:</td>
</tr>
<tr>
<td>♦ CPT® 76816 is used to report follow up studies requiring more information, such as growth scans or follow up on anatomy when more than one area is examined.</td>
</tr>
<tr>
<td>♦ CPT® 76815 is used to report limited follow-up studies.</td>
</tr>
<tr>
<td>➤ Whether a detailed fetal anatomic evaluation is performed:</td>
</tr>
<tr>
<td>♦ CPT® 76811 and CPT® 76812 describe an extensive fetal ultrasound evaluation and detailed anatomic survey and are used only when the study includes this service.</td>
</tr>
<tr>
<td>♦ CPT® 76812 is an add-on for each additional fetus.</td>
</tr>
<tr>
<td>♦ Any follow-up ultrasound for CPT® 76811 should be coded as CPT® 76816</td>
</tr>
</tbody>
</table>
OB-24.2: Required Elements for First Trimester OB Ultrasound

- Determination of the number of gestational sacs and fetuses
- Gestational sac/fetal measurements appropriate for gestation (< 14 weeks)
- Survey of visible fetal anatomic structures and placental evaluation when possible
- Qualitative assessment of amniotic fluid volume/gestational sac shape
- Examination of maternal uterus and adnexa

A complete first-trimester transabdominal ultrasound (CPT® 76801 and CPT® 76802) is defined in CPT® as including the following elements:

<table>
<thead>
<tr>
<th>CPT® Code Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>It may not be possible to visualize the placenta during the early weeks of pregnancy. CPT® 76801 and/or CPT® 76802 may still be appropriately billed if the report documentation indicates placental anatomic structure could not be evaluated due to gestational age.</td>
</tr>
<tr>
<td>CPT® 76802 is an ‘add-on’ code reported in conjunction with the ‘primary procedure’ CPT® 76801 to report each additional gestation.</td>
</tr>
<tr>
<td>CPT® 76801 and CPT® 76802 should only be reported once per pregnancy unless the mother changes to a new medical caregiver at a new office and there is a medical indication for ultrasound. Follow-up studies to CPT® 76801 and CPT® 76802 should be reported as CPT® 76815</td>
</tr>
</tbody>
</table>
### OB-24.3: Required Elements for Second or Third Trimester Fetal Anatomic Evaluation OB Ultrasound

<table>
<thead>
<tr>
<th>CPT® Code Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A complete second or third trimester transabdominal ultrasound (CPT® 76805 and CPT® 76810) is defined in CPT® as including the following elements:</td>
</tr>
<tr>
<td>- Head, face, and neck</td>
</tr>
<tr>
<td>- Lateral cerebral ventricles;</td>
</tr>
<tr>
<td>- Choroid plexus;</td>
</tr>
<tr>
<td>- Midline falx;</td>
</tr>
<tr>
<td>- Cavum septi pellucidi;</td>
</tr>
<tr>
<td>- Cerebellum;</td>
</tr>
<tr>
<td>- Cistern magna; and</td>
</tr>
<tr>
<td>- Upper lip</td>
</tr>
<tr>
<td>- A measurement of the nuchal fold may be helpful during a specific age interval to assess the risk of aneuploidy.</td>
</tr>
<tr>
<td>- Chest/Heart</td>
</tr>
<tr>
<td>- Four-chamber view;</td>
</tr>
<tr>
<td>- Left ventricular outflow tract; and</td>
</tr>
<tr>
<td>- Right ventricular outflow tract.</td>
</tr>
<tr>
<td>- Abdomen:</td>
</tr>
<tr>
<td>- Stomach (presence, size, and situs);</td>
</tr>
<tr>
<td>- Kidneys;</td>
</tr>
<tr>
<td>- Urinary bladder;</td>
</tr>
<tr>
<td>- Umbilical cord insertion site into the fetal abdomen; and</td>
</tr>
<tr>
<td>- Umbilical cord vessel number.</td>
</tr>
<tr>
<td>- Spine:</td>
</tr>
<tr>
<td>- Cervical, thoracic, lumbar, and sacral spine.</td>
</tr>
<tr>
<td>- Extremities:</td>
</tr>
<tr>
<td>- Legs and arms.</td>
</tr>
<tr>
<td>- Genitalia:</td>
</tr>
<tr>
<td>- In multiple gestations and when medically indicated</td>
</tr>
<tr>
<td>- Placenta</td>
</tr>
<tr>
<td>- Location</td>
</tr>
<tr>
<td>- Relationship to internal os</td>
</tr>
<tr>
<td>- Appearance</td>
</tr>
<tr>
<td>- Placental cord insertion (when possible)</td>
</tr>
<tr>
<td>- Standard evaluation</td>
</tr>
<tr>
<td>- Fetal number</td>
</tr>
<tr>
<td>- Presentation</td>
</tr>
<tr>
<td>- Qualitative or semi-qualitative estimate of amniotic fluid</td>
</tr>
<tr>
<td>- Maternal anatomy</td>
</tr>
<tr>
<td>- Cervix (transvaginal if cervical length is ≤ 3 cm)</td>
</tr>
<tr>
<td>- Uterus</td>
</tr>
<tr>
<td>- Adnexa</td>
</tr>
<tr>
<td>- Biometry</td>
</tr>
<tr>
<td>- Biparietal diameter</td>
</tr>
<tr>
<td>- Head circumference</td>
</tr>
<tr>
<td>- Femur length</td>
</tr>
<tr>
<td>- Abdominal circumference</td>
</tr>
</tbody>
</table>
Fetal weight estimate

CPT® 76810 is an ‘add-on’ code used with the ‘primary procedure’ CPT® 76805 to report each additional gestation.

CPT® 76805 and CPT® 76810 **should only be used once per pregnancy** unless the mother changes to a new medical caregiver at a new office and there is a medical indication for ultrasound. Follow-up studies to CPT® 76805 and CPT® 76810 should be coded as CPT® 76815 or CPT® 76816.

References
**OB-24.4: Required Elements for a Detailed Fetal Anatomic Evaluation**

**OB Ultrasound**

<table>
<thead>
<tr>
<th>CPT® Code Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance of the specialized fetal anatomic evaluation (CPT® 76811 and CPT® 76812) should be limited to those with special skills to perform this study, such as Maternal Fetal Medicine specialists, Perinatologists, and Radiologists (with advanced training in fetal imaging).</td>
</tr>
</tbody>
</table>

CPT® 76811 and CPT® 76812 are defined in CPT® as including all of the requirements listed for CPT® 76805 and CPT® 76810. In addition, the report must document detailed anatomic evaluation of the following elements:

- Head, face, and neck
- 3rd ventricle
- 4th ventricle
- Lateral ventricles
- Cerebellar lobes, vermis, and cisterna magna
- Corpus callosum
- Integrity and shape of cranial vault
- Brain parenchyma
- Neck
- Profile
- Coronal face (nose/lips/lensa)
- Palate, maxilla, mandible, and tongue
- Ear position and size
- Orbits
- Chest/Heart
- Aortic arch
- Superior and inferior vena cava
- 3-vessel view
- 3-vessel and trachea view
- Lungs
- Integrity of diaphragm
- Ribs
- Abdomen:
  - Small and large bowel
  - Adrenal glands
  - Gallbladder
- Liver
- Renal arteries
- Spleen
- Integrity of abdominal wall
- Spine:
  - Integrity of spine and overlying soft tissue
  - Shape and curvature
- Extremities:
  - Number: architecture and position
  - Hands
  - Feet
  - Digits: number and position
- Genitalia
CPT® Code Guidance

- Sex
- Placenta
- Masses
- Placental cord insertion
- Accessory/succenturiate lobe with location of connecting vascular supply to primary placenta
- Biometry
- Cerebellum
- Inner and outer orbital diameters
- Nuchal thickness (16 to 20 wk)
- Nasal bone measurement (15 to 22 wk)
- Humerus
- Ulna/radius
- Tibia/fibula
- Maternal Anatomy
- Cervix (transvaginal if cervical length is ≤ 3.0cm
- Uterus
- Adnexa

- CPT® 76812 is an ‘add-on’ code used with the ‘primary procedure’ CPT® 76811 to report each additional gestation.
- These studies are usually performed at 18 to 20 weeks and are most often completed at tertiary referral centers with perinatology departments.
- Only one medically indicated procedure CPT® 76811 per pregnancy, per practice (per NPI) is appropriate. *Follow-up studies should be coded as CPT® 76815 or CPT® 76816
References


OB-24.5: Fetal Nuchal Translucency

<table>
<thead>
<tr>
<th>CPT® Code Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>➤ CPT® 76813 and CPT® 76814 describe ultrasound measurement of the clear (translucent) space at the back of the fetal neck to assess risk for Down Syndrome (Trisomy 21), Trisomy 18, and other genetic disorders.</td>
</tr>
<tr>
<td>➤ NT is performed when the crown rump length 44-83 mm. This is typically at a gestational age of approximately 11 to 13 6/7 weeks</td>
</tr>
<tr>
<td>➤ CPT® 76813 can be performed if the CRL measures between 44-83mm regardless of gestational age</td>
</tr>
<tr>
<td>➤ Biochemistry testing is 10 to 14 weeks</td>
</tr>
<tr>
<td>➤ The sonographer performing the study and the physician interpreting the study must be credentialed by the Maternal Fetal Medicine Foundation or Nuchal Translucency Quality Review Program (NTQR).</td>
</tr>
<tr>
<td>➤ CPT® 76814 is an add-on for each additional fetus.</td>
</tr>
</tbody>
</table>

The first trimester screening is typically done between 11 and 13 6/7 weeks (CRL between 44 and 83 millimeters); abnormal Fetal Nuchal Translucency scan (if ≥ 2.5 mm there is an increased risk for aneuploidy, imaging should be based upon the MOM for NT and biochemical markers, ≥ 3 mm increased risk for cardiac defects, abdominal wall defects, diaphragmatic hernia, and genetic syndromes in euploid fetuses) during current pregnancy.

**Practice Note**

Required elements of the 76813 ultrasound code include:

➤ Fetal crown-rump measurement
➤ Observation of fetal cardiac activity
➤ Observation of the embryo at high magnification until the embryonic neck is in a neutral position and spontaneous embryonic movement allows for differentiation between the outer edge of the nuchal skin and the amnion
➤ At least three separate measurements of the largest distance between the inner borders of the fetal nuchal translucency
➤ Comparison of the largest nuchal translucency measurement from an acceptable image to crown-rump length and gestational age-specific medians
➤ Written documentation of each component of the examination and permanent documentation of ultrasound images.

The use of ultrasound codes (CPT® 76801/ CPT® 76802) should be indication driven and should not be routinely done whenever an ultrasound for nuchal translucency (CPT® 76813/ CPT® 76814) is requested. In cases where there is either a maternal and/or fetal indication, then the CPT® 76801 code can indeed be billed along with the nuchal translucency screening (CPT® 76813/ CPT® 76814).

**References**

## OB-24.6: Limited and Follow-Up Studies

### CPT® Code Guidance

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPT® 76815</strong></td>
<td>describes a limited or “quick look” study used to report one or more of the elements listed in the code definition, i.e. “fetal heartbeat”, placental location or fluid check (re: modified BPP which is NST with CPT® 76815)</td>
</tr>
<tr>
<td>-</td>
<td>Reported only once, regardless of the number of fetuses, and only once per date of service</td>
</tr>
<tr>
<td>-</td>
<td>CPT® 76815 should never be reported with complete studies CPT® 76801/ CPT® 76802 and CPT® 76805/ CPT® 76810.</td>
</tr>
<tr>
<td>-</td>
<td>CPT® 76816 describes a follow-up ultrasound (eg, re-evaluation of fetal size by measuring standard growth parameters and amniotic fluid volume, re-evaluation of organ system(s) suspected or confirmed to be abnormal on a previous scan), trans-abdominal approach, per fetus.</td>
</tr>
<tr>
<td>-</td>
<td>The use of this CPT code is reserved for subsequent follow up ultrasound only; i.e. An ultrasound must have been performed previously.</td>
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<tr>
<td>-</td>
<td>Components include: Focused assessment of fetal size by measuring BPD, abdominal circumference, femur length, or other appropriate measurement; and amniotic fluid volume</td>
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<tr>
<td>-</td>
<td>Detailed re-examination of a specific organ or system known or suspected to be abnormal</td>
</tr>
<tr>
<td>-</td>
<td>CPT® 76816 should be reported once per fetus evaluated in follow-up.</td>
</tr>
<tr>
<td>-</td>
<td>Modifier -59 is appropriately used on subsequent codes. For example, a follow-up of a twin pregnancy is reported: CPT® 76816 and CPT® 76816-59.</td>
</tr>
<tr>
<td>-</td>
<td>CPT® 76816 should never be reported with complete studies CPT® 76801, CPT® 76802 and CPT® 76805, CPT® 76810.</td>
</tr>
<tr>
<td>-</td>
<td>CPT® 76816 should not be performed prior to a CPT® 76801 and/or an anatomy scan CPT® 76805 (normal pregnancy) or Detailed anatomy scan CPT® 76811 (high risk pregnancy).</td>
</tr>
</tbody>
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OB-24.7: Obstetric Transvaginal Ultrasound

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<th>CPT® Code Guidance</th>
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<tbody>
<tr>
<td>CPT® 76817 is used to report an obstetric transvaginal ultrasound.</td>
</tr>
<tr>
<td>Although an obstetrical transvaginal ultrasound and transabdominal ultrasound can be performed at the same sitting and reported as two codes, there is rarely a medical indication to perform both studies at once.</td>
</tr>
</tbody>
</table>

OB-24.8: Biophysical Profile (BPP)

- The BPP combines data from ultrasound imaging and fetal heart rate (FHR) monitoring and is designed to predict the presence or absence of fetal asphyxia and, ultimately the risk of fetal death in the antenatal period (appropriately performed > 24 weeks; should NOT be performed prior to the time when the fetus would be viable outside of the uterus).
- Typically all components of the BPP, such as breathing, are not present until 26 weeks gestation. However, BPP may be utilized below 26 weeks in cases of FGR (with Doppler studies). The following parameters are evaluated:
  - Fetal breathing movements
  - Gross fetal body movements
  - Fetal tone
  - Qualitative amniotic fluid volume, at least one vertical pocket 2 x 2 cm
  - Reactive FHR (non-stress testing portion)

<table>
<thead>
<tr>
<th>CPT® Code Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT® 76818 includes non-stress testing.</td>
</tr>
<tr>
<td>CPT® 76819 does not include the non-stress testing portion.</td>
</tr>
<tr>
<td>If non-stress testing is performed without BPP, the appropriate code to use is CPT® 59025 (Fetal non-stress test). CPT® 59025 should not be reported with codes CPT® 76818 or CPT® 76819.</td>
</tr>
<tr>
<td>Although obstetrical ultrasound (CPT® codes: CPT® 76805, CPT® 76810, CPT® 76815, CPT® 76816, CPT® 76820) and BPP (CPT® 76818 and CPT® 76819) can be performed at the same sitting and reported as two codes, it is generally not necessary to perform both studies at once.</td>
</tr>
</tbody>
</table>
  - There are certain clinical circumstances in which it would be medically indicated to perform both studies at once. |
  - Each study must have separate images, interpretations, and reports |
| BPP and/or non-stress testing, performed on more than one fetus, should be reported separately. The use of modifier -59 on the second and subsequent studies is appropriate, depending on payer policy. |

**Practice Note**
If BPP ≤ 6, repeat BPP in 24 hours
OB-24.9: Fetal Doppler

### CPT® Code Guidance

- CPT® 76820 describes Doppler velocimetry of the umbilical artery
  - Utilized for known FGR; see: [OB-8.1 Fetal Growth Restriction Current Pregnancy](#) and known oligohydramnios. See: [OB-4.1 Amniotic Fluid Abnormalities](#), and is typically performed > 22 weeks gestation. It may also be indicated with known twin to twin transfusion or known discordant twins (See: [OB-16 Multiple Pregnancies](#)) Its use to predict preeclampsia, and stillbirth is considered investigational.

- CPT® 76821 describes Doppler velocimetry of the middle cerebral artery.
  - MCA Doppler (CPT® 76821), starting at 34 weeks, if Doppler CPT® 76820 is normal.
  - Performed as a substitute for amniocentesis to evaluate a fetus at risk for anemia due to Rhesus isoimmunization/alloimmunization, Twin anemia polycythemia sequence and non-immune hydrops caused by parvovirus B19 infection or any other known acquired or congenital cause of fetal anemia. See [OB-3.1: Alloimmunization/RH Isoimmunization/Other Causes of Fetal Anemia](#) - 3.4 Fetal Hydrops Associated with Polyhydramnios, and [OB-16: Multiple Pregnancies](#)

### Practice Notes

- **Middle Cerebral Artery Doppler (MCA):** Doppler flow studies of the MCA are used in the assessment of the fetus at risk for anemia see: [OB-3: Alloimmunization/RH Isoimmunization/Other Causes of Fetal Anemia/Parvo/Hydrops](#) and monochorionic twin pregnancies see: [OB-17: Previous C-section](#)
- In the preterm SGA/FGR fetus, middle cerebral artery (MCA) Doppler has limited accuracy to predict acidaemia and adverse outcome; it should not be used to time delivery. Most studies investigating MCA Doppler as a predictor of adverse outcome in preterm SGA/FGR fetuses have reported low predictive value, especially when umbilical artery Doppler is abnormal. In the largest study of predictors of neonatal outcome in SGA/FGR neonates of less than 33 weeks gestational age (n = 604), it was not a statistically significant predictor of outcome on logistic regression, although MCA PI < –2 SDs was associated with neonatal death (LR 1.12, 95% CI 1.04–1.21) and major morbidity (LR 1.12, 95% CI 1.1–1.33).
- In addition, it has been found that umbilical artery Doppler studies are less reliable after 34 weeks as IUGR at 34 weeks or greater is typically characterized by milder placental dysfunction
- In the near-term SGA/FGR fetus with normal umbilical artery Doppler, an abnormal middle cerebral artery Doppler (PI <5th centile) has moderate predictive value for acidaosis at birth and should be used to time delivery. MCA Doppler may be a more useful test in SGA/FGR fetuses detected after 34 weeks of gestation when umbilical artery Doppler is normal. Based on this evidence it is reasonable to use MCA Doppler to time delivery in the near term-term (34 weeks gestation or greater) SGA/FGR fetus with normal umbilical artery Doppler.
References


OB-24.10: Duplex Scan (Uterine Artery)

- Uterine artery Duplex (Doppler) scan (CPT® 93976), evaluation has been shown to predict adverse outcomes when utilized in the first and second trimester, prior to 16 weeks. The clinical utility, however, is limited to the first trimester when low dose Aspirin therapy can be instituted to decrease the risk of adverse outcomes (chronic hypertension, preeclampsia, and possibly FGR). Provider certification, study technique, and abnormal test thresholds have been established by the Fetal Medicine Foundation (similar to the certification process for Nuchal Translucency screening). The Society of Maternal Fetal Medicine (SMFM) has recommended the use of CPT® 93976 only.
- Prophylaxis is now possible if started prior to 16 weeks gestation. Therefore, the use of Uterine Artery Doppler evaluation is now justified when utilized before 16 weeks gestation for patients with chronic hypertension or who are at risk for preeclampsia.
- The CPT® code recommended by SMFM is CPT® 93976 only. Send to Medical Director review if beyond 16 weeks gestation. One time only study.

<table>
<thead>
<tr>
<th>CPT® Code Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPT® 93975</strong> describes a complete duplex scan and should be reported if an organ is evaluated in its entirety. A complete study involves the evaluation of the inflow and outflow vessels of one or more organs. This code is <strong>NOT</strong> used for obstetric imaging.</td>
</tr>
<tr>
<td><strong>CPT® 93976</strong> describes a limited duplex scan and should be reported when a complete study is not documented, for example, in the case of a follow-up study or a study of only the arterial flow.</td>
</tr>
<tr>
<td><strong>CPT® 93976</strong> is used to report a <strong>fetal umbilical-placental flow study</strong>.</td>
</tr>
</tbody>
</table>

References


OB-24.11: Fetal Echocardiography

<table>
<thead>
<tr>
<th>CPT® Code Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>➤ It is inappropriate to report codes CPT® 76825 – CPT® 76828 for the routine monitoring of fetal heart tones using a hand-held or any Doppler device that does not create a hard-copy output. Such fetal heart tone monitoring is considered part of the physical examination and is not separately billable.</td>
</tr>
<tr>
<td>➤ CPT® 76825 describes fetal echocardiography, real time with image documentation (2D), with or without M-mode recording.</td>
</tr>
<tr>
<td>➤ CPT® 76826:</td>
</tr>
<tr>
<td>➤ is a follow-up or repeat fetal echocardiogram</td>
</tr>
<tr>
<td>➤ should never be billed with CPT® 76825</td>
</tr>
<tr>
<td>➤ should never be billed more than once on any date of service</td>
</tr>
<tr>
<td>➤ CPT® 76827 describes a complete Doppler echocardiography, fetal, pulsed wave and/or continuous wave with spectral display.</td>
</tr>
<tr>
<td>➤ CPT® 76828: is a follow-up or repeat Doppler fetal echocardiogram.</td>
</tr>
<tr>
<td>➤ CPT® 93325 is used to report color mapping in conjunction with fetal echocardiography procedures CPT® 76825 – CPT® 76828.</td>
</tr>
</tbody>
</table>

Practice Notes

Doppler of the ductus venosus, Doppler of the ductus arteriosus, and PR Interval measurement.

➤ Ductus venosus Doppler: This is billable when sampled as part of a fetal echocardiogram study. Initial evaluation is reported as 76827; follow-up as 76828. Ductus Venosus Doppler is not billed when it is the sole assessment performed.

➤ Ductus arteriosus Doppler: This is often performed after another ultrasound study, so it is billed as 76828. If performed as part of an initial fetal echocardiogram evaluation, it is billed as 76827 then, and 76828 on subsequent studies.

➤ PR interval measurement: This is often performed after another ultrasound study, so it is billed as 76828. If performed as part of an initial fetal echocardiogram evaluation, it is billed as 76827 then, and 76828 on subsequent studies.

Reference

1. SMFM Coding Committee July 2017 Coding Tip #1: When and how are Ductus Venosus, Ductus Arteriosus and PR Intervals reported.
OB-24.12: 3D and 4D Rendering

- There is currently insufficient data to generate appropriateness criteria for the use of 3D and 4D rendering in conjunction with ultrasound.
- Current guidelines on ultrasonography in pregnancy from ACOG state: “The technical advantages of 3-dimensional ultrasonography include its ability to acquire and manipulate an infinite number of planes and to display ultrasound planes traditionally inaccessible by 2-dimensional ultrasonography. Despite these technical advantages, proof of a clinical advantage of 3-dimensional ultrasonography in prenatal diagnosis, in general, is still lacking. Potential areas of promise include fetal facial anomalies, neural tube defects, and skeletal malformations where 3-dimensional ultrasonography may be helpful in diagnosis as an adjunct to, but not a replacement for, 2-dimensional ultrasonography.”
- Yagel et al described the state of the science of 3D/4D ultrasound (3D/4D US) applications in fetal medicine. They noted that 3D/4D US applications are many and varied. Their use in fetal medicine varies with the nature of the tissue to be imaged and the challenges each organ system presents, versus the advantages of each ultrasound application. The investigators stated that 3D/4D US has been extensively applied to the study of the fetus. Fetal applications include all types of anatomical assessment, morphometry, and volumetry, as well as functional assessment. The authors concluded that 3D/4D US provides many advantages in fetal imaging; however, its contribution to improving the accuracy of fetal scanning over rates achieved with 2D US, remains to be established.
- Clinical use of 3D ultrasound should be on an individual basis. There can be specific reasons that require 3D ultrasound when 2D cannot be utilized. Such as determination of fetal growth when there is absence of lower limbs / femurs. Since the femur length is vital in determination of fetal weight and growth. Fractional limb volume measurement of the humerus is required to evaluate for FGR.
- A second clinical scenario is seen with gastroschisis. Since the fetal abdomen is small due to the defect present, there is artificially high rate of FGR. The cause of this is the use of the fetal abdominal circumference to determine growth. 3D Fractional limb volume measurement eliminates this issue and decreases false positives.

References
OB-24.13: Fetal MRI

CPT® Code Guidance

- Fetal MRI (CPT® 74712); for each additional gestation (CPT® 74713)
- Do not report CPT® 74712 and CPT® 74713 in conjunction with CPT® 72195, CPT® 72196, CPT® 72197
- If only placenta or maternal pelvis is imaged without fetal imaging, use MRI pelvis (CPT® 72195)

Indications for fetal MRI

- Fetal MRI may be considered for surgical planning (re: fetal anomalies), and/or if an ultrasound is equivocal and additional information is needed for counseling purposes, for indications including the following:
  - Brain
    - Congenital anomalies
      - ventriculomegaly
      - corpus callosal dysgenesis
      - holoprosencephaly
      - posterior fossa anomalies
      - malformations of cerebral cortical development
    - Screening fetuses with a family risk for brain anomalies
      - tuberous sclerosis
      - corpus callosal dysgenesis
      - malformations of cerebral cortical development
  - Vascular abnormalities
    - vascular malformations
    - hydranencephaly
    - infarctions
    - monochorionic twin pregnancy complications
  - Spine
    - Congenital anomalies
      - neural tube defects
      - sacrococcygeal teratomas
      - caudal regression/sacral agenesis
      - sirenomelia
      - vertebral anomalies
  - Skull, face, and neck
    - Masses of the face and neck
      - venolymphatic malformations
      - hemangiomas
      - goiter
      - teratomas
      - facial clefts
    - Airway obstruction
      - conditions that may impact parental counseling, prenatal management, delivery planning, and postnatal therapy
Thorax

- Masses
  - congenital pulmonary airway malformations (congenital cystic adenomatoid malformation; sequestration, and congenital lobar emphysema);
  - congenital diaphragmatic hernia
  - effusion
  - Volumetric assessment of lung
  - cases at risk for pulmonary hypoplasia secondary to oligohydramnios, chest mass, or skeletal dysplasias

Abdomen, retroperitoneal and pelvis

- Mass
  - abdominal–pelvic cyst
  - tumors (e.g. hemangiomas, neuroblastomas, sacrococcygeal teratomas, and suprarenal or renal masses)
  - complex genitourinary anomalies (e.g. cloaca)
  - renal anomalies in cases of severe oligohydramnios
  - bowel anomalies such as megacystis microcolon

Complications of monochorionic twins

- delineation of vascular anatomy prior to laser treatment of twins
- assessment of morbidity after death of a monochorionic co-twin
- improved delineation of anatomy in conjoined twins

Fetal surgery assessment

- meningomyelocele
- sacrococcygeal teratomas
- processes obstructing the airway (e.g. neck mass or congenital high airway obstruction)
- complications of monochorionic twins needing surgery
- chest masses

References


3. Uma M. Reddy, MD, MPH, Alfred Z. Abuhamad, MD, Deborah Levine, MD, and George R. Saade, MD, for the Fetal Imaging Workshop Invited Participants* Fetal Imaging Executive Summary of a Joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, Society for Maternal-Fetal Medicine, American Institute of Ultrasound in Medicine, American College of Obstetricians and Gynecologists, American College of Radiology, Society for Pediatric Radiology, and Society of Radiologists in Ultrasound Fetal Imaging Workshop Obstet Gynecol 2014;123:1070–82)


OB-25: High Risk Medications and Substances

- Specific drugs that qualify as risk factors in High Risk Pregnancy and qualify as medical indications for Specialized Fetal Anatomic Scan (CPT® 76811): If another high risk indication see appropriate guideline for any further imaging

**Practice note**
This list is by no means all inclusive

<table>
<thead>
<tr>
<th>High Risk Medications/Substances</th>
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</thead>
<tbody>
<tr>
<td>Alcohol</td>
</tr>
<tr>
<td>Aminoglycosides (amikacin, gentamycin, kanamycin, tobramycin, and other mycins)</td>
</tr>
<tr>
<td>Amphetamines</td>
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<tr>
<td>Angiotensin II antagonists or blockers</td>
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<tr>
<td>Anti-neoplastics (cancer drugs)</td>
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<tr>
<td>Accutane/isoretinoin/retinoic acid</td>
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<tr>
<td>Aspirin – only if exposed less than 10 weeks gestation</td>
</tr>
<tr>
<td>Atenolol</td>
</tr>
<tr>
<td>ACE inhibitors (benzaripril, captopril, enalopril, fosinopril, lisinipril, etc)</td>
</tr>
<tr>
<td>Anticonvulsants (phenytoin, carbamazepine, valproate, primidone, phenobarbital, Dilantin)</td>
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<tr>
<td>Azathioprine</td>
</tr>
<tr>
<td>Benzodiazepines (Diazepam (valium), etc)</td>
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<tr>
<td>Carbon monoxide</td>
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<td>Chlordiazepoxide</td>
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<td>Cocaine</td>
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<tr>
<td>Codeine</td>
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<tr>
<td>Cortisone</td>
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<tr>
<td>Coumadin/ warfarin</td>
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<tr>
<td>Cyclophosphamidine</td>
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<tr>
<td>Cytarabine</td>
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<tr>
<td>Daunorubicin</td>
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<tr>
<td>Dextroamphetamine</td>
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<tr>
<td>Ergotamine</td>
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<tr>
<td>Fluconazole (and other anti-fungals)</td>
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<tr>
<td>Heparin</td>
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<td>Lithium</td>
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<tr>
<td>Methimazole</td>
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<td>Methotrexate</td>
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<td>Methyl mercury</td>
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<td>Misoprostol</td>
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<td>Oral contraceptives</td>
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<td>Paramethadione</td>
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<td>Paroxetine/SSRI</td>
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<tr>
<td>Penicillamine</td>
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<td>Primidone</td>
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<tr>
<td>Progesterones (exposure less than 12 weeks) and anti-progesterone drug RU486</td>
</tr>
<tr>
<td>Pregabalin/Lyrica</td>
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<tr>
<td>Quinine</td>
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</tbody>
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### References


OB-26: Imaging for Planned Pregnancy Termination

- For a planned pregnancy termination, ultrasound can be performed to determine intrauterine pregnancy and gestational age.
  - One complete ultrasound (CPT® 76801) and/or one transvaginal ultrasound (CPT® 76817), if less than 14 weeks
  - If ≥ 14 weeks, send to MD review. Imaging may be indicated to confirmed EGA, placenta location, and/or fetal anomalies

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<tr>
<td>ACTH</td>
<td>adrenocorticotropin hormone</td>
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<tr>
<td>AFP</td>
<td>alpha-fetoprotein</td>
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<td>betaHCG</td>
<td>beta human chorionic gonadotropin</td>
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<td>CTA</td>
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<td>DLBCL</td>
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<td>digital rectal exam</td>
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<td>ERCP</td>
<td>endoscopic retrograde cholangiopancreatography</td>
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<td>ESR</td>
<td>erythrocyte sedimentation rate</td>
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<tr>
<td>EUS</td>
<td>endoscopic ultrasound</td>
<td></td>
</tr>
<tr>
<td>FDG</td>
<td>fluorodeoxyglucose</td>
<td></td>
</tr>
<tr>
<td>FUO</td>
<td>fever of unknown origin</td>
<td></td>
</tr>
<tr>
<td>GE</td>
<td>gastroesophageal</td>
<td></td>
</tr>
<tr>
<td>GU</td>
<td>genitourinary</td>
<td></td>
</tr>
<tr>
<td>HIV</td>
<td>human immunodeficiency disease</td>
<td></td>
</tr>
<tr>
<td>HRPC</td>
<td>hormone refractory prostate cancer</td>
<td></td>
</tr>
<tr>
<td>LCIS</td>
<td>lobular carcinoma in situ</td>
<td></td>
</tr>
<tr>
<td>LFT</td>
<td>liver function tests</td>
<td></td>
</tr>
<tr>
<td>MALT</td>
<td>mucosa associated lymphoid tissue</td>
<td></td>
</tr>
<tr>
<td>MEN</td>
<td>multiple endocrine neoplasia</td>
<td></td>
</tr>
<tr>
<td>MGUS</td>
<td>monoclonal gammopathy of unknown significance</td>
<td></td>
</tr>
<tr>
<td>MIBG</td>
<td>I-123 metaiodobenzylguanidine scintigraphy</td>
<td></td>
</tr>
<tr>
<td>MRA</td>
<td>magnetic resonance angiography</td>
<td></td>
</tr>
<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
<td></td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---------</td>
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<td></td>
</tr>
<tr>
<td>MUGA</td>
<td>‘multiple gated acquisition’ cardiac nuclear scan</td>
<td></td>
</tr>
<tr>
<td>NaF</td>
<td>Sodium Fluoride</td>
<td></td>
</tr>
<tr>
<td>NCCN®</td>
<td>National Comprehensive Cancer Network</td>
<td></td>
</tr>
</tbody>
</table>
| NHL | non-Hodgkin’s lymphoma  
NPC  
nasopharyngeal carcinoma |
| NSABP | National Surgical Adjuvant Breast and Bowel Project |
| NSAIDS | nonsteroidal anti-inflammatory drugs |
| NSCLC | non-small cell lung cancer |
| NSGCT | non-seminomatous germ cell tumor  
PA  
posteroanterior |
| PCI | prophylactic cranial irradiation |
| PET | positron emission tomography  
COG  
Children’s Oncology Group |
| PSA | prostate specific antigen  
RFA  
radiofrequency ablation |
| RPLND | retroperitoneal lymph node dissection |
| SqCCa | squamous cell carcinoma  
SCLC  
small cell lung cancer |
| SIADH | syndrome of inappropriate secretion of antidiuretic hormone |
| TCC | transitional cell carcinoma  
TNM  
tumor node metastasis staging system |
| TSH | thyroid-stimulating hormone |
| TURBT | trans-urethral resection of bladder tumor |
| VIPoma | vasoactive intestinal polypeptide |
| WM | Waldenstrom’s macroglobulinemia  
WBXRT  
Whole brain radiation therapy |
# ONC-1: General Guidelines

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<td>ONC-1.6: Predisposition Syndromes</td>
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**ONC-1.1: Key Principles**

**Imaging based on Age at diagnosis:**
- Patients age ≥ 18 years old at initial diagnosis should be imaged according to the Oncology Imaging Guidelines, and patients age < 18 years at initial diagnosis should be imaged according to the Pediatric Oncology Imaging Guidelines, except where directed otherwise by a specific guideline section.
- Patients age 15 to 39 years old at initial diagnosis are defined as Adolescent and Young Adult (AYA) Oncology patients:
  - When unique guidelines for a specific cancer type exist only in either Oncology or Pediatric Oncology, AYA patients should be imaged according to the guideline section for their specific cancer type, regardless of the patient’s age.
  - When unique guidelines for a specific cancer type exist in both Oncology and Pediatric Oncology, AYA patients should be imaged according to the age rule in the previous bullet.

**General Principles:**
- A recent clinical evaluation (within 60 days) (history and physical examination, laboratory studies, non-advanced imaging studies) or meaningful contact (telephone call, electronic mail or messaging) should be performed prior to considering advanced imaging, unless the patient is undergoing guideline-supported scheduled off therapy surveillance evaluation. The clinical evaluation may include a relevant history and physical examination, including biopsy, appropriate laboratory studies, and non-advanced imaging modalities.
- Advanced imaging is not indicated for monitoring disease in individuals who choose to not receive standard oncologic therapy, but may be receiving alternative therapies or palliative care and/or Hospice. All advanced imaging indicated for initial staging of the specific cancer type can be approved once when the patient is considering initiation of a standard therapeutic approach (surgery, chemotherapy, or radiation therapy).
- Conventional Imaging (mostly CT, sometimes MRI or bone scan) of the affected area(s) drives much of initial and re-staging and surveillance.
  - CT imaging should be performed with contrast for known or suspected body regions, unless contraindicated.
  - Shellfish allergy is not a contraindication to contrast. Patients with known shellfish allergy do not have contrast reaction any more often than other atopic individuals or patients with other food allergies.
  - For iodinated contrast dye allergy, either CT scans without contrast or MRI scans without and with contrast are indicated. If CT scanning is considered strongly indicated in a patient with known contrast allergy, CT with contrast may be considered to be safely performed following prednisone premedication over a 24 hour period prior to the study. For patients with renal insufficiency which precludes contrast use, CT without contrast appropriate disease-specific areas.
should be offered. Further imaging (such as MRI) may be indicated if noncontrast CT results are inconclusive.

- Severe renal insufficiency, i.e. an eGFR less than 30, is a contraindication for an MRI using a gadolinium-based contrast agent (GBCA) as well. In patients with eGFR greater than 40, GBCA administration can be safely performed. GBCA administered to patients with acute kidney injury or severe chronic kidney disease can result in a syndrome of nephrogenic systemic fibrosis (NSF), but GBCAs are not considered nephrotoxic at dosages approved for MRI.

- Gadolinium deposition has been found in patients with normal renal function following the use of gadolinium based contrast agents (GBCAs). The U.S. Food and Drug Administration (FDA) is investigating the risk of brain deposits following repeated use of GBCAs. The FDA has noted that, “It is unknown whether these gadolinium deposits are harmful or can lead to adverse health effects.” and have recommended: To reduce the potential for gadolinium accumulation, health care professionals should consider limiting GBCA use to clinical circumstances in which the additional information provided by the contrast is necessary. Health care professionals are also urged to reassess the necessity of repetitive GBCA MRIs in established treatment protocols.

- The use of MRI in place of CT scans to reduce risk of secondary malignancy is not supported by the peer-reviewed literature. Unless otherwise specified in the Guidelines, MRI in place of CT scans for this purpose alone is not indicated. In some instances (i.e., testicular cancer surveillance), MRI may be considered inferior to CT scans.

- PET is not indicated for surveillance imaging unless specifically stated in the diagnosis-specific guideline sections.

- Routine imaging of brain, spine, neck, chest, abdomen, pelvis, bones, or other body areas is not indicated. Except where explicitly stated in a diagnosis-specific guideline section, advanced imaging of the neck, chest, abdomen, and/or pelvis are not indicated in oncological evaluations unless one of the following applies:
  - Known prior disease involving the requested body area
  - New or worsening symptoms or physical exam findings involving the requested body area (including non-specific findings such as ascites or pleural effusion)
  - New finding on basic imaging study such as plain x-ray or ultrasound
  - New finding on adjacent body area CT/MRI study (i.e., pleural effusion observed on CT abdomen)

- Brain imaging is performed for signs or symptoms of brain disease
  - MRI Brain without and with contrast (CPT® 70553) is the recommended study for evaluation of suspected or known brain metastases. If a non-contrast CT head shows suspicious lesion, MRI brain may be obtained to further characterize the lesion
  - CT without and with contrast (CPT® 70470) can be approved when MRI is contraindicated or not available, or if there is skull bone involvement
  - Certain malignancies including, but not limited to melanoma, lung cancer and renal cell cancer have indications for brain imaging for asymptomatic patients
If stage IV disease is demonstrated elsewhere or if systemic disease progression is noted, refer to disease specific guidelines. Initiation of angiogenesis therapy is not an indication for advanced imaging of the brain in asymptomatic patients (Avastin/Bevacizumab; < 3% risk of bleeding and < 1% risk of serious bleeding).

Bone scan supplemented by plain x-rays are the initial imaging modalities for suspected malignant bone pain. For specific imaging indications, see also:

- **ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology**
- **ONC-31.5: Bone (including Vertebral) Metastases**
- **ONC-31.6: Spinal Cord Compression**
- **ONC-31.7: Carcinoma of Unknown Primary Site**

Patients receiving cardiotoxic chemotherapy (such as doxorubicin, trastuzumab, mitoxantrone, etc.) may undergo cardiac evaluation – at baseline and for monitoring while on active therapy with Echocardiography (CPT® 93306, CPT® 93307, or CPT® 93308) instead of MUGA scan.

See also: **CD-3.5: MUGA Study - Oncologic Indications for Cancer Therapeutics-Related Cardiac Dysfunction (CTRCD).**

See also: **CD-3.4: MUGA Study – Cardiac Indications** - for exceptions when a MUGA Study may be approved rather than an Echocardiogram.

Whole body MRI imaging is considered investigational for all oncology indications at this time. See also: **Preface-5.2: Whole Body MR Imaging** for details.

CTA or MRA of a specific anatomic region is indicated when requested for surgical planning when there is suspected vascular proximity to proposed resection margin.
**ONC-1.2: Phases of Oncology Imaging and General Phase-Related Considerations**

<table>
<thead>
<tr>
<th>Phases of Oncology Imaging</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>Imaging requested for patients at increased risk for a particular cancer in the absence of known clinical signs or symptoms</td>
</tr>
<tr>
<td>Suspected Diagnosis</td>
<td>Imaging requested to evaluate a suspicion of cancer, prior to histological confirmation</td>
</tr>
<tr>
<td>Initial work up and Staging</td>
<td>Imaging requested after biopsy confirmation and prior to starting specific treatment</td>
</tr>
<tr>
<td>Treatment response or Interim Restaging</td>
<td>Imaging performed during active treatment with chemotherapy, endocrine therapy or maintenance therapy</td>
</tr>
<tr>
<td>Restaging of locally treated lesions</td>
<td>Imaging performed to evaluate primary or metastatic lesions with ablation using radiofrequency, radioactive isotope, microwave or chemotherapy</td>
</tr>
<tr>
<td>Restaging / Suspected Recurrence</td>
<td>Imaging requested when there is suspicion for progression or recurrence of known cancer based on clinical signs/symptoms, laboratory tests or basic imaging studies</td>
</tr>
<tr>
<td>Surveillance</td>
<td>Imaging performed in patients who are asymptomatic or have chronic stable symptoms, and are not receiving active treatment</td>
</tr>
</tbody>
</table>

**General phase-related considerations:**

- Imaging performed prior to diagnosis should not be repeated prior to surgical resection or initiation of chemotherapy unless there is a delay of at least 6 weeks since previous imaging and consultation or there are new or significantly worsening clinical signs or symptoms.

- **Interim Restaging:**
  - After definitive local therapy of primary tumor (surgery or radiation therapy), imaging is recommended according to surveillance guidelines as the patient does not have measurable active disease. Unless stated in a diagnosis-specific guideline section, advanced imaging while receiving adjuvant chemotherapy is not indicated.
  - For patients receiving chemotherapy or immunotherapy, guideline-appropriate imaging of the involved body area(s) should be considered no more frequently than every 2 cycles (generally every 6 to 8 weeks).
  - For patients receiving endocrine/hormonal therapy only, guideline-appropriate imaging of the involved body area(s) should be considered no more frequently than every 3 months.
For patients with measurable or metastatic disease being observed without therapy (“chemo-holiday”) or for those with minimal metastatic disease on maintenance therapy, imaging should be considered no more often than every 3 months or when new signs/symptoms suggest progression

Restaging of Locally Treated Lesions:
- Regardless of the methodology used for embolization, PET imaging is not indicated for assessing response to this mode of therapy
- See: **ONC-31.2: Liver Metastases** for guidelines to monitor primary and secondary cancers to the liver treated with ablation
- See: **ONC-17.4: Surveillance** for guidelines to monitor renal cell carcinoma treated with ablation
- For monitoring of ablated metastases to any other sites, please refer to individual disease-specific guidelines

Surveillance:
- Certain tumor types do not require surveillance with advanced imaging as patient outcomes following relapse are not improved by surveillance imaging. See diagnosis-specific guideline sections for details.
- PET imaging is not supported for surveillance imaging unless specifically stated in elsewhere in the diagnosis-specific guideline sections.
- For patients with history of metastatic cancer who have had complete response and are taken off therapy, follow-up/surveillance imaging is not indicated beyond 5 years from the diagnosis of metastatic disease.
ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology

- This section does not apply to PET imaging. PET imaging considerations can be found in ONC-1.4: PET Imaging in Oncology.

Bone Scan:
- Primarily used for evaluation of bone metastases in patients with solid malignancies.
- Indications for bone scan in patients with history of malignancy include – bone pain, rising tumor markers, elevated alkaline phosphatase or in patients with primary bone tumor.
- For evaluation of suspected or known bone metastases, CPT® 78306 (Nuclear bone scan whole body), may be approved.
- Nuclear Bone SPECT scan (CPT® 78320) may be approved as an add-on test for further evaluation of a specific area of interest.
- CPT® codes 78300 (Nuclear bone scan limited), 78305 (Nuclear bone scan multiple areas) or 78315 do not have any indications in oncology nuclear medicine imaging.

Octreotide scan:
- Specific for low and intermediate grade neuroendocrine tumors which express specific cell surface somatostatin receptors. See cancer specific guidelines for recommended use.
- One of the following codes may be approved when Octreotide scan is requested:
  - CPT® 78802 (Radiopharmaceutical localization of tumor whole body single day study)
  - CPT® 78804 (Radiopharmaceutical localization of tumor whole body two or more days)
- In addition to one of the above CPT codes, CPT® 78803 (Radiopharmaceutical localization of tumor SPECT) may be approved as an add-on test for further evaluation of a specific area of interest.

Bone marrow imaging:
- This study is rarely performed for evaluation of the entire bone marrow in conditions like myeloproliferative disorders, sickle cell bone infarct or ischemia, avascular necrosis or myeloma.
- The correct CPT code for this study is CPT® 78104 (Diagnostic Nuclear Medicine Procedures on the Hematopoietic, Reticuloendothelial and Lymphatic System).

Brain imaging SPECT with Technetium-99m or thallium-201 (CPT® 78607):
- Immunocompromised patients with mass lesion detected on CT or MRI for differentiation between lymphoma and infection.
- In distinguishing recurrent brain tumor from radiation necrosis.
- Immunocompromised patients with mass lesion detected on CT or MR for differentiation of lymphoma and infection.
Radiopharmaceutical imaging of inflammatory process:
- CPT® 78805 (Limited area), CPT® 78806 (Whole body), or CPT® 78807 (SPECT)
- For evaluation of fever of unknown origin and osteomyelitis
- For suspected infections such as infected central lines, grafts or shunts

Gallium Isotope Scan:
- Radiopharmaceutical Localization of tumor (CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78803, or CPT® 78804)
- This may be rarely used in place of PET/CT scan when PET/CT scan not available and PET/CT is indicated by guidelines for lymphoma, sarcoma, melanoma or myeloma
ONC-1.4: PET Imaging in Oncology

NOTE: Some payors have specific restrictions on PET imaging, and those coverage policies may supersede the recommendations for PET imaging in these guidelines.

- CPT codes:
  - PET imaging in oncology should use PET/CT fusion imaging (CPT® 78815 or CPT® 78816) unless there is clear documentation that the treating facility does not have fusion capacity, in which case PET alone (CPT® 78812 or CPT® 78813) can be approved along with the appropriate CT studies. Unbundling PET/CT imaging into separate PET and diagnostic CT codes is otherwise not supported.
  - The decision whether to use skull base to mid-femur ("eyes to thighs") procedure code for PET (CPT® 78812 or CPT® 78815) or whole body PET (CPT® 78813 or CPT® 78816) is addressed in the diagnosis-specific guideline sections.
  - ‘Limited area’ protocol is done infrequently, but may be considered, and is reported with PET (CPT® 78811) or for PET/CT, (CPT® 78814) and should be forwarded for Medical Director review.

- Radiotracers:
  - Unless specified otherwise, the term "PET" refers to 18F-FDG-PET and PET/CT fusion studies
  - PET/CT imaging using isotopes other than 18F-FDG is considered investigational/experimental at this time with exceptions listed below where restricted use of non-FDG radiotracer PET/CT scan is permissible. See also: diagnosis-specific guideline sections for details.
    - 68Gallium DOTATATE (NETSPOT®) for low grade neuroendocrine tumors
    - 11C Choline and 18F-Fluciclovine (AXUMIN®) for prostate cancer

- Unless specified in diagnosis-specific guideline section PET/CT Imaging is NOT indicated for:
  - Infection, inflammation, trauma, post-operative healing, granulomatous disease, rheumatological conditions
  - Concomitantly with separate diagnostic CT studies
  - Distant or diffuse metastatic disease
  - Metastatic disease in the central nervous system (CNS)
  - Lesions less than 8 mm in size
  - Follow up after localized therapy (i.e. radiofrequency ablation, embolization, stereotactic radiation, etc.)
  - Rare malignancies, due to lack of available evidence regarding the diagnostic accuracy of PET in rare cancers
  - Surveillance
    - Serial monitoring of FDG avidity until resolution.
    - PET/CT avidity in a residual mass at the end of planned therapy is not an indication for PET/CT imaging during surveillance.
    - Residual mass that has not changed in size since the last conventional imaging does not justify PET imaging
Unless otherwise specified for a specific cancer type, once PET has been documented to be negative for a given patient’s cancer or all PET-avid disease has been surgically resected, PET should not be used for continued disease monitoring or surveillance.

PET/CT may be indicated if:

- Conventional imaging (CT, MRI or bone scan) reveals findings that are inconclusive or negative, with continued suspicion for recurrence
- The patient is undergoing salvage treatment for a recurrent solid tumor with residual measurable disease on conventional imaging and confirmed repeat negative PET imaging will allow the patient to transition from active treatment to surveillance.
- PET/CT may be considered prior to biopsy in order to determine a more favorable site for biopsy when a prior biopsy was nondiagnostic or a relatively inaccessible site is contemplated which would require invasive surgical intervention for biopsy attempt.

PET/CT for rare malignancies is not covered by eviCore guidelines due to lack of available evidence regarding diagnostic accuracy of PET/CT in the majority of rare cancers. Conventional imaging studies should be used for initial staging and treatment response for these diagnoses. PET/CT can be approved if all of the following apply:

- Conventional imaging (CT, MRI or bone scan) reveals equivocal or suspicious findings
- No other specific metabolic imaging (MIBG, octreotide, technetium, etc.) is appropriate for the disease type
- The submitted clinical information describes a specific decision regarding the patient’s care that will be made based on the PET/CT results
- These requests will be forwarded for Medical Director review

Delay PET/CT for at least 12 weeks after completion of radiation treatment, unless required sooner for imminent surgical resection. PET/CT requests < 12 weeks from completion of radiation treatment should be forwarded for Medical Director review.

PET mammography (PEM, generally reported with CPT® 78811) is considered experimental and investigational at this time.
**ONC-1.5: Unlisted Procedure Codes in Oncology**

- eviCore authorizes requests for CT or MRI associated with image-directed biopsy or radiation therapy treatment planning for some payors.
- eviCore does not routinely authorize requests for PET associated with image-directed biopsy or radiation therapy treatment planning.
- There is often no unique procedure code for a service performed solely for treatment planning purposes. AMA instructions in the CPT state that if no specific code exists for a particular service, the service is reported with an unlisted code.
- Advanced imaging being used for radiation therapy treatment planning should not be authorized using any of the diagnostic imaging codes for CT, MRI or PET. In the absence of written payor guidelines, advanced imaging performed in support of radiation therapy treatment planning should be reported with:
  - **CPT® 76498 for Unlisted MRI** – when MRI will be used for treatment planning of radiation therapy to be delivered ONLY to the brain, prostate and cervix. The use of this code for radiation treatment planning of any other cancers/body parts not listed above, may be reviewed on a case-by-case basis and should be sent for Medical Director Review.
  - **CPT® 76497 for Unlisted CT** – may NOT be used for radiation treatment planning. CT imaging performed in support of radiation therapy treatment planning is bundled in with the concurrent radiation treatment authorization codes and a separate authorization for treatment planning is not required.
  - **CPT® 78999 for Unlisted procedure, nuclear medicine (PET)** – eviCore does not perform prior authorization for this CPT code for any payor. This code may not be reviewed or offered as an alternative recommendation to the provider.
- Imaging associated with image-directed biopsy should be reported with the corresponding interventional codes. See also: [Preface-4.2: CT-, MR-, or Ultrasound-Guided Procedures.](#)
- For advanced imaging used solely for the purpose of Surgical planning, see [Preface-4.3: Unlisted Procedures/Therapy treatment planning](#)
ONC-1.6: Predisposition Syndromes
For predisposition syndrome screening in adult patients, see PEDONC-2: Screening Imaging in Cancer Predisposition Syndromes
References


# ONC-2: Primary Central Nervous System Tumors

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<td>Choroid Plexus Tumors</td>
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</table>
This guideline section applies to primary CNS tumors only. For imaging guidelines in metastatic brain cancer, see the appropriate diagnosis-specific section or ONC-31.3: Brain Metastases for imaging guidelines.

**ONC-2.1: General Considerations**

- Primary brain tumors presenting only with uncomplicated headache are very uncommon. Most primary brain tumors present with specific CNS symptoms.

- Histologic confirmation is critical. Therapeutic decisions should not be made on radiographic findings alone, except for the following:
  - Medically fragile patients for whom attempted biopsy carries excess medical risk, as stated in writing by both the attending physician and surgeon.
  - Brain stem tumors or other sites where the imaging findings are pathognomonic and the risk of permanent neurological damage is excessive with even a limited biopsy attempt.

- MRI Brain without and with contrast (CPT® 70553) is appropriate for both characterization and follow-up of all brain tumors
  - CT Head without and with contrast (CPT® 70470) can be approved when MRI is contraindicated or not available, or there is skull bone involvement
  - CT Head (contrast as requested) can be approved for preoperative planning when requested by the operating surgeon

- MRA or CTA are not routinely indicated in primary CNS tumors but can be approved for preoperative planning or to clarify inconclusive findings on MRI or CT

- For suspected brain tumors in neurofibromatosis, see: PEDONC-2: Screening Imaging in Cancer Predisposition Syndromes

- MRI Brain without and with contrast (CPT® 70553) can be repeated within 24 to 72 hours following brain tumor surgery

- MRI Brain without and with contrast (CPT® 70553) is appropriate when a patient with a diagnosed brain tumor deteriorates or develops new features.

- Rare tumors occurring more commonly in the pediatric population should be imaged according to the imaging guidelines in: PEDONC-4: Pediatric Central Nervous System Tumors

**MR Spectroscopy in Brain Tumors (MRS, CPT® 76390)**

**NOTE:** Some payors have specific restrictions on MR Spectroscopy, and those coverage policies may supersede the recommendations for MRS in these guidelines

- MRS is only supported for use in brain tumors of specified histologies where diagnostic accuracy has been established in peer-reviewed literature
  - See diagnosis-specific guidelines for MRS indications

- MRS is considered investigational/experimental for all other histologies and indications not listed in a diagnosis-specific guideline section. These requests should be forwarded for Medical Director review
PET Brain Imaging (CPT® 78608 and CPT® 78609)

**NOTE:** Some payors have specific restrictions on PET Brain Metabolic Imaging, and those coverage policies may supersede the recommendations for this study in these guidelines.

- PET Brain Metabolic Imaging (CPT® 78608) is only supported for use in brain tumors of specified histologies where diagnostic accuracy has been established in peer-reviewed literature
  - See diagnosis-specific guidelines for PET indications below.
  - According to Medicare NCD 220.6.17, FDG-PET may be approved once for initial treatment strategy and three times for subsequent treatment strategy for brain tumors. See: [ONC-32.3: Brain PET](#) for details.

- PET Brain metabolic imaging (CPT® 78608) is considered investigational/experimental for all other histologies and indications not listed in a diagnosis-specific guideline section and should be forwarded for Medical Director review

- PET Brain perfusion imaging (CPT® 78609) is not indicated in the evaluation or management of primary CNS tumors, and is nationally non-covered by Medicare per NCD 220.6.17.

- Body PET studies (CPT® 78811, CPT® 78812, and CPT® 78813) and fusion PET/CT studies (CPT® 78814, CPT® 78815, or CPT® 78816) are not indicated in the evaluation or management of primary CNS tumors.
ONC-2.2: Low Grade Gliomas

These tumors are defined as having a WHO histologic grade of I or II (out of IV), can occur anywhere in the CNS, and includes the following tumors:

- Pilocytic Astrocytoma
- Fibrillary (or Diffuse) Astrocytoma
- Optic Pathway Gliomas
- Pilomyxoid Astrocytoma
- Oligodendroglioma
- Oligoastrocytoma
- Oligodendrocytoma
- Subependymal Giant Cell Astrocytoma (SEGA)
- Ganglioglioma
- Gangliocytoma
- Dysembryoplastic infantile astrocytoma (DIA)
- Dysembryoplastic infantile ganglioglioma (DIG)
- Dysembryoplastic neuroepithelial tumor (DNT)
- Tectal plate gliomas
- Cerebromedullary gliomas
- Pleomorphic xanthoastrocytoma (PXA)
- Any other glial tumor with a WHO grade of I or II
<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study(ies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Staging</td>
<td>- MRI Brain without and with contrast (CPT® 70553) if not already done</td>
</tr>
<tr>
<td></td>
<td>- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158)</td>
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<tr>
<td></td>
<td>- MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain</td>
</tr>
<tr>
<td>After initial resection or other treatment (XRT, etc.)</td>
<td>- MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td>For patients undergoing chemotherapy treatment</td>
<td>- MRI Brain without and with contrast (CPT® 70553) every 2 cycles</td>
</tr>
<tr>
<td></td>
<td>- Patients with spinal cord involvement at diagnosis can have MRI without and with contrast of the involved spinal region on the same schedule as MRI brain</td>
</tr>
<tr>
<td>One of the following:</td>
<td>- PET Brain metabolic imaging (CPT® 78608)</td>
</tr>
<tr>
<td></td>
<td>- Determine need for biopsy when transformation to high grade glioma is suspected based on clinical symptoms or recent MRI findings</td>
</tr>
<tr>
<td></td>
<td>- Evaluate a brain lesion of indeterminate nature when the PET findings will be used to determine whether biopsy/resection can be safely postponed</td>
</tr>
<tr>
<td>One of the following:</td>
<td>- MR Spectroscopy (CPT® 76390)</td>
</tr>
<tr>
<td></td>
<td>- Distinguish low grade from high grade gliomas</td>
</tr>
<tr>
<td></td>
<td>- Evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed</td>
</tr>
<tr>
<td></td>
<td>- Distinguish radiation-induced tumor necrosis from progressive disease within 18 months of completing radiotherapy</td>
</tr>
<tr>
<td>Surveillance</td>
<td>- MRI Brain without and with contrast (CPT® 70553) every 3 months for 2 years, then every 6 months for 3 years, then annually</td>
</tr>
<tr>
<td></td>
<td>- Patients with spinal cord involvement at diagnosis can have MRI spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) on the same schedule as MRI Brain</td>
</tr>
</tbody>
</table>
**ONC-2.3: High Grade Gliomas**

These tumors are defined as having a WHO histologic grade of III or IV (out of IV can occur anywhere in the CNS (though the majority occur in the brain), and include the following tumors:

- Anaplastic astrocytoma
- Glioblastoma multiforme
- Diffuse intrinsic pontine glioma (DIPG, or “brainstem glioma”)
- Gliomatosis cerebri
- Gliosarcoma
- Anaplastic oligodendroglioma
- Anaplastic ganglioglioma
- Anaplastic mixed glioma
- Anaplastic mixed ganglioneuronal tumors
- Any other glial tumor with a WHO grade of III or IV

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study(ies)</th>
</tr>
</thead>
</table>
| Initial Staging                                 | ✦ MRI Brain without and with contrast (CPT® 70553) if not already done  
✦ MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158)  
   - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain |
| Immediately following partial or complete resection | ✦ MRI Brain without and with contrast (CPT® 70553)                                                                                                                                 |
| Immediately following radiation therapy (XRT)    | ✦ MRI Brain without and with contrast (CPT® 70553) once within 2 to 6 weeks following completion of treatment, and then go to surveillance imaging |
| For patients undergoing chemotherapy treatment   | ✦ MRI Brain without and with contrast (CPT® 70553) every 2 cycles  
✦ Patients with spinal cord involvement at diagnosis can have MRI without and with contrast of the involved spinal region on the same schedule as MRI brain |
<table>
<thead>
<tr>
<th>One of the following:</th>
<th>MR Spectroscopy (CPT® 76390)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Distinguish low grade from high grade gliomas</td>
<td></td>
</tr>
<tr>
<td>- Evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed</td>
<td></td>
</tr>
<tr>
<td>- Distinguish radiation-induced tumor necrosis from progressive disease within 18 months of completing radiotherapy</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>One of the following:</th>
<th>PET Brain metabolic imaging (CPT® 78608)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Distinguish radiation-induced tumor necrosis from progressive disease within 18 months of completing radiotherapy</td>
<td></td>
</tr>
<tr>
<td>- Evaluate inconclusive MRI findings when the PET findings will be used to determine need for biopsy or change in therapy, including a change from active therapy to surveillance</td>
<td></td>
</tr>
<tr>
<td>- Evaluate a brain lesion of indeterminate nature when the PET findings will be used to determine whether biopsy/resection can be safely postponed</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surveillance</th>
<th>MRI Brain without and with contrast (CPT® 70553) every 3 months for 3 years and every 6 months thereafter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients with spinal cord involvement at diagnosis can have MRI spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) on the same schedule as MRI Brain</td>
</tr>
</tbody>
</table>
ONC-2.4: Medulloblastoma and Supratentorial Primitive Neuroectodermal Tumors (sPNET)

Medulloblastoma and sPNET imaging indications in adult patients are identical to those for pediatric patients. See PEDONC-4.4: Medulloblastoma (MDB), Supratentorial Primitive Neuroectodermal Tumors (sPNET), and Pineoblastoma for imaging guidelines.
ONC-2.5: Ependymoma

Ependymoma imaging indications in adult patients are identical to those for pediatric patients. See PEDONC-4.8: Ependymoma for imaging guidelines.
ONC-2.6: Central Nervous System Germ Cell Tumors

Central nervous system germ cell tumor imaging indications in adult patients are identical to those for pediatric patients. See PEDONC-4.7: CNS Germinomas and Non-Germinomatous Germ Cell Tumors (NGGCT) for imaging guidelines.
# ONC-2.7: CNS Lymphoma (also known as Microglioma)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Staging</td>
<td>All of the following are indicated:</td>
</tr>
<tr>
<td></td>
<td>- MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td></td>
<td>- MRI Cervical spine without and with contrast (CPT® 72156)</td>
</tr>
<tr>
<td></td>
<td>- MRI Thoracic spine without and with contrast (CPT® 72157)</td>
</tr>
<tr>
<td></td>
<td>- MRI Lumbar spine without and with contrast (CPT® 72158)</td>
</tr>
<tr>
<td>Extra-neural evaluation to confirm CNS primary</td>
<td>Any or all of the following are indicated:</td>
</tr>
<tr>
<td>*Patients with CNS Lymphoma that is metastatic should be imaged according to:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- <strong>ONC-27: Non-Hodgkin Lymphomas</strong> for patients age ≥ 18 years</td>
</tr>
<tr>
<td></td>
<td>- <strong>PEDONC-5.3: Pediatric Aggressive Mature B-Cell Non-Hodgkin Lymphomas (NHL)</strong> for patients age ≤ 17 years</td>
</tr>
<tr>
<td>Treatment Response</td>
<td>MRI without and with contrast of all positive disease sites every 2 cycles</td>
</tr>
<tr>
<td>Surveillance</td>
<td>MRI without and with contrast of all positive disease sites every 3 months for 2 years, then every 6 months for 3 years, then annually thereafter</td>
</tr>
</tbody>
</table>
## ONC-2.8: Meningiomas (Intracranial and Intraspinal)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study(ies)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Staging of Intracranial Meningioma</strong></td>
<td>Any or all of the following are indicated:</td>
</tr>
<tr>
<td></td>
<td>- MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td></td>
<td>- CT Head (contrast as requested)</td>
</tr>
<tr>
<td><strong>Initial staging of Intraspinal Meningioma</strong></td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>- MRI without and with contrast of appropriate spinal region (Cervical, Thoracic and Lumbar)</td>
</tr>
<tr>
<td></td>
<td>- CT without and with contrast of the appropriate spinal region (Cervical, Thoracic and Lumbar)</td>
</tr>
<tr>
<td><strong>Treatment Response</strong></td>
<td>- MRI without and with contrast of all positive disease sites every 2 cycles</td>
</tr>
<tr>
<td><strong>Surveillance for Grade I (low grade) and Grade II (atypical) meningioma (completely resected, partially resected and unresected)</strong></td>
<td><strong>Intracranial Meningioma:</strong> MRI Brain without and with contrast (CPT® 70553) at 3, 6, and 12 months, then annually for 5 years</td>
</tr>
<tr>
<td></td>
<td><strong>Intraspinal Meningioma:</strong> MRI without and with contrast CPT® 72156 (Cervical spine), CPT® 72157 (Thoracic spine), CPT® 72158 (lumbar spine) OR CT without and with contrast CPT® 72127 (Cervical spine), CPT® 72130 (Thoracic spine), CPT® 72133 (Lumbar spine) of the involved spinal level at 3, 6 and 12 months, and then annually for 5 years</td>
</tr>
<tr>
<td><strong>Surveillance for Grade III (malignant or anaplastic) meningioma</strong></td>
<td><strong>Intracranial Meningioma:</strong> MRI Brain without and with contrast (CPT® 70553) every 3 months for 3 years, and then every 6 months thereafter</td>
</tr>
<tr>
<td></td>
<td><strong>Intraspinal Meningioma:</strong> MRI or CT without and with contrast of the involved spinal region every 3 months for 3 years and then every 6 months thereafter</td>
</tr>
</tbody>
</table>
**ONC-2.9: Spinal Cord Tumors (Benign and Malignant)**

- See also: **ONC-2.2: Low Grade Gliomas** and **ONC-2.3: High Grade Gliomas** for imaging guidelines of low grade and high grade gliomas of the spinal cord
- See also: **PEDONC-4.9: Malignant Tumors of the Spinal Cord** for imaging guidelines for other malignant spinal cord tumors
- See also: **PEDPN-2.1: Neurofibromatosis 1** and **PEDPN-2.2: Neurofibromatosis 2** for spinal tumors in patients with Neurofibromatosis 1 or 2
- See also: **ONC-31.6: Spinal Cord Compression** for known secondary malignancy involving the spine/spinal canal/spinal cord
**ONC-2.10: Choroid Plexus Tumors**

Choroid Plexus Tumor imaging indications in adult patients are identical to those for pediatric patients. See **PEDONC-4.13: Choroid Plexus Tumors** for imaging guidelines.
References

   Central Nervous System Cancers, available at:
   https://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Referenced with permission from the
   NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System
   Tumors Cancer V1.2018. – March 20, 2018©2018 National Comprehensive Cancer Network, Inc. All
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   complete version of the NCCN Guidelines™, go online to NCCN.org.

2. Brandão LA and Castillo M. Adult brain tumors: clinical applications of magnetic resonance


   factors in 119 irradiated patients. A multicenter, retrospective study of the Rare Cancer Network. Int J

5. Modha A, and Gutin PH. Diagnosis and treatment of atypical and anaplastic meningiomas: a review.


   http://www.ajnr.org/content/30/8/1469.
## ONC-3: Squamous Cell Carcinomas of the Head and Neck

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<tr>
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<th>Page</th>
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</thead>
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</tr>
<tr>
<td>ONC-3.1: Suspected/Diagnosis</td>
<td>35</td>
</tr>
<tr>
<td>ONC-3.2: Initial Work-Up/Staging</td>
<td>36</td>
</tr>
<tr>
<td>ONC-3.3: Restaging/Recurrence</td>
<td>37</td>
</tr>
<tr>
<td>ONC-3.4: Surveillance/Follow-Up</td>
<td>38</td>
</tr>
</tbody>
</table>
**ONC-3.0: General Considerations**

- Patients with esthesioneuroblastoma should be imaged according to this guideline section.

- For evaluation of squamous cell carcinoma from an unknown primary to the cervical lymph nodes, CT Neck (CPT® 70491) and CT Chest (CPT® 71260) are indicated. CT scans of the abdomen and pelvis are not routinely indicated, unless there are signs/symptoms related to these areas.

- Imaging of the CNS (head, spine) is indicated only to evaluate specific signs or symptoms or if concern for base of skull invasion suggesting spread to those areas.

- Stage III/IV disease encompasses any primary tumor larger than 4 cm or documented lymph node positive disease.

- CT Chest is not indicated for routine surveillance of head/neck cancers. In patients with smoking history, annual low dose CT for lung cancer screening may be approved if criteria’s met see also: **CH-34: Lung Cancer Screening**.
ONC-3.1: Suspected/Diagnosis

- See also: NECK-6.1: Imaging for imaging guidelines for evaluation of suspected malignancy in the neck
- PET may be considered prior to biopsy in order to determine a more favorable site for biopsy when a prior biopsy was nondiagnostic or a relatively inaccessible site is contemplated which would require invasive surgical intervention for biopsy attempt
## ONC-3.2: Initial Work-Up/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| All Stages of Disease                                                     | - CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck (OFN) without and with contrast (CPT® 70543)  
|                                                                            | - Chest x-ray or CT Chest with contrast (CPT® 71260)  
|                                                                            | - Lymph system imaging (lymphoscintigraphy, CPT® 78195) is indicated for sentinel lymph node evaluation when nodes are not clinically positive |
| Nasal cavity and paranasal sinuses (bony erosion or skull base and intracranial involvement) | One of the following studies is indicated:  
|                                                                            | - CT Maxillofacial with contrast (CPT® 70487)  
|                                                                            | - CT Neck with contrast (CPT® 70491)  
|                                                                            | - MRI Orbits/Face/Neck without and with contrast (CPT® 70543) |
| Nasopharyngeal (NPC) Cancer                                               | - MRI Orbits/Face/Neck without and with contrast (CPT® 70543) is the preferred study  
|                                                                            | - CT Neck (CPT® 70491) and/or CT Maxillofacial (CPT® 70487) with contrast can be approved if contraindication to MRI  
|                                                                            | - Chest x-ray or CT Chest with contrast (CPT® 71260) |
| For any of the following:                                                 | PET/CT (CPT® 78815)                                                             |
| Known stage III or IV disease                                             |                                                                                   |
| Prior to start of primary chemoradiotherapy and have not undergone definitive surgical resection |                                                                                   |
| Nasopharyngeal primary site                                               |                                                                                   |
| Inconclusive findings on conventional imaging (CT, MRI)                   |                                                                                   |
| In order to direct laryngoscopy/exam under anesthesia for biopsy          |                                                                                   |
| Pulmonary nodule(s) ≥ 8 mm in size (see: [ONC-31.1 Lung Metastases](#))   |                                                                                   |
| Cervical lymph node biopsy positive for squamous cell carcinoma and no primary site identified on CT or MRI of neck and chest |                                                                                   |
| Inconclusive findings suggestive of disease outside the head and neck area |                                                                                   |
| Signs or symptoms of abdominal metastatic disease, including elevated liver function tests | CT Abdomen with contrast (CPT® 74160)                                           |
| Any head and neck cancer with neurological findings or suspicion of skull base invasion | MRI Brain without and with contrast (CPT® 70553)                                  |
### ONC-3.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Following complete resection and/or radical neck dissection</td>
<td>See Surveillance imaging below</td>
</tr>
<tr>
<td>Following primary chemoradiotherapy for Stage III or IV disease</td>
<td>• CT Neck with contrast (CPT® 70491) or MRI</td>
</tr>
<tr>
<td></td>
<td>• Orbits/Face/Neck without and with contrast (CPT® 70543)</td>
</tr>
<tr>
<td></td>
<td>• PET/CT is indicated (no sooner than 12 weeks post completion XRT) for:</td>
</tr>
<tr>
<td></td>
<td>▪ Evaluating the need for salvage surgery/radical neck dissection in patients</td>
</tr>
<tr>
<td></td>
<td>▪ with measurable residual disease on physical exam or recent CT or MRI</td>
</tr>
<tr>
<td></td>
<td>▪ Distinguishing active tumor from radiation fibrosis</td>
</tr>
<tr>
<td>Induction chemotherapy response</td>
<td>• CT neck with contrast (CPT® 70491) or MRI</td>
</tr>
<tr>
<td></td>
<td>• Orbits/Face/Neck without and with contrast (CPT® 70543)</td>
</tr>
<tr>
<td></td>
<td>• PET not indicated to assess response to induction chemotherapy</td>
</tr>
<tr>
<td>Suspected local recurrence</td>
<td>• CT Neck with contrast (CPT® 70491) or MRI</td>
</tr>
<tr>
<td></td>
<td>• Orbits/Face/Neck without and with contrast (CPT® 70543)</td>
</tr>
<tr>
<td></td>
<td>• CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>Biopsy proven local recurrence</td>
<td>Either one of the following:</td>
</tr>
<tr>
<td></td>
<td>• PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td></td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>• CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and</td>
</tr>
<tr>
<td></td>
<td>with contrast (CPT® 70543)</td>
</tr>
<tr>
<td></td>
<td>AND CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>Inconclusive conventional imaging (CT or MRI)</td>
<td>• PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>If new symptoms or chest previously involved</td>
<td>• CT Chest with contrast (CPT® 71260)</td>
</tr>
</tbody>
</table>
## ONC-3.4: Surveillance/Follow-Up

<table>
<thead>
<tr>
<th>Indications</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage III-IV carcinoma with any of the following primary sites:</td>
<td>Once within 6 months of completing all treatment:</td>
</tr>
<tr>
<td>- Nasopharynx</td>
<td>- CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543)</td>
</tr>
<tr>
<td>- Oropharynx</td>
<td>- CT with contrast of any other involved body area</td>
</tr>
<tr>
<td>- Hypopharynx</td>
<td></td>
</tr>
<tr>
<td>- Glottic or supraglottic larynx</td>
<td></td>
</tr>
<tr>
<td>Any stage carcinoma with any of the following primary sites:</td>
<td></td>
</tr>
<tr>
<td>- Sinus</td>
<td>Annually for 3 years:</td>
</tr>
<tr>
<td>- Lip</td>
<td>- CT Neck with contrast (CPT® 70491) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543)</td>
</tr>
<tr>
<td>After initial post-treatment study, for any of the following:</td>
<td></td>
</tr>
<tr>
<td>- Nasopharyngeal primary site</td>
<td></td>
</tr>
<tr>
<td>- Physical exam unable to evaluate primary site for recurrence</td>
<td></td>
</tr>
<tr>
<td>All other primary sites and stages not listed above</td>
<td>- Routine advanced imaging is not indicated</td>
</tr>
</tbody>
</table>

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References


# ONC-4: Salivary Gland Cancers

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>General Considerations</td>
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<td>42</td>
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<td>ONC-4.2</td>
<td>Initial Workup/Staging</td>
<td>43</td>
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<tr>
<td>ONC-4.3</td>
<td>Restaging/Recurrence</td>
<td>44</td>
</tr>
<tr>
<td>ONC-4.4</td>
<td>Surveillance/Follow Up</td>
<td>45</td>
</tr>
</tbody>
</table>
ONC-4.0: General Considerations

- Salivary gland tumors may originate within the parotid, submandibular, sublingual or minor salivary glands in the mouth.
- Histological subtypes include mucoepidermoid, acinic, adenocarcinoma, adenoid cystic carcinoma, malignant myoepithelial tumors and squamous cell carcinoma. Lymphoma and metastatic squamous carcinoma can also occur in the parotid gland.
- Over 80% of parotid gland tumors are benign. A bilateral parotid tumor is most likely Warthin’s tumor.
- The role of PET in salivary gland tumors has yet to be established.
ONC-4.1: Suspected/Diagnosis
## ONC-4.2: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biopsy-proven malignancy (only if none of these imaging studies has already been done)</td>
<td>One of the following can be approved:</td>
</tr>
<tr>
<td></td>
<td>✦ MRI Orbits/ Face/ Neck without and with contrast (CPT® 70543)</td>
</tr>
<tr>
<td></td>
<td>✦ CT Neck with contrast (CPT® 70491)</td>
</tr>
<tr>
<td></td>
<td>✦ CT Neck without contrast (CPT® 70490)</td>
</tr>
<tr>
<td>Skull base invasion</td>
<td>✦ MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td>Abnormalities on chest x-ray or if lymphadenopathy in neck</td>
<td>✦ CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>Only for suspicious lung abnormalities</td>
<td>✦ PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td></td>
<td>See also: [CH-16: Solitary Pulmonary Nodule (SPN)]</td>
</tr>
</tbody>
</table>
## ONC-4.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with unresected disease receiving systemic therapy (chemotherapy)</td>
<td>One of the following may be approved every 2 cycles:</td>
</tr>
<tr>
<td></td>
<td>- CT Neck with contrast (CPT® 70491) and any other sites of disease</td>
</tr>
<tr>
<td></td>
<td>- MRI Orbits/Face/Neck without and with contrast (CPT® 70543) and any other sites of disease</td>
</tr>
<tr>
<td>Recurrence or progression suspected based on new or worsening signs or symptoms</td>
<td>One of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>- CT Neck with contrast (CPT® 70491)</td>
</tr>
<tr>
<td></td>
<td>- MRI Orbits/Face/Neck without and with contrast (CPT® 70543)</td>
</tr>
<tr>
<td></td>
<td>In addition, for all patients:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>All other patients</td>
<td>No routine advanced imaging indicated</td>
</tr>
</tbody>
</table>
### ONC-4.4: Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total surgical resection</td>
<td>✷ No routine advanced imaging indicated</td>
</tr>
<tr>
<td>Unresectable or partially resected disease, including those treated with XRT</td>
<td>✷ Either CT Neck (CPT® 70491) or MRI Orbits/Face/Neck (CPT® 70543) once within 6 months of end of treatment and then no further routine imaging unless there are new or worsening signs or symptoms</td>
</tr>
</tbody>
</table>
References


# ONC-5: Melanomas and Other Skin Cancers

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| ONC-5.6: Initial Work-Up/Staging (Non-Melanoma Skin Cancers) | 54  |
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| ONC-5.9: Ocular Melanoma                   | 57  |
ONC-5.0: General Considerations (Melanoma)

- Melanomas can metastasize in an unpredictable fashion.
- Primary mucosal melanomas (i.e., gastrointestinal or sinus mucosa) and orbital/ocular melanomas are considered (and should be managed as) Stage III (i.e., node positive) at initial diagnosis.
### ONC-5.1: Suspected/Diagnosis (Melanoma)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>✦ Imaging is not indicated until histologic diagnosis is confirmed</td>
</tr>
</tbody>
</table>
## ONC-5.2: Initial Work-Up/Staging (Melanoma)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 0 or Ia (in situ or disease &lt; 1 mm)</td>
<td>♦ Routine advanced imaging is not indicated</td>
</tr>
</tbody>
</table>
| ♦ Stage Ib (≤ 1 mm with ulceration or high mitotic rate)  
♦ Stage II (lesions > 1 mm thick, but node negative) | ♦ CT with contrast or MRI without and with contrast of specific areas, only if signs or symptoms indicate need for further evaluation  
♦ Lymph system imaging (lymphoscintigraphy, CPT® 78195) is indicated for sentinel lymph node (SLN) evaluation |
| Any of the following:  
♦ Stage III (sentinel node positive, palpable regional nodes)  
♦ Stage IV (metastatic)  
♦ Mucosal, including lip primary | ♦ CT with contrast of Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) or PET/CT (CPT® 78815 or CPT® 78816)  
♦ CT Neck with contrast (CPT® 70491) is indicated for head or neck primary sites or if palpable lymph nodes are present in the neck  
♦ MRI Brain without and with contrast (CPT® 70553) |
| ♦ Primary site of melanoma is unknown and CT Chest and Abdomen/Pelvis are negative | ♦ MRI Abdomen without and with contrast (CPT® 74183) and PET/CT (CPT® 78815 or CPT® 78816) |
### ONC-5.3: Restaging/Recurrence (Melanoma)

All recurrences should be confirmed histologically, except when excessive morbidity from a biopsy may occur, such as a biopsy requiring craniotomy.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients receiving chemotherapy, with measurable disease</td>
<td>- CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast every 2 cycles (commonly every 6 to 8 weeks)</td>
</tr>
<tr>
<td>All in SITU recurrences</td>
<td>- Restaging imaging is not needed after adequate aggressive local therapy (see Surveillance below)</td>
</tr>
</tbody>
</table>
| Documented or clinically suspected (see top of page regarding biopsy morbidity) recurrence at: | - CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast  
  - MRI Brain without and with contrast (CPT® 70553)  
  - PET/CT (CPT® 78815 or CPT® 78816) if inconclusive conventional imaging or isolated metastatic based on results of conventional imaging, initially |
| Primary site                                                              |                                                                                                  |
| In-transit disease                                                        |                                                                                                  |
| Regional lymph nodes                                                      |                                                                                                  |
| Metastatic site                                                           |                                                                                                  |
| Brain imaging is indicated for:                                          |                                                                                                  |
| New discovery of metastatic disease or progression of metastatic disease  | - MRI Brain without and with contrast (CPT® 70553)                                                |
| Signs or symptoms of CNS disease                                         |                                                                                                  |
| If considering Interleukin (IL-2) therapy                                |                                                                                                  |
## ONC-5.4: Surveillance/Follow Up (Melanoma)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 0, IA, IB and IIA Melanomas</td>
<td>No routine advanced imaging indicated</td>
</tr>
<tr>
<td>Stage IIB, IIIA and IIIB Melanomas</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast every 6 months for 5 years</td>
</tr>
<tr>
<td>Stage IIIC and IV Melanomas</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast every 3 months for 3 years, then every 6 months for 2 years</td>
</tr>
<tr>
<td></td>
<td>MRI Brain without and with contrast (CPT® 70553) annually for 5 years</td>
</tr>
<tr>
<td>Liver metastases treated with focal therapy</td>
<td>See also: <strong>ONC-31.2: Liver Metastases</strong></td>
</tr>
</tbody>
</table>
ONC-5.5: General Considerations (Non-Melanoma skin cancers)

- Advanced Imaging is generally not indicated for basal cell and squamous cell skin cancers
- PET/CT scan is not indicated for evaluation of non-melanoma skin cancers unless specified within the guidelines below (e.g. Merkel cell carcinoma)
- Merkel cell carcinoma is an unusual skin cancer with neuroendocrine-like histologic features, which has a high propensity (25% to 33%) for regional lymph node spread and occasionally, metastatic spread to lungs.
- Merkel cell carcinoma may present as a primary cancer or as a skin metastasis from a noncutaneous primary neuroendocrine carcinoma (i.e., small cell lung cancer), therefore conventional imaging is indicated initially to confirm the absence of metastasis prior to considering PET scan.
### ONC-5.6: Initial Work-Up/Staging (Non-Melanoma Skin Cancers)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body area with unexplained signs or symptoms</td>
<td>CT with contrast of that body area</td>
</tr>
<tr>
<td>Perineural invasion or local regional extension (i.e. bone; deep soft tissue) involvement</td>
<td>One of the following may be approved of the primary site:</td>
</tr>
<tr>
<td></td>
<td>- MRI without contrast or without and with contrast</td>
</tr>
<tr>
<td></td>
<td>- CT (contrast as requested)</td>
</tr>
<tr>
<td>Skin lesion may be a dermal metastasis from distant primary</td>
<td>CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td></td>
<td>PET/CT is indicated if conventional imaging (CT or MRI) is unable to identify a primary site</td>
</tr>
<tr>
<td>Squamous cell carcinoma head or neck skin with regional lymphadenopathy</td>
<td>CT Neck (CPT® 70491) and CT Chest (CPT® 71260) with contrast</td>
</tr>
<tr>
<td>Merkel Cell carcinoma</td>
<td>CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td></td>
<td>CT with contrast of other involved body area(s)</td>
</tr>
<tr>
<td></td>
<td>PET/CT if no metastatic disease identified on conventional imaging</td>
</tr>
<tr>
<td></td>
<td>Lymph system imaging (lymphoscintigraphy, CPT® 78195) or sentinel lymph node evaluation</td>
</tr>
<tr>
<td></td>
<td>MRI Brain with and without contrast (CPT® 70553)</td>
</tr>
</tbody>
</table>
**ONC-5.7: Restaging/Recurrence (Non-Melanoma Skin Cancers)**

All recurrences should be confirmed histologically, except when excessive morbidity from a biopsy may occur, such as a biopsy requiring craniotomy.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrence where planned therapy is more extensive than simple wide local excision</td>
<td>✷ CT with contrast of the primary and recurrent site(s)</td>
</tr>
<tr>
<td>Recurrence of Merkel cell carcinoma</td>
<td>✷ CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td></td>
<td>✷ MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td></td>
<td>✷ PET/CT if no metastatic disease on any of the previous imaging studies</td>
</tr>
</tbody>
</table>
# ONC-5.8: Surveillance/Follow up (Non-Melanoma Skin Cancers)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Merkel cell cancer – only if node positive | • CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast every 6 months for 5 years  
• Add CT Neck with contrast (CPT® 70491) if known prior neck disease or scalp/facial/neck disease |
| All others                              | • Routine advanced imaging for surveillance is not indicated  
• Imaging indicated only for signs and symptoms of recurrent disease |
**ONC-5.9: Ocular Melanoma**

**General Considerations**

- Approximately 95% of ocular melanomas arise from the uvea (iris, ciliary body and choroid) and 5% arise from the conjunctiva or orbit.
- Treatment is directed to the affected eye with systemic therapy reserved only for known metastatic disease.
- The most common site of metastatic disease is the liver.
- Surveillance of the affected eye is with clinical examination only; advanced imaging is supported for surveillance of systemic metastatic disease based on individual risk factors. See Risk categories below for surveillance recommendations.

<table>
<thead>
<tr>
<th>Ocular Melanoma Risk Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low Risk</strong></td>
</tr>
<tr>
<td>T1</td>
</tr>
<tr>
<td>Class IA</td>
</tr>
<tr>
<td>Spindle cell histology</td>
</tr>
<tr>
<td>No extraocular extension</td>
</tr>
<tr>
<td>No ciliary body involvement</td>
</tr>
<tr>
<td>Chromosome mutations: Disomy 3 EIF1AZ mutation</td>
</tr>
<tr>
<td>Indication</td>
</tr>
<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td>Initial staging</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Restaging/Suspected Recurrence</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Surveillance: (see Risk Categories Table above)</td>
</tr>
<tr>
<td>Low Risk</td>
</tr>
<tr>
<td>Medium Risk</td>
</tr>
<tr>
<td>High Risk</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>ONC-6: Thyroid Cancer</th>
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</tr>
</thead>
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<td>ONC-6.1: Suspected/Diagnosis</td>
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<td>ONC-6.2: Initial Work-Up/Staging</td>
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</tr>
<tr>
<td>ONC-6.3: Restaging/Recurrence</td>
<td>65</td>
</tr>
<tr>
<td>ONC-6.4: Surveillance/Follow Up</td>
<td>66</td>
</tr>
</tbody>
</table>
ONC-6.0: General Considerations

- PET for initial staging for anaplastic thyroid cancer is currently not recommended before conventional imaging since recommendations for PET are derived from observational studies and clinical trials with other methodological limitations.

- Patients with measurable metastatic disease that are RAI refractory may be followed with conventional imaging, PET-CT scan is reserved for inconclusive findings.

- Whole body thyroid nuclear scan is coded with CPT® 78018. If CPT® 78018 is obtained and found to be positive, CPT® 78020 may be approved as an add-on test to evaluate the degree of iodine uptake.
**ONC-6.1: Suspected/Diagnosis**

See **NECK-9.1: Thyroid Nodule** for imaging guidelines for suspected thyroid malignancies.
# ONC-6.2: Initial Work-Up/Staging

## Follicular, Papillary and Hürthle Cell Carcinomas

<table>
<thead>
<tr>
<th>One of the following:</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixation suggested by clinical exam and/or ultrasound</td>
<td>One of the following:</td>
</tr>
<tr>
<td>Subternal or bulky disease</td>
<td>MRI Neck without contrast (CPT® 70540)</td>
</tr>
<tr>
<td>Disease precluding full ultrasound examination</td>
<td>MRI Neck without and with contrast (CPT® 70543)</td>
</tr>
<tr>
<td></td>
<td>CT Neck without contrast (CPT® 70490)</td>
</tr>
<tr>
<td></td>
<td>CT Neck with contrast (CPT® 70491) can be approved if contrast study is necessary for complete pre-operative assessment and use of IV contrast will not delay post-operative use of RAI therapy.</td>
</tr>
</tbody>
</table>

### Post-thyroidectomy to assess thyroid remnant and to look for iodine-avid metastases for one of the following:

- Extent of thyroid remnant cannot be accurately ascertained from the surgical report or neck ultrasound
- When the results may alter the decision to treat
- Prior to administration of RAI therapy

### Skeletal pain

- Bone scan
  - See also: **ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology**
- Nuclear Thyroid scan (CPT® 78018)
  - CPT® 78020 may be approved as an add-on test to evaluate the degree of iodine uptake

### Suspicious findings on CXR, US, or substernal extension of mass

- CT Chest without contrast (CPT® 71250)

### All other patients

- Routine preoperative advanced imaging is not indicated
<table>
<thead>
<tr>
<th>Medullary Thyroid Carcinomas</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| All patients with positive lymph nodes or calcitonin level > 500 pg/mL | Any or all of the following:  
  - CT Neck with contrast (CPT® 70491)  
  - CT Chest with contrast (CPT® 71260)  
  - CT Abdomen either with (CPT® 74160) or CT Abdomen without and with contrast (CPT® 74170)  
  - Bone scan see also: **ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology** |
| Skeletal pain | Bone scan see also: **ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology** |
| Inconclusive finding on conventional imaging | PET/CT (CPT® 78815) |

<table>
<thead>
<tr>
<th>Anaplastic Thyroid Carcinomas</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| All | Any or all of the following:  
  - CT Neck with contrast (CPT® 70491)  
  - CT Chest with contrast (CPT® 71260)  
  - CT Abdomen/Pelvis with contrast (CPT® 74177)  
  - MRI Brain without and with contrast (CPT® 70553)  
  - Bone scan see also: **ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology** |
| Skeletal pain | Bone scan see also: **ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology** |
| Inconclusive finding on conventional imaging | PET/CT (CPT® 78815 or CPT® 78816) |
## Oncology Imaging

### ONC-6.3: Restaging/Recurrence

#### Follicular, Papillary and Hürthle Cell Carcinomas

- Within 2 weeks (ideally 7 to 10 days) following the administration of Radioactive Iodine therapy dose
  - Whole body thyroid nuclear scan (CPT® 78018)

#### Any of the following:
- Recurrence documented by biopsy
- Increasing thyroglobulin level without Thyrogen® stimulation
- Thyroglobulin level > 2 ng/mL or higher than previous after Thyrogen® stimulation
- Anti-thyroglobulin antibody present
- Evidence of residual thyroid tissue on ultrasound or physical exam after thyroidectomy or ablation

#### Any or all of the following:
- Thyroid Nuclear Scan (CPT® 78018)
  - CPT® 78020 may be approved as an add-on test to evaluate the degree of iodine uptake
- CT with contrast of any symptomatic body area
- MRI without and with contrast of any symptomatic body area

#### Any of the following:
- Negative radioidine scan and rising thyroglobulin level
- Inconclusive findings on conventional imaging (including I-131 study)

#### PET/CT (CPT® 78815)

#### Medullary and Anaplastic Thyroid Carcinomas

- Medullary carcinoma with elevated calcitonin or CEA, or signs or symptoms of recurrence
  - CT Neck with contrast (CPT® 70491)
  - CT Chest with contrast (CPT® 71260)
  - CT Abdomen either with (CPT® 74160) or without and with contrast (CPT® 74170)
  - Bone scan
  - See also: **ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology**

- Anaplastic carcinoma with signs or symptoms of recurrence
  - Either CT Abdomen/Pelvis with contrast (CPT® 74177) OR MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast

- Inconclusive conventional imaging
  - PET/CT (CPT® 78815)
### ONC-6.4: Surveillance/Follow Up

#### Follicular, Papillary and Hürthle Cell Carcinomas

<table>
<thead>
<tr>
<th>Imaging/Diagnostic Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
</tr>
<tr>
<td>- Neck ultrasound (CPT® 76536), chest x-ray, and laboratory studies every 6 months for the first year, then annually</td>
</tr>
<tr>
<td>For patients with One of the following:</td>
</tr>
<tr>
<td>- Node positive disease</td>
</tr>
<tr>
<td>- RAI-avid metastases</td>
</tr>
<tr>
<td>- Thyroid Nuclear Scan annually (CPT® 78018)</td>
</tr>
<tr>
<td>- CPT® 78020 may be approved as an add-on test to evaluate the degree of iodine uptake</td>
</tr>
</tbody>
</table>

#### Medullary Carcinomas

<table>
<thead>
<tr>
<th>Imaging/Diagnostic Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
</tr>
<tr>
<td>- CEA and calcitonin are required for monitoring medullary carcinomas</td>
</tr>
<tr>
<td>- Routine surveillance imaging is not indicated</td>
</tr>
</tbody>
</table>

#### Anaplastic Thyroid Carcinomas

<table>
<thead>
<tr>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
</tr>
<tr>
<td>- Every 3 months for 2 years:</td>
</tr>
<tr>
<td>- CT Neck with contrast (CPT® 70491)</td>
</tr>
<tr>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
</tbody>
</table>
References


## ONC-7: Small Cell Lung Cancer

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>ONC-7.1: Small Cell Lung Cancer (SCLC)</td>
<td>70</td>
</tr>
</tbody>
</table>
**ONC-7.0: General Considerations**

- Combined histologies of Small and Non-Small cell are considered Small cell lung cancer.
- Imaging is presently guided by traditional staging of limited or extensive disease.
- Extensive stage is either metastatic disease or an extent which cannot be encompassed by a single radiotherapy portal. Limited staging is confined to one side of the chest.
- Patients treated curatively for SCLC are at increased risk for developing a second lung cancer. If new lung nodule is seen on imaging without any evidence of other systemic disease, follow [CH-31.1: Lung Metastases](#) for work-up of nodule.
- For carcinoid (low grade neuroendocrine tumors) of the lung, see: [ONC-15: Neuroendocrine Cancers and Adrenal Tumors](#)
### ONC-7.1: Small Cell Lung Cancer (SCLC)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of pulmonary nodule or mass</td>
<td>See: <strong>ONC-8.2: Suspected/Diagnosis or CH-16: Solitary Pulmonary Nodule (SPN)</strong></td>
</tr>
<tr>
<td>Initial staging</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td>- CT Chest with contrast (CPT® 71260)</td>
<td></td>
</tr>
<tr>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
<td></td>
</tr>
<tr>
<td>- MRI Brain without and with contrast (CPT® 70553)</td>
<td></td>
</tr>
<tr>
<td>- Bone scan, if PET/CT not being done (See also: <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong></td>
<td></td>
</tr>
<tr>
<td>Confirm limited stage (non-metastatic) disease if initial staging imaging (CT and MRI) shows disease limited to the thorax</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>Treatment Response for one of the following:</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td>- After every 2 cycles of chemotherapy</td>
<td></td>
</tr>
<tr>
<td>- Following completion of chemoradiation</td>
<td></td>
</tr>
<tr>
<td>- CT Chest with contrast (CPT® 71260)</td>
<td></td>
</tr>
<tr>
<td>- CT Abdomen with contrast (CPT® 74160)</td>
<td></td>
</tr>
<tr>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) may be substituted for known pelvic disease or pelvic symptoms</td>
<td></td>
</tr>
<tr>
<td>- Bone scan (See also: <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong></td>
<td></td>
</tr>
<tr>
<td>- PET is not indicated for evaluation of treatment response in SCLC, but can be considered on a case-by-case basis. These cases should be forwarded for medical director review.</td>
<td></td>
</tr>
<tr>
<td>Restaging (suspected recurrence)</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td>- CT Chest with contrast (CPT® 71260)</td>
<td></td>
</tr>
<tr>
<td>- CT Abdomen with contrast (CPT® 74160)</td>
<td></td>
</tr>
<tr>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) may be substituted for known pelvic disease or pelvic symptoms</td>
<td></td>
</tr>
<tr>
<td>- Brain MRI without and with contrast (CPT® 70553)</td>
<td></td>
</tr>
<tr>
<td>- Bone scan (See: <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong></td>
<td></td>
</tr>
<tr>
<td>- PET is not indicated for evaluation of recurrent SCLC, but can be considered on a case-by-case basis. These cases should be forwarded for Medical Director review.</td>
<td></td>
</tr>
<tr>
<td>Complete or partial response to initial treatment, if prophylactic cranial irradiation (PCI) is planned.</td>
<td>MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td>Indication</td>
<td>Imaging Study</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Surveillance of Limited stage SCLC             | ✦ CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) and CT Abdomen without (CPT® 74150) or CT Abdomen with contrast (CPT® 74160) every 3 months for one year, every 6 months for two years and then annually  
✦ For new nodules, see: ONC-31.1: Lung Metastases for new nodule evaluation                                                                 |
| Surveillance of Extensive stage SCLC           | ✦ CT Chest without (CPT® 71250) or CT Chest with contrast (CPT® 71260) and CT Abdomen without (CPT® 74150) or CT Abdomen with contrast (CPT® 74160) every 2 months for one year, every 4 months for two years, every 6 months for two years and then annually  
✦ For new nodules, see: ONC-31.1: Lung Metastases for new nodule evaluation                                                                 |
| Surveillance for brain metastases:            | ✦ MRI Brain without and with contrast (CPT® 70553) every 4 months for the first 2 years                                                                 |
| If prophylactic cranial irradiation is not given |                                                                                                                                                 |
| Surveillance for brain metastases:            | ✦ Routine imaging of the brain is not indicated                                                                                                |
| After prophylactic cranial irradiation         |                                                                                                                                                 |
References


## ONC-8: Non-Small Cell Lung Cancer

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<td>ONC-8.1: Asymptomatic Screening</td>
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<td>ONC-8.2: Suspected/Diagnosis</td>
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<td>ONC-8.3: Initial Workup/Staging</td>
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<td>ONC-8.4: Restaging/Recurrence</td>
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</tr>
<tr>
<td>ONC-8.5: Surveillance/Follow-Up</td>
<td>79</td>
</tr>
</tbody>
</table>
ONC-8.0: General Considerations

- Non-small cell lung cancer includes adenocarcinoma, squamous cell carcinoma, adenosquamous and large cell tumors.

- PET/CT scan is not generally indicated for initial staging or restaging of NSCLC with distant metastatic disease, pleural/pericardial effusion, or for multiple sites that are located outside the chest cavity, when found on conventional imaging (i.e., liver, bone and adrenal metastases, etc.).

- PET/CT may be considered to confirm solitary focus of metastatic disease (i.e., brain or adrenal) if being considered for an aggressive surgical management.
ONC-8.1: Asymptomatic Screening
See CH-34: Lung Cancer Screening for criteria for low-dose CT scan chest for lung cancer screening.
## ONC-8.2: Suspected/Diagnosis

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal chest x-ray or clinical suspicion remains high despite a normal chest x-ray in symptomatic patient</td>
<td>CT Chest without contrast (CPT® 71250) or CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>Pulmonary nodule &lt; 8 mm in size noted on CT Chest</td>
<td>See: CH-16.2: Incidental Pulmonary Nodules Detected on CT Images</td>
</tr>
<tr>
<td>Pulmonary nodule 8 mm (0.8 cm) to 30 mm (3 cm) seen on CT Chest or MRI Chest</td>
<td>See CH-16.4: PET If PET is Positive: Qualifies as initial staging PET/CT</td>
</tr>
</tbody>
</table>
| Pulmonary mass 31 mm (3.1 cm) or greater seen on CT or MRI                 | PET/CT (CPT® 78815) can be approved prior to biopsy if one or more of the following applies:  
  • Resection will be performed instead of biopsy if PET confirms limited disease  
  • Multiple possible biopsy options are present within the chest and PET findings will be used to determine the most favorable biopsy site  
  • Biopsy is indicated prior to PET imaging for all other indications in pulmonary masses ≥ 31 mm (3.1 cm) in size |
| Mediastinal/Hilar Mass                                                                 | See also: CH-2: Lymphadenopathy                                                  |
| Paraneoplastic syndrome suspected                                           | See also: ONC-30.3: Paraneoplastic Syndromes                                   |
## ONC-8.3: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| All patients | Any or all of the following:  
  - CT Chest (CPT® 71260) with contrast  
  - CT Abdomen (CPT® 74160) with contrast  
    - CT Abdomen may be omitted if CT Chest report clearly documents upper abdomen through level of adrenals  
  - Bone scan, if PET/CT not being done  
See also: [ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology](#) |

| Any of the following:  
  - All Stage I-IIIB disease  
  - Stage IV disease confined to the chest region  
  - Conventional imaging is inconclusive | PET/CT (CPT® 78815) if not already completed prior to histological diagnosis |

***PET is not indicated for metastatic disease outside the chest cavity (e.g. malignant pleural/pericardial effusion or bony metastases) present on CT, MRI or bone scan***

| Any of the following:  
  - All Stage II-IV disease  
  - Stage I disease and considering surgical resection as primary therapy | MRI Brain without and with contrast (CPT® 70553) |

| Superior sulcus (Pancoast) tumor suspected | Any or all of the following:  
  - MRI Chest without and with contrast (CPT® 71552)  
  - MRI Cervical spine without and with contrast (CPT® 72156)  
  - MRI Thoracic spine without and with contrast (CPT® 72157) |
## ONC-8.4: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I or II patients who undergo definitive local treatment with surgery, radiation, or radiosurgery</td>
<td>Restaging imaging is not indicated. See also: Surveillance <strong>ONC-8.5: Surveillance/Follow-Up</strong></td>
</tr>
<tr>
<td>Measurable disease, undergoing active treatment</td>
<td>Any or all of the following every 2 cycles:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen with contrast (CPT® 74160)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) may be substituted for known pelvic disease or pelvic symptoms</td>
</tr>
<tr>
<td></td>
<td>- MRI Brain without and with contrast (CPT® 70553) for measurable brain metastases being treated with systemic therapy</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td>- Locally advanced (Stage III, non-metastatic, unresectable)</td>
<td>- CT Chest with (CPT® 71260) or CT Chest without contrast (CPT® 71250)</td>
</tr>
<tr>
<td>- Inoperable tumor if chemotherapy or chemoradiation was the initial treatment modality</td>
<td>- CT Abdomen with contrast (CPT® 74160)</td>
</tr>
<tr>
<td>- Inadequately resected disease</td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) may be substituted for known pelvic disease or pelvic symptoms</td>
</tr>
<tr>
<td>- Suspected recurrence</td>
<td>- MRI Chest without and with contrast (CPT® 71552)</td>
</tr>
<tr>
<td>Determine resectability following neo-adjuvant therapy</td>
<td>See <strong>ONC-31.1: Lung Metastases</strong> for new nodule evaluation</td>
</tr>
<tr>
<td>Newly identified lung nodule(s)</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td></td>
<td>***PET not indicated for metastatic disease outside the chest cavity (e.g. malignant pleural/pericardial effusion or bony metastases) present on CT, MRI or bone scan</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td>- Suspected/biopsy proven recurrence localized to the chest cavity</td>
<td></td>
</tr>
<tr>
<td>- Inconclusive findings conventional imaging</td>
<td></td>
</tr>
<tr>
<td>- To differentiate tumor from radiation scar/fibrosis</td>
<td></td>
</tr>
<tr>
<td>Any of the following:</td>
<td></td>
</tr>
<tr>
<td>- Following a demonstrated adequate response to neoadjuvant therapy if intracranial disease will preclude surgery</td>
<td></td>
</tr>
<tr>
<td>- Documented recurrence/progression</td>
<td></td>
</tr>
<tr>
<td>- New or worsening neurological signs or symptoms</td>
<td></td>
</tr>
</tbody>
</table>
## ONC-8.5: Surveillance/Follow-Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I-II</td>
<td>• CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) every 6 months for 2 years and then annually. ***Patients treated with radiation therapy and residual abnormality on imaging may undergo CT Chest every 3 months for the first year after therapy, every 6 months in year 2, annually thereafter.</td>
</tr>
<tr>
<td>Stage III-IV (metastatic sites treated with definitive intent)</td>
<td>• CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) every 3 months for 2 years, every 6 months for 3 years and then annually.</td>
</tr>
<tr>
<td>New lung nodule</td>
<td>See: <strong>ONC-31.1: Lung Metastases</strong></td>
</tr>
</tbody>
</table>
References


## ONC-9: Esophageal Cancer

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<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>ONC-9.0: General Considerations</td>
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<tr>
<td>ONC-9.1: Suspected/Diagnosis</td>
<td>83</td>
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<tr>
<td>ONC-9.2: Initial Workup/Staging</td>
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<tr>
<td>ONC-9.3: Restaging/Recurrence</td>
<td>85</td>
</tr>
<tr>
<td>ONC-9.4: Surveillance/Follow-Up</td>
<td>86</td>
</tr>
</tbody>
</table>
ONC-9.0: General Considerations

- Clinicians must describe esophageal cancer by cell type and in which third of the esophagus it occurs.
- Cancers of the upper and middle third are usually squamous cell and are highly associated with tobacco and alcohol abuse.
- Cancers of the gastroesophageal (GE) junction are treated as lower third cancers. Lower third cancers are usually adenocarcinomas; 62% of these arise in the setting of Barrett’s esophagus, a condition associated with high body mass index (BMI).
ONC-9.1: Suspected/Diagnosis

See also: NECK-3.1: Dysphagia for imaging guidelines for evaluation of suspected esophageal malignancy
## ONC-9.2: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biopsy proven</td>
<td>▶ CT Chest and Abdomen with contrast (CPT® 71260 and CPT® 74160)&lt;br&gt;▶ CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms</td>
</tr>
<tr>
<td>Upper 1/3 or neck mass</td>
<td>▶ CT Neck with contrast (CPT® 70491) for upper 1/3 primary and/or neck mass</td>
</tr>
<tr>
<td>Prior to start of neoadjuvant therapy in preparation for surgery and no evidence of metastatic disease by conventional imaging</td>
<td>▶ PET/CT (CPT® 78815)</td>
</tr>
</tbody>
</table>
## ONC-9.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>After primary chemoradiation therapy prior to surgery</td>
<td>CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast</td>
</tr>
<tr>
<td>Post-surgical resection</td>
<td>See Surveillance <a href="#">ONC-9.4: Surveillance/Follow-up</a></td>
</tr>
<tr>
<td>If conventional imaging is inconclusive or</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>Salvage surgical candidate with recurrence and no metastatic disease</td>
<td>□ PET imaging can be done as early as 6 weeks after completion of XRT if recent</td>
</tr>
<tr>
<td>documented by conventional imaging</td>
<td>CT findings are inconclusive and PET findings will alter immediate care</td>
</tr>
<tr>
<td></td>
<td>decision making</td>
</tr>
<tr>
<td>For any of the following:</td>
<td>CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast</td>
</tr>
<tr>
<td>▪ Signs or symptoms of recurrence</td>
<td></td>
</tr>
<tr>
<td>▪ Biopsy proven on follow-up endoscopy</td>
<td></td>
</tr>
<tr>
<td>▪ Recurrence suggested by other imaging (i.e. CXR or barium swallow)</td>
<td></td>
</tr>
<tr>
<td>If previously involved or new signs or symptoms</td>
<td>CT Pelvis with contrast (CPT® 72193) and/or CT Neck with contrast (CPT® 70491)</td>
</tr>
</tbody>
</table>
## ONC-9.4: Surveillance/Follow-Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 0-I disease</td>
<td>No routine advanced imaging indicated</td>
</tr>
<tr>
<td>Stage II-III disease</td>
<td>CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast every 6 months for 2 years</td>
</tr>
<tr>
<td>Stage IV disease</td>
<td>See: <strong>ONC-1.2: Phases of Oncology Imaging and General Phase-Related Considerations</strong></td>
</tr>
</tbody>
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# ONC-10: Other Thoracic Tumors

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<th>Title</th>
<th>Page</th>
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<td>ONC-10.2</td>
<td>Malignant Pleural Mesothelioma - Initial Workup/Staging</td>
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<td>ONC-10.3</td>
<td>Malignant Pleural Mesothelioma - Restaging</td>
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<td>ONC-10.4</td>
<td>Malignant Pleural Mesothelioma - Surveillance</td>
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<td>ONC-10.6</td>
<td>Thymoma And Thymic Carcinoma - Initial Workup/Staging</td>
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<td>ONC-10.7</td>
<td>Thymoma And Thymic Carcinoma - Restaging</td>
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<tr>
<td>ONC-10.8</td>
<td>Thymoma And Thymic Carcinoma - Surveillance</td>
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</tbody>
</table>
ONC-10.1: Malignant Pleural Mesothelioma - Suspected/Diagnosis

See CH-9: Asbestos Exposure for imaging guidelines for evaluation of suspected mesothelioma
**ONC-10.2: Malignant Pleural Mesothelioma - Initial Workup/Staging**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytologically or pathologically proven</td>
<td>- CT Chest (CPT® 71260) <strong>and</strong> CT Abdomen (CPT® 74160) with contrast  &lt;br&gt;- CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms  &lt;br&gt;- PET/CT (CPT® 78815) if no evidence of metastatic disease or inconclusive conventional imaging</td>
</tr>
<tr>
<td>Preoperative planning</td>
<td>- MRI Chest without and with contrast (CPT® 71552)</td>
</tr>
</tbody>
</table>
### ONC-10.3: Malignant Pleural Mesothelioma - Restaging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs or symptoms of recurrence</td>
<td>- CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms</td>
</tr>
<tr>
<td>Treatment with chemotherapy</td>
<td>Every 2 cycles:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms</td>
</tr>
<tr>
<td>Following induction chemotherapy prior to surgical resection</td>
<td>- CT Chest (CPT® 71260) and CT Abdomen (CPT® 74160) with contrast</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) may be approved instead of CT Abdomen if there are pelvic signs or symptoms</td>
</tr>
<tr>
<td></td>
<td>- PET/CT (CPT® 78815) if no evidence of metastatic disease</td>
</tr>
<tr>
<td>Inconclusive Chest CT</td>
<td>- MRI Chest without and with contrast (CPT® 71552)</td>
</tr>
</tbody>
</table>
## ONC-10.4: Malignant Pleural Mesothelioma - Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>CT Chest with contrast (CPT® 71260) and previously involved regions every 3 months for 2 years, then annually thereafter</td>
</tr>
</tbody>
</table>
**ONC-10.5: Thymoma and Thymic Carcinoma - Suspected/Diagnosis**

- See [CH-20: Mediastinal Mass](#) for imaging guidelines for evaluation of suspected thymic malignancies
### ONC-10.6: Thymoma and Thymic Carcinoma - Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encapsulated or invasive limited disease</td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>Extensive mediastinal involvement on Chest CT</td>
<td>- CT Abdomen with contrast (CPT® 74160)</td>
</tr>
<tr>
<td></td>
<td>- CT Neck with contrast (CPT® 70491)</td>
</tr>
<tr>
<td>Inconclusive finding on CT</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>- PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td></td>
<td>- MRI Chest without and with contrast (CPT® 71552)</td>
</tr>
<tr>
<td>Preoperative planning</td>
<td>- MRI Chest without and with contrast (CPT® 71552)</td>
</tr>
<tr>
<td>Thymic Carcinomas</td>
<td>- Image according to <strong>ONC-8: Non-Small Cell Lung Cancer</strong></td>
</tr>
</tbody>
</table>
## ONC-10.7: Thymoma and Thymic Carcinoma - Restaging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjuvant therapy following surgical resection</td>
<td>Follow surveillance imaging</td>
</tr>
<tr>
<td>For suspected recurrence</td>
<td>CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>Recurrence with extensive mediastinal involvement on chest CT</td>
<td>CT Abdomen with contrast (CPT® 74160)</td>
</tr>
<tr>
<td></td>
<td>CT Neck with contrast (CPT® 70491)</td>
</tr>
<tr>
<td>Thymic carcinomas</td>
<td>See <a href="#">ONC-8: Non-Small Cell Lung Cancer</a></td>
</tr>
<tr>
<td>Inconclusive finding on CT</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td></td>
<td>MRI Chest without and with contrast (CPT® 71552)</td>
</tr>
<tr>
<td>Extensive disease on chemotherapy</td>
<td>CT Neck (CPT® 70491), Chest (CPT® 71260), and Abdomen (CPT® 74160) with contrast, every 2 cycles of therapy</td>
</tr>
<tr>
<td></td>
<td>Following induction chemotherapy prior to surgical resection, PET/CT (CPT® 78815) if no evidence of metastatic disease</td>
</tr>
</tbody>
</table>
## ONC-10.8: Thymoma and Thymic Carcinoma - Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thymoma</td>
<td>CT Chest with contrast (CPT® 71260) and previously involved regions every 6 months for 2 years, then annually for next 10 years</td>
</tr>
<tr>
<td>Thymic carcinomas</td>
<td>CT Chest with contrast (CPT® 71260) every 6 months for 2 years and then annually for 5 years</td>
</tr>
</tbody>
</table>
References
## ONC-11: Breast Cancer

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<td>100</td>
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<td>ONC-11.2: Initial Workup/Staging</td>
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<tr>
<td>ONC-11.4: Surveillance/Follow Up</td>
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</tr>
</tbody>
</table>
ONC-11.0: General Considerations

- Advanced imaging to evaluate for distant metastases is not indicated for pre-invasive or in-situ breast cancer (histologies such as DCIS and LCIS). Bone scan has a high concordance rate with PET for detecting bone metastases.

- Scintimammography and Breast Specific Gamma Imaging (BSGI) are considered experimental and investigational.

- NOTE: Some payors have specific restrictions on PET imaging, and those coverage policies may supersede the recommendations for PET imaging in these guidelines.

- PET is not indicated for the following:
  - Non-invasive breast cancers
  - Prior to lymph node sampling in a patient with clinical stage I, II, or operable IIIA disease
  - Obvious multi-organ metastatic disease is present on CT or MRI
ONC-11.1: Suspected/Diagnosis
See BR-6: Breast MRI Indications for imaging guidelines for evaluation of suspected breast cancer
## ONC-11.2: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of the following:</td>
<td>• Bilateral Breast MRI (CPT® 77049)</td>
</tr>
<tr>
<td>◦ Biopsy proven invasive breast cancer or carcinoma in-situ</td>
<td></td>
</tr>
<tr>
<td>◦ Adenocarcinoma in axillary lymph node</td>
<td></td>
</tr>
<tr>
<td>Operable disease (stage I and II)</td>
<td>• Bilateral Breast MRI is helpful in determining surgical margins and extent of disease if breast conserving therapy is being considered</td>
</tr>
<tr>
<td></td>
<td>• For planned sentinel lymph node (SLN) biopsy:</td>
</tr>
<tr>
<td></td>
<td>Lymph system imaging (lymphoscintigraphy, CPT® 78195)</td>
</tr>
<tr>
<td>Clinical Stage III and Stage IV disease or for signs or symptoms of systemic disease (including elevated liver function tests or tumor markers)</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td></td>
<td>◦ CT Chest with contrast (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td></td>
<td>◦ Bone scan</td>
</tr>
<tr>
<td></td>
<td>See also: <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong></td>
</tr>
<tr>
<td>Inconclusive CT and bone scan</td>
<td>• PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>Bone pain</td>
<td>• Bone scan (see: <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong>)</td>
</tr>
<tr>
<td></td>
<td>See also: <strong>ONC-31.5: Bone (including Vertebral Metastases</strong></td>
</tr>
<tr>
<td></td>
<td>See also: <strong>ONC-31.6: Spinal Cord Compression</strong></td>
</tr>
</tbody>
</table>
## ONC-11.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of the following:</td>
<td>Bilateral MRI Breast without and with contrast (CPT® 77049)</td>
</tr>
<tr>
<td>- Biopsy proven breast or chest wall recurrence</td>
<td></td>
</tr>
<tr>
<td>- Suspicion of recurrence with inconclusive mammogram and/or ultrasound (BIRADS 0)</td>
<td></td>
</tr>
<tr>
<td>- Mammogram and ultrasound conflicts with physical exam</td>
<td></td>
</tr>
<tr>
<td>- End of planned neoadjuvant chemotherapy to determine resectability</td>
<td></td>
</tr>
<tr>
<td>Any of the following:</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td>- Elevated LFTs</td>
<td>- CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td>- Rising tumor markers</td>
<td>- Bone scan (See also: <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong>)</td>
</tr>
<tr>
<td>- Signs or symptoms of recurrence</td>
<td></td>
</tr>
<tr>
<td>- Biopsy proven recurrence</td>
<td></td>
</tr>
<tr>
<td>Treatment response in patients with metastatic disease and measurable disease on imaging</td>
<td>Any or all of the following for patients being treated with <strong>chemotherapy, every 2 cycles</strong>:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td></td>
<td>- Bone scan (see also: <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong>)</td>
</tr>
<tr>
<td></td>
<td>- MRI Brain without and with contrast (CPT® 70553) for patients receiving systemic treatment for brain metastases</td>
</tr>
<tr>
<td>Inconclusive CT, MRI, and/or bone scan for suspected recurrence, and further characterization is needed to make treatment decisions</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>Neither PET nor CT are indicated for systemic restaging after neoadjuvant chemotherapy or after surgery</td>
</tr>
<tr>
<td>- Assessing for residual disease after surgery</td>
<td></td>
</tr>
<tr>
<td>- Assessing response to neoadjuvant chemotherapy</td>
<td></td>
</tr>
<tr>
<td>Indication</td>
<td>Imaging Study</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>After lumpectomy or mastectomy, prior to adjuvant therapy</td>
<td></td>
</tr>
<tr>
<td>Bone metastasis as the only site of stage IV disease (excluding brain metastases) and a prior bone scan has not been performed for serial comparison</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
</tbody>
</table>
## ONC-11.4: Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Metastatic disease on a break from therapy with persistent measurable disease | Any or all of the following, every 3 months:  
- CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast  
- Bone scan (see also: ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology) |
| Asymptomatic non-metastatic disease                                        | No advanced imaging indicated                                                  |
| Breast imaging surveillance, including after bilateral mastectomy         | See BR-6: Breast MRI Indications for imaging guidelines                       |
References


**ONC-12: Sarcomas – Bone, Soft Tissue and GIST**

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<td>ONC-12.7: Bone Sarcomas - Restaging/Recurrence</td>
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<td>ONC-12.10: Benign Bone Tumors - Initial Workup/Staging</td>
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</tr>
<tr>
<td>ONC-12.12: Benign Bone Tumors - Surveillance/Follow Up</td>
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</tr>
</tbody>
</table>
**ONC-12.1: Bone and Soft Tissue Sarcomas - General Considerations**

Sarcomas are tumors of mesenchymal origin, classified as high-, intermediate-, and low-grade (G) tumors (sometimes described as “spindle cell” cancers). They can arise in any bony, cartilaginous, smooth muscle, skeletal muscle, or cardiac muscle tissue.

Sarcomas occur in both adult and pediatric patients, but some are more common in one age group than the other. Unless specified below, patients age ≥ 18 years old should be imaged according to this guideline section.

Exceptions include:

- Rhabdomyosarcoma patients of all ages should be imaged according to guidelines in **PEDONC-8.2: Rhabdomyosarcoma**
- Osteogenic sarcoma (Osteosarcoma) patients of all ages should be imaged according to guidelines in **PEDONC-9.3: Osteogenic Sarcoma (OS)**
- Ewing sarcoma and Primitive Neuroectodermal Tumor patients of all ages should be imaged according to guidelines in **PEDONC-9.4: Ewing Sarcoma and Primitive Neuroectodermal Tumors (ESFT)**
- Kaposi’s sarcoma patients of all ages should be imaged according to guidelines in **ONC-31.10: Kaposi’s Sarcoma**
# ONC-12.2: Soft Tissue Sarcomas - Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retroperitoneal or intraabdominal primary site</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>- Either CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td></td>
<td>- MRI without and with contrast of involved area</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td></td>
<td>- MRI without and with contrast of involved area</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>- Either CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>Myxoid round cell liposarcoma</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td></td>
<td>- MRI without and with contrast of involved area</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>- Either CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td></td>
<td>- MRI Cervical/Thoracic/Lumbar spine without and with contrast (CPT® 72156, CPT® 72157, and CPT® 72158)</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>Any of the following:</td>
</tr>
<tr>
<td></td>
<td>- MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td>Indication</td>
<td>Imaging Study</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>- Grade of tumor in doubt following biopsy</td>
<td></td>
</tr>
<tr>
<td>- Conventional imaging suggests solitary metastasis amenable to surgical resection</td>
<td></td>
</tr>
<tr>
<td>- Planning neoadjuvant therapy</td>
<td></td>
</tr>
<tr>
<td>- Prior to surgical resection for tumors &gt; 3cm on conventional imaging</td>
<td></td>
</tr>
<tr>
<td>Desmoid Tumors</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>CT without contrast or with contrast of the affected body part</td>
</tr>
<tr>
<td></td>
<td>MRI without contrast or without and with contrast of the affected body part</td>
</tr>
<tr>
<td></td>
<td>Imaging of lung, lymph node, and metastatic site for these tumors is not indicated</td>
</tr>
<tr>
<td>Dermatofibrosarcoma Protuberans (DFSP)</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>CT without contrast or with contrast of the affected body part</td>
</tr>
<tr>
<td></td>
<td>MRI without contrast or without and with contrast of the affected body part</td>
</tr>
<tr>
<td></td>
<td>CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for</td>
</tr>
<tr>
<td></td>
<td>pulmonary symptoms</td>
</tr>
<tr>
<td></td>
<td>abnormal chest x-ray</td>
</tr>
<tr>
<td></td>
<td>sarcomatous differentiation</td>
</tr>
</tbody>
</table>
## ONC-12.3: Soft Tissue Sarcomas - Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of the following:</td>
<td>MRI without and with contrast of affected body area</td>
</tr>
<tr>
<td>- After preoperative radiotherapy</td>
<td></td>
</tr>
<tr>
<td>- After surgical resection</td>
<td>CT without contrast or with contrast can be added if demonstrated bone involvement</td>
</tr>
<tr>
<td>- After adjuvant radiotherapy</td>
<td>Chest or lymph node imaging is not indicated if no abnormality on previous imaging</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>- Differentiate tumor from radiation or surgical fibrosis</td>
<td></td>
</tr>
<tr>
<td>- Determine response to neoadjuvant therapy</td>
<td>CT with contrast or MRI without and with contrast of affected body area every 2 cycles</td>
</tr>
<tr>
<td>- Confirm oligometastatic disease prior to curative intent surgical resection</td>
<td></td>
</tr>
<tr>
<td>Chemotherapy response for patients with measurable disease</td>
<td>Repeat all imaging for initial workup of specific histology and/or primary site</td>
</tr>
<tr>
<td>Local recurrence suspected</td>
<td></td>
</tr>
<tr>
<td>Preoperative planning prior to resection</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td></td>
<td>MRI without contrast or without and with contrast of involved area</td>
</tr>
<tr>
<td></td>
<td>CT (contrast as requested) of involved area</td>
</tr>
<tr>
<td>Dermatofibrosarcoma Protuberans (DFSP)</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>CT without contrast or with contrast of the affected body part</td>
</tr>
<tr>
<td></td>
<td>MRI without contrast or without and with contrast of the affected body part</td>
</tr>
<tr>
<td></td>
<td>CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for:</td>
</tr>
<tr>
<td></td>
<td>- pulmonary symptoms</td>
</tr>
<tr>
<td></td>
<td>- abnormal chest x-ray</td>
</tr>
<tr>
<td></td>
<td>- sarcomatous differentiation</td>
</tr>
</tbody>
</table>
## ONC-12.4: Soft Tissue Sarcomas Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Retroperitoneal/intraabdominal primary site                               | Any or all of the following every 3 months for 2 years, then every 6 months for 2 more years, then annually:  
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250)  
  - CT Abdomen/Pelvis with contrast (CPT® 74177)  
  - CT with contrast or MRI without and with contrast of any other involved body areas |
| Extremity, trunk, or Head/Neck primary site, low grade Stage I disease      | Any or all of the following every 6 months for 2 years, then annually until year 10:  
  - Chest x-ray  
    - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated for new findings on CXR or new/worsening pulmonary signs/symptoms  
    - CT with contrast, MRI without contrast, or MRI without and with contrast of primary site if primary site not easily evaluated by physical exam |
| Extremity, trunk, or Head/Neck primary site, Stages II-IV disease.          | Any or all of the following every 3 months for 2 years, then every 6 months for 2 more years, then annually:  
  - CT with contrast, MRI without contrast, or MRI without and with contrast of primary site  
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250)  
  - CT with contrast or MRI without and with contrast of any other involved body areas |
| Desmoid tumors                                                            | One of the following every 6 months for 3 years, then annually:  
  - CT without contrast or with contrast of the affected body part  
  - MRI without contrast or without and with contrast of the affected body part |
| Dermatofibrosarcoma Protuberans                                            | No routine imaging unless clinical signs/symptoms of recurrence |
**ONC-12.5: Gastrointestinal Stromal Tumor (GIST)**

**General Considerations**
GISTs are mesenchymal neoplasms of the gastrointestinal (GI) tract, mostly found in the stomach and upper small bowel, commonly metastasizing to the liver and abdominal cavity and primarily treated with surgery.

Use of the tyrosine kinase inhibitors (TKI), Imatinib mesylate (Gleevec®) and Sunitinib malate (Sutent®) has substantially changed imaging and treatment paradigms for GIST.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspected/Diagnosis</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>Initial Workup/Staging</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td></td>
<td>MRI Abdomen without and with contrast (CPT® 74183) is indicated for evaluation of liver lesions that are equivocal on CT imaging or for preoperative assessment of liver</td>
</tr>
<tr>
<td></td>
<td>PET is indicated for evaluation of inconclusive findings on conventional imaging</td>
</tr>
<tr>
<td>Restaging/Recurrence</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>CT Chest with contrast (CPT® 71260) if prior evidence of chest disease or signs or symptoms of chest disease</td>
</tr>
<tr>
<td></td>
<td>PET is indicated for evaluation of inconclusive findings on conventional imaging</td>
</tr>
<tr>
<td>Treatment Response</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>CT Chest with contrast (CPT® 71260) if prior evidence of chest disease or signs or symptoms of chest disease</td>
</tr>
<tr>
<td></td>
<td>PET is indicated for evaluation of inconclusive findings on conventional imaging</td>
</tr>
<tr>
<td>Surveillance/Follow-up</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177) every 6 months for 5 years, then annually</td>
</tr>
</tbody>
</table>
## ONC-12.6: Bone Sarcomas - Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Chondrosarcoma | Any or all of the following:  
  - MRI without contrast or without and with contrast of involved area  
  - CT (contrast as requested) of involved area  
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) |
| Chordoma     | Any or all of the following:  
  - MRI without contrast or without and with contrast of involved area  
  - CT (contrast as requested) of involved area  
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250)  
  - CT Abdomen/Pelvis with contrast (CPT® 74177)  
  - MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast  
  - Bone scan (see also: [ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology](#))  
  - PET may be approved for inconclusive conventional imaging |
**ONC-12.7: Bone Sarcomas - Restaging/Recurrence**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chondrosarcoma</td>
<td>Any or all of the following, after completion of radiotherapy or every 2 cycles of chemotherapy:</td>
</tr>
<tr>
<td></td>
<td>- MRI without contrast or without and with contrast of involved area</td>
</tr>
<tr>
<td></td>
<td>- CT (contrast as requested) of involved area</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td>Chordoma</td>
<td>Any or all of the following, after completion of radiotherapy or every 2 cycles of chemotherapy:</td>
</tr>
<tr>
<td></td>
<td>- MRI without contrast or without and with contrast of involved area</td>
</tr>
<tr>
<td></td>
<td>- CT (contrast as requested) of involved area</td>
</tr>
<tr>
<td></td>
<td>- Bone scan (see also: <a href="#">ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</a>)</td>
</tr>
<tr>
<td></td>
<td>- PET may be approved for inconclusive conventional imaging</td>
</tr>
</tbody>
</table>
## ONC-12.8: Bone Sarcomas - Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I Chondrosarcoma</td>
<td>Any or all of the following every 6 months for 2 years, then annually for 10 years:</td>
</tr>
<tr>
<td>Intracompartmental Chondrosarcoma</td>
<td>- Plain x-ray of primary site</td>
</tr>
<tr>
<td></td>
<td>- MRI without and with contrast is indicated for new findings on plain x-ray or new/worsening clinical symptoms.</td>
</tr>
<tr>
<td></td>
<td>- Chest x-ray</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for new findings on CXR, or new/worsening signs/symptoms.</td>
</tr>
<tr>
<td>Grade II or III Chondrosarcoma</td>
<td>Any or all of the following every 6 months for 5 years, then annually for 10 years:</td>
</tr>
<tr>
<td>Clear Cell Chondrosarcoma</td>
<td>- Plain x-ray of primary site</td>
</tr>
<tr>
<td>Extracompartmental Chondrosarcoma</td>
<td>- MRI without and with contrast is indicated for new findings on plain x-ray or new/worsening clinical symptoms.</td>
</tr>
<tr>
<td></td>
<td>- Chest x-ray or CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for new findings on CXR, or new/worsening signs/symptoms.</td>
</tr>
<tr>
<td>Chordoma</td>
<td>Any or all of the following every 6 months for 5 years, then annually until year 10:</td>
</tr>
<tr>
<td></td>
<td>- Plain x-ray of primary site</td>
</tr>
<tr>
<td></td>
<td>- MRI without and with contrast is indicated for new findings on plain x-ray or new/worsening clinical symptoms.</td>
</tr>
<tr>
<td></td>
<td>- Chest x-ray</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for new findings on CXR, or new/worsening signs/symptoms.</td>
</tr>
</tbody>
</table>
ONC-12.9: Benign Bone Tumors - General Considerations

- Variety of diagnoses, including osteoid osteochondroma, chondroblastoma, desmoplastic fibroma, Paget’s disease, osteoid osteoma and others
- Plain x-ray appearance is diagnostic for many benign bone tumors and advanced imaging is generally unnecessary except for preoperative planning
- MRI without and with contrast is the primary modality for advanced imaging of bone tumors, and can be approved to help narrow differential diagnoses and determine whether biopsy is indicated
- Some benign bone tumor types carry a risk of malignant degeneration over time, but routine advanced imaging surveillance has not been shown to improve outcomes for these patients
- MRI without and with contrast can be approved to evaluate new findings on plain x-ray new/worsening clinical symptoms not explained by a recent plain x-ray
- There are no data to support the use of PET/CT in the evaluation of benign bone tumors, and PET requests should not be approved without biopsy confirmation of a malignancy
- Other benign bone tumor patients of all ages should be imaged according to guidelines in PEDONC-9.2: Benign Bone Tumors
### ONC-12.10: Benign Bone Tumors - Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giant Cell Tumor of Bone (GCTB)</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td></td>
<td>✷ MRI without contrast or without and with contrast of involved area</td>
</tr>
<tr>
<td></td>
<td>✷ CT (contrast as requested) of involved area</td>
</tr>
<tr>
<td></td>
<td>✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>✷ Bone scan (see also: <a href="#">ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</a>)</td>
</tr>
<tr>
<td>Enchondroma</td>
<td>✷ MRI without contrast or without and with contrast of primary site</td>
</tr>
</tbody>
</table>
### ONC-12.11: Benign Bone Tumors - Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Giant Cell Tumor of Bone (GCTB) | Any or all of the following, after completion of radiotherapy or every 2 cycles of chemotherapy:  
  - MRI without contrast or without and with contrast of involved area  
  - CT (contrast as requested) of involved area  
  - Bone scan (see also: ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology) |
| Enchondroma                     | Generally no indication for this benign tumor unless symptoms                                                                                   |
### ONC-12.12: Benign Bone Tumors - Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giant Cell Tumor of Bone (GCTB)</td>
<td>Any or all of the following every 6 months for 2 years, then annually until year 10:</td>
</tr>
<tr>
<td></td>
<td>- Plain x-ray of primary site</td>
</tr>
<tr>
<td></td>
<td>- MRI without and with contrast is indicated for new findings on plain x-ray or new/worsening clinical symptoms.</td>
</tr>
<tr>
<td></td>
<td>- Chest x-ray</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for new findings on CXR, or new/worsening signs/symptoms.</td>
</tr>
<tr>
<td>Enchondroma</td>
<td>Plain films of primary site</td>
</tr>
</tbody>
</table>
References


### ONC-13: Pancreatic Cancer

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<th>Page</th>
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</table>
ONC-13.0: General Considerations

- This guideline refers only to adenocarcinoma of the exocrine pancreas, which accounts for over 90% of pancreatic malignancies. This guideline may also be used for cancer of the Ampulla of Vater.

- Neuroendocrine and carcinoid tumors of the pancreas are not included in this guideline, see: ONC-15: Neuroendocrine Cancers and Adrenal Tumors
# ONC-13.1: Screening Studies for Pancreatic Cancer

<table>
<thead>
<tr>
<th>Indications</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Age 40, or ten years earlier than the youngest affected family member, with any of the risk factors below* | **Initial/Baseline:**  
  - Endoscopic ultrasound (EUS)  
  - CT Abdomen (CPT® 74160) with or without and with contrast (CPT® 74170) or MRI Abdomen without and with contrast (CPT® 74183)  
  
  **Follow-Up:**  
  - EUS every year  
  - CT Abdomen (CPT® 74160) with or without and with contrast (CPT® 74170) or MRI Abdomen without and with contrast (CPT® 74183) annually |

*Increased risk factors for pancreatic cancer:*

- Family history of familial cancer syndromes including Peutz-Jegher’s Syndrome, Hereditary Breast and Ovarian Cancer Syndrome, Familial Atypical Multiple Mole-Melanoma Syndrome (FAMMM), Familial Adenomatous Polyposis
- Hereditary pancreatitis
- Familial pancreatic cancer (two or more first degree relatives or any combination of 3 or more first/second degree relatives)
- Hereditary pancreatic neuroendocrine tumors (Multiple Endocrine Neoplasia Type I [MEN-1], Von Hippel-lindau disease, neurofibromatosis Type 1, tuberous sclerosis)
## ONC-13.2: Suspected/Diagnosis

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>For any suspected symptoms only</td>
<td>♦ Ultrasound (CPT® 76700 or CPT® 76705)</td>
</tr>
<tr>
<td>Symptoms and abnormal lab(s), or physical exam findings, or abnormal</td>
<td>♦ CT Abdomen without and with contrast (CPT® 74170) or MRI Abdomen without and</td>
</tr>
<tr>
<td>ultrasound/ERCP</td>
<td>with contrast (CPT® 74183)</td>
</tr>
<tr>
<td>No resection or biopsy after abdomen CT</td>
<td>♦ Interval transabdominal ultrasound (CPT® 76705) or endoscopic ultrasound</td>
</tr>
<tr>
<td></td>
<td>(preferred).</td>
</tr>
<tr>
<td>Preoperative studies for potentially resectable tumors without confirmed</td>
<td>♦ See also: <strong>ONC-13.3: Initial Workup/Staging</strong></td>
</tr>
<tr>
<td>histologic diagnosis</td>
<td></td>
</tr>
</tbody>
</table>
### ONC-13.3: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>• CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>• CT Abdomen/Pelvis with (CPT® 74177) or without and with contrast or (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>• EUS</td>
</tr>
<tr>
<td>Preoperative planning or CT</td>
<td>• MRI Abdomen without and with contrast (CPT® 74183)</td>
</tr>
<tr>
<td>insufficient to determine resectability</td>
<td></td>
</tr>
<tr>
<td>No evidence of metastatic disease on CT or MRI</td>
<td>• PET/CT (CPT® 78815)</td>
</tr>
</tbody>
</table>
## ONC-13.4: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>For any of the following:</td>
<td></td>
</tr>
<tr>
<td>- After neoadjuvant chemoradiation</td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>- Suspected recurrence</td>
<td>- CT Abdomen/Pelvis with (CPT® 74177) or without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td>- CT with contrast of other involved or symptomatic areas</td>
<td>- PET/CT (CPT® 78815) for inconclusive conventional imaging post chemoradiation</td>
</tr>
<tr>
<td>Unresectable disease or metastatic disease on chemotherapy</td>
<td>Every 2 cycles of treatment (commonly every 6 to 8 weeks):</td>
</tr>
<tr>
<td>- CT Chest with contrast (CPT® 71260)</td>
<td>- CT Abdomen/Pelvis with (CPT® 74177) or without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td>- CT with contrast of other involved or symptomatic areas</td>
<td>- MRI Abdomen without and with contrast (CPT® 74183)</td>
</tr>
<tr>
<td>Unexplained elevated liver enzymes or inconclusive recent CT abnormality</td>
<td>See also: <strong>ONC-13.5: Surveillance/Follow Up</strong> for surveillance imaging</td>
</tr>
<tr>
<td>If complete surgical resection was initial therapy</td>
<td></td>
</tr>
</tbody>
</table>
### ONC-13.5: Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>Every 3 months for 2 years, then annually:</td>
</tr>
<tr>
<td></td>
<td>• CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>• Chest x-ray</td>
</tr>
</tbody>
</table>
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## ONC-14: Upper GI Cancers

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<th>Title</th>
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<td>ONC-14.2</td>
<td>Hepatocellular Carcinoma (HCC) - Suspected/Diagnosis</td>
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<tr>
<td>ONC-14.3</td>
<td>Hepatocellular Carcinoma (HCC) - Initial Workup/Staging</td>
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<tr>
<td>ONC-14.4</td>
<td>Hepatocellular Carcinoma (HCC) - Restaging/Recurrence</td>
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<tr>
<td>ONC-14.5</td>
<td>Hepatocellular Carcinoma (HCC) - Surveillance/Follow Up</td>
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<td>ONC-14.7</td>
<td>Gallbladder and Biliary Tumors - Restaging/Recurrence</td>
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<tr>
<td>ONC-14.8</td>
<td>Gallbladder and Biliary Tumors - Surveillance/Follow Up</td>
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<td>ONC-14.9</td>
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<td>ONC-14.10</td>
<td>Gastric Cancer - Restaging/Recurrence</td>
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<tr>
<td>ONC-14.11</td>
<td>Gastric Cancer - Surveillance/Follow Up</td>
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</tr>
</tbody>
</table>
ONC-14.1: Hepatocellular Carcinoma (HCC) - General Considerations

- Imaging studies in Liver Transplantation – See: **AB-42.4: Liver Transplant, Post-Transplant Lymphoproliferative Disease (PTLD)**

- Diagnosis: A biopsy is not always required for the diagnosis of Hepatocellular carcinoma (HCC). A dedicated triple-phase CT or MRI may be obtained. MRI with contrast is the test of choice for the evaluation of liver masses and offers soft tissue contrast resolution superior to CT as well as the possibility of using two different contrast agents, one of which is more blood flow based and the other which also demonstrates hepatobiliary function (Eovist). Classical imaging findings include:
  - Arterial phase hyperenhancement
  - Venous phase washout appearance
  - Capsule appearance
  - Threshold growth

- For patients who are high risk for developing HCC (cirrhosis, chronic Hepatitis B or current or prior HCC), if the liver lesion is > 1 cm with 2 classic enhancements on triple-phase CT or MRI, the diagnosis is confirmatory and biopsy is not needed.

- For lesions less than 1 cm or with less than 2 classical enhancements or for any liver lesions in patients who are not high risk, a biopsy is needed for histological confirmation.

- PET/CT scan is not indicated for diagnosis or staging of Hepatocellular carcinoma.
ONC-14.2: Hepatocellular Carcinoma (HCC) - Suspected/Diagnosis

► See AB-26: Cirrhosis and Liver Screening for Hepatocellular Carcinoma
► See AB-29: Liver Lesion Characterization
<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>CT Abdomen with contrast (CPT® 74160)</td>
</tr>
<tr>
<td></td>
<td>CT Abdomen without and with contrast (CPT® 74170)</td>
</tr>
<tr>
<td></td>
<td>CT Abdomen and Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast</td>
</tr>
</tbody>
</table>

**ONC-14.3: Hepatocellular Carcinoma (HCC) - Initial Workup/Staging**
## ONC-14.4: Hepatocellular Carcinoma (HCC) - Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the following:</td>
<td></td>
</tr>
<tr>
<td>♦ After initial therapy</td>
<td>♦ CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250)</td>
</tr>
<tr>
<td>♦ For suspected recurrence or new liver lesions</td>
<td></td>
</tr>
<tr>
<td>♦ Patients receiving systemic chemotherapy (every 6 to 8 weeks) or immunotherapy (every 3 months)</td>
<td></td>
</tr>
<tr>
<td>Hepatocellular Carcinoma treated with embolization</td>
<td>♦ CTA Abdomen (CPT® 74175) can be approved immediately prior to embolization</td>
</tr>
<tr>
<td></td>
<td>One of the following, immediately prior to and 1 month post-ablation:</td>
</tr>
<tr>
<td></td>
<td>♦ MRI Abdomen without and with contrast (CPT® 74183)</td>
</tr>
<tr>
<td></td>
<td>♦ CT Abdomen without and with contrast (CPT® 74170)</td>
</tr>
<tr>
<td></td>
<td>For surveillance, see <a href="#">ONC-14.5: HCC and Biliary Tumors-Surveillance/Follow Up</a> below</td>
</tr>
<tr>
<td>Hepatocellular Carcinoma awaiting liver transplant</td>
<td>♦ See <a href="#">AB-42.1: Liver Transplant, Pre-Transplant</a> for imaging guidelines</td>
</tr>
</tbody>
</table>
### ONC-14.5: Hepatocellular Carcinoma (HCC) - Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatocellular Carcinoma:</td>
<td>Every 3 months for 2 years, then annually:</td>
</tr>
<tr>
<td>- Treated with surgical resection</td>
<td>- CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250)</td>
</tr>
<tr>
<td>- Treated with embolization</td>
<td><strong>And ONE of the following:</strong></td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen with contrast (CPT® 74160)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen without and with contrast (CPT® 74170)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen and Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>- MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>Hepatocellular Carcinoma treated with liver transplant</td>
<td>CT Abdomen without and with contrast (CPT® 74170) or MRI Abdomen without and with contrast (CPT® 74183) at 6 and 12 months post-transplant, then annually until 5 years</td>
</tr>
<tr>
<td></td>
<td>Also see <strong>AB-42.3: Liver Transplant, Post-transplant</strong></td>
</tr>
<tr>
<td>If unable to perform CT (due to contrast allergy or renal insufficiency)</td>
<td>MRI Abdomen without and with contrast (CPT® 74183)</td>
</tr>
</tbody>
</table>
## ONC-14.6: Gallbladder and Biliary Tumors - Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen with contrast (CPT® 74160)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen without and with contrast (CPT® 74170)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen and Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>- MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>If no evidence of metastatic disease by conventional imaging, and determining if patient is a surgical candidate</td>
<td>- PET/CT (CPT® 78815)</td>
</tr>
</tbody>
</table>
## ONS-14.7: Gallbladder and Biliary Tumors - Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of the following:</td>
<td></td>
</tr>
<tr>
<td>◦ After initial therapy</td>
<td>◦ CT Abdomen with contrast (CPT® 74160) or CT Abdomen without and with contrast (CPT® 74170) or MRI Abdomen without and with contrast (CPT® 74183)</td>
</tr>
<tr>
<td>◦ For suspected recurrence or new liver lesions</td>
<td>◦ CT Chest with contrast (CPT® 71260) or CT Pelvis with contrast (CPT® 72193) may only be obtained for known disease or new signs/symptoms</td>
</tr>
<tr>
<td>◦ Patients receiving systemic chemotherapy (every 2 cycles)</td>
<td></td>
</tr>
</tbody>
</table>
## ONC-14.8: Gallbladder and Biliary Tumors - Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| All patients       | Annually for 5 years:  
  * CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250)  
  And ONE of the following:  
  * CT Abdomen with contrast (CPT® 74160)  
  * CT Abdomen without and with contrast (CPT® 74170)  
  * CT Abdomen and Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178)  
  * MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast |
**ONC-14.9: Gastric Cancer - Initial Workup/Staging**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>✦ CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>✦ CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen/Pelvis without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>✦ Gastric cancer ≥ T2 or higher with no metastatic disease by conventional imaging</td>
</tr>
<tr>
<td></td>
<td>✦ PET/CT (CPT® 78815)</td>
</tr>
</tbody>
</table>
## ONC-14.10: Gastric Cancer - Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| After initial therapy and any suspected recurrence | - CT Abdomen with contrast (CPT® 74160), CT Abdomen without and with contrast (CPT® 74170), or MRI Abdomen without and with contrast (CPT® 74183)  
- CT Chest with contrast (CPT® 71260) for known disease or new signs/symptoms |
| New liver lesion(s) and primary site controlled | - CT Abdomen (CPT® 74170) or MRI Abdomen without and with contrast (CPT® 74183)  
- CT Chest with contrast (CPT® 71260) |
| One of the following: | - CT Chest (CPT® 71260 ) and CT Abdomen/Pelvis with contrast (CPT® 74177) |
| ◦ After neoadjuvant therapy for presumed surgically resectable disease or  
◦ Post curative chemoradiation being treated without surgery | |
| Inconclusive findings on conventional imaging | - PET/CT (CPT® 78815) |
## ONC-14.11: Gastric Cancer - Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I (treated with resection alone)</td>
<td>✤ No routine imaging unless clinical signs/symptoms of recurrence</td>
</tr>
<tr>
<td>Any of the following:</td>
<td></td>
</tr>
<tr>
<td>✤ Stage I treated with systemic therapy</td>
<td>✤ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) annually for 5 years</td>
</tr>
<tr>
<td>✤ Stages II-III</td>
<td></td>
</tr>
<tr>
<td>✤ Stage IV - Metastatic disease (post definitive treatment of all measurable disease or being observed off therapy)</td>
<td></td>
</tr>
</tbody>
</table>
References


# ONC-15: Neuroendocrine Cancers and Adrenal Tumors

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<td>ONC-15.4: Gastrointestinal/Pancreatic Neuroendocrine Cancers - Restaging/Recurrence</td>
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<td>ONC-15.5: Gastrointestinal/Pancreatic Neuroendocrine Cancers - Surveillance</td>
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<tr>
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<td>ONC-15.7: Bronchopulmonary Or Thymic Carcinoid - Restaging/Recurrence</td>
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<td>ONC-15.8: Bronchopulmonary Or Thymic Carcinoid - Surveillance</td>
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<td>ONC-15.10: Adrenal Tumors - Initial Workup/Staging</td>
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<td>ONC-15.12: Adrenal Tumors - Surveillance</td>
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</tbody>
</table>
ONC-15.1: General Considerations

This guideline includes low-grade or well-differentiated carcinoid and endocrine tumors of the pancreas such as insulinoma, glucagonoma, VIPoma, gastrinoma, somatostatinoma and others as well as catecholamine-secreting tumors of the adrenal such as pheochromocytoma, paraganglioma, adrenocortical carcinoma, and others.

- For poorly-differentiated or high-grade small cell or large cell neuroendocrine tumors of either GI/pancreatic primary or unknown primary origin see: **ONC-31.8: Extrathoracic Small Cell and Large Cell Neuroendocrine Tumors**

- For poorly-differentiated or high grade neuroendocrine tumors of the lung, refer to **ONC-7: Small Lung Cell Cancer**

- For neuroendocrine tumor of unknown primary follow guidelines in **ONC-31.7: Carcinoma of Unknown Primary Site**

- Neuroblastoma, ganglioneuroblastoma, and ganglioneuroma occurring in adults should be imaged according to **PEDONC-6: Neuroblastoma**

- Also see **AB-15: Zollinger-Ellison Syndrome (ZES)** in the Abdomen Imaging Guidelines

- Many are associated with Multiple Endocrine Neoplasia (MEN) familial syndromes. – See **PEDONC-2.8: Multiple Endocrine Neoplasias (MEN)** for screening recommendations

- Somatostatin receptor-based imaging is more sensitive and specific for evaluation of well-differentiated neuroendocrine tumors and may be performed using $^{111}$In DTPA Octreotide scintigraphy or $^{68}$Gallium-labeled DOTATATE PET/CT scan. This study is not part of evaluation of poorly-differentiated or high grade neuroendocrine tumors, which are imaged according to: **ONC-31.8: Extrathoracic Small Cell and Large Cell Neuroendocrine Tumors**
### ONC-15.2: Gastrointestinal/Pancreatic Neuroendocrine Cancers - Suspected/Diagnosis

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>✷ Systemic symptoms strongly suggestive of functioning neuroendocrine tumor</td>
<td>Any or all of the following:</td>
</tr>
<tr>
<td>✷ Suspicious findings on other imaging studies</td>
<td>☞ CT Abdomen/Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td>✷ Unexplained elevation in any of the following:</td>
<td>☞ If CT inconclusive, MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast is indicated</td>
</tr>
<tr>
<td>☞ Chromogranin A</td>
<td>❌ CT Chest with contrast (CPT® 71260) or CXR</td>
</tr>
<tr>
<td>☞ 5HIAA</td>
<td>✷ Continued suspicion with negative/inconclusive CT scan or MRI</td>
</tr>
<tr>
<td>☞ Insulin</td>
<td>ONE of the following:</td>
</tr>
<tr>
<td>☞ VIP</td>
<td>☞ Octreotide scan (either CPT® 78802 – whole body single day study OR CPT® 78804 whole body two or more day study).</td>
</tr>
<tr>
<td>☞ Glucagon</td>
<td>☞ CPT® 78803 (SPECT) may be approved as an add-on test to any one of the above codes</td>
</tr>
<tr>
<td>☞ Gastrin</td>
<td>☞ 68Gallium-labeled DOTATATE PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>☞ Substance P</td>
<td></td>
</tr>
<tr>
<td>☞ Serotonin</td>
<td></td>
</tr>
<tr>
<td>☞ Somatostatin</td>
<td></td>
</tr>
</tbody>
</table>
## ONC-15.3: Gastrointestinal/Pancreatic Neuroendocrine Cancers - Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinoid, pancreatic endocrine tumors</td>
<td>If not already done:</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>- If CT inconclusive, MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast is indicated</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>Inconclusive CT or MRI scans</td>
<td>ONE of the following:</td>
</tr>
<tr>
<td></td>
<td>- Octreotide scan (either CPT® 78802 – whole body single day study OR CPT® 78804 - whole body two or more day study).</td>
</tr>
<tr>
<td></td>
<td>- CPT® 78803 (SPECT) may be approved as an add-on test to any one of the above codes</td>
</tr>
<tr>
<td></td>
<td>- ⁶⁸Gallium-labeled DOTATATE PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>All, after complete resection fails to resolve secretion of pathologic levels of hormones or neurotransmitter compounds, and nuclear imaging (Octreotide, or Somatostatin scintigraphy) is negative</td>
<td>FDG-PET/CT scan (CPT® 78815)</td>
</tr>
</tbody>
</table>
# ONC-15.4: Gastrointestinal/Pancreatic Neuroendocrine Cancers - Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All after surgical resection</td>
<td>See: Surveillance below</td>
</tr>
<tr>
<td>Unresectable/metastatic disease on treatment with somatostatin analogues</td>
<td>CT of involved body area no more frequently than every 3 months</td>
</tr>
<tr>
<td>Unresectable/metastatic disease on treatment with chemotherapy</td>
<td>CT of involved body area every 2 cycles (6 to 8 weeks)</td>
</tr>
<tr>
<td>Progression of symptoms or elevation of tumor markers</td>
<td>CT Chest without (CPT® 71250) or with contrast (CPT® 71260) ONE of the following: CT Abdomen/Pelvis with contrast (CPT® 74177) CT Abdomen/Pelvis without and with contrast (CPT® 74178) MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>Continued suspicion for recurrence with negative or inconclusive CT scan or MRI</td>
<td>ONE of the following: Octreotide scan (either CPT® 78802 – whole body single day study OR CPT® 78804 - whole body two or more day study). CPT® 78803 (SPECT) may be approved as an add-on test to any one of the above codes 68Gallium-labeled DOTATATE PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>All above studies done and negative/inconclusive</td>
<td>FDG-PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>Indication</td>
<td>Imaging Study</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Neuroendocrine tumors of the bowel (small/large)</td>
<td>CT Abdomen/Pelvis (CPT® 74177) once at 3 to 12 months postoperatively and annually thereafter for 10 years</td>
</tr>
<tr>
<td>Neuroendocrine tumors of the upper abdomen (i.e., pancreas, stomach)</td>
<td>CT Abdomen (CPT® 74160) once at 3 to 12 months postoperatively and annually thereafter for 10 years</td>
</tr>
</tbody>
</table>
## ONC-15.6: Bronchopulmonary or Thymic Carcinoid - Initial Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial diagnosis</td>
<td>If not already done:</td>
</tr>
<tr>
<td></td>
<td>♦ CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>♦ CT Abdomen/Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>♦ If CT inconclusive, MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast is indicated</td>
</tr>
<tr>
<td>Inconclusive CT or MRI scans</td>
<td>ONE of the following:</td>
</tr>
<tr>
<td></td>
<td>♦ Octreotide scan (either CPT® 78802 – whole body single day study OR CPT® 78804 - whole body two or more day study).</td>
</tr>
<tr>
<td></td>
<td>♦ CPT® 78803 (SPECT) may be approved as an add-on test to any of the above codes</td>
</tr>
<tr>
<td></td>
<td>♦ 68Gallium-labeled DOTATATE PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>All, after complete resection fails to</td>
<td>♦ FDG- PET/CT scan (CPT® 78815)</td>
</tr>
<tr>
<td>resolve secretion of pathologic levels</td>
<td></td>
</tr>
<tr>
<td>of hormones or neurotransmitter</td>
<td></td>
</tr>
<tr>
<td>compounds, and nuclear imaging (MBG,</td>
<td></td>
</tr>
<tr>
<td>Octreotide, or Somatostatin scintigraphy</td>
<td></td>
</tr>
<tr>
<td>is negative</td>
<td></td>
</tr>
</tbody>
</table>
### ONC-15.7: Bronchopulmonary or Thymic Carcinoid - Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All after surgical resection</td>
<td>✦ See: Surveillance below</td>
</tr>
<tr>
<td>Unresectable/metastatic disease on treatment with somatostatin analogues</td>
<td>✦ CT of involved body area no more frequently than every 3 months</td>
</tr>
<tr>
<td>Unresectable/metastatic disease on treatment with chemotherapy</td>
<td>✦ CT of involved body area every 2 cycles (6 to 8 weeks)</td>
</tr>
<tr>
<td>Progression of symptoms or elevation of tumor markers</td>
<td>✦ CT Chest without (CPT® 71250) or with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td><strong>ONE of the following:</strong></td>
</tr>
<tr>
<td></td>
<td>✦ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>✦ CT Abdomen/Pelvis without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>✦ MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>Continued suspicion for recurrence with negative or inconclusive CT scan or MRI</td>
<td><strong>ONE of the following:</strong></td>
</tr>
<tr>
<td></td>
<td>✦ Octreotide scan (either CPT® 78802 – whole body single day study OR CPT® 78804 - whole body two or more day study).</td>
</tr>
<tr>
<td></td>
<td>▪ CPT® 78803 (SPECT) may be approved as an add-on test to any one of the above codes</td>
</tr>
<tr>
<td></td>
<td>✦ 68Gallium-labeled DOTATATE PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>All above studies done and negative/inconclusive</td>
<td>✦ FDG-PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
</tbody>
</table>
## ONC-15.8: Bronchopulmonary or Thymic Carcinoid - Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinoid tumors of lung or thymus</td>
<td>CT Chest with contrast (CPT® 71260) or CT Chest without contrast (CPT® 71250) once at 3 to 12 months post resection and annually thereafter for 10 years</td>
</tr>
</tbody>
</table>
ONC-15.9: Adrenal Tumors - Suspected/Diagnosis
See AB-16: Adrenal Cortical Lesions for imaging guidelines for evaluation of suspected adrenal malignancies

If concern for genetic predisposition syndrome such as MEN, neurofibromatosis, or Von Hippel-lindau disease, see screening recommendations in PEDONC-2: Screening Imaging and Cancer Predisposition Syndromes.
# ONC-15.10: Adrenal Tumors - Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>For any of the following:</td>
<td>If not already done:</td>
</tr>
<tr>
<td>- Pheochromocytoma</td>
<td>- CT Chest without (CPT® 71250) or with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>- Paraganglioma</td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>- Paraganglineuroma</td>
<td>- CT Abdomen/Pelvis without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>- MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>Continued suspicion with negative/inconclusive CT scan or MRI</td>
<td>ONE of the following:</td>
</tr>
<tr>
<td></td>
<td>- MIBG Scan (either CPT® 78802 – whole body single day study OR CPT® 78804 - whole body two or more day study).</td>
</tr>
<tr>
<td></td>
<td>- CPT® 78803 (SPECT) may be approved as an add-on test to any one of the above codes</td>
</tr>
<tr>
<td></td>
<td>- Octreotide scan (either CPT® 78802 – whole body single day study OR CPT® 78804 - whole body two or more day study).</td>
</tr>
<tr>
<td></td>
<td>- CPT® 78803 (SPECT) may be approved as an add-on test to any one of the above codes</td>
</tr>
<tr>
<td></td>
<td>- 68Gallium-labeled DOTATATE PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>All above studies done and negative/inconclusive</td>
<td>- FDG-PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>Adrenocortical carcinoma</td>
<td>- CT Chest without (CPT® 71250) or with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis without and with contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>- MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
</tbody>
</table>
## ONC-15.11: Adrenal Tumors - Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>If surgery is primary therapy</td>
<td>CT Abdomen (CPT® 74160) one time within first year post resection then go to surveillance recommendations</td>
</tr>
<tr>
<td>Recurrence, progression of symptoms, or elevation of tumor markers</td>
<td>CT Chest without (CPT® 71250) or with contrast (CPT® 71260) &lt;br&gt;ONE of the following: &lt;br&gt;CT Abdomen/Pelvis with contrast (CPT® 74177) &lt;br&gt;CT Abdomen/Pelvis without and with contrast (CPT® 74178) &lt;br&gt;MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>Continued suspicion for recurrence with negative or inconclusive CT scan or MRI</td>
<td>ONE of the following: &lt;br&gt;MIBG scan (either CPT® 78802 – whole body single day study OR CPT® 78804 - whole body two or more day study). &lt;br&gt; CPT® 78803 (SPECT) may be approved as an add-on test to any one of the above codes &lt;br&gt;Octreotide scan (either CPT® 78802 – whole body single day study OR CPT® 78804 - whole body two or more day study). &lt;br&gt; CPT® 78803 (SPECT) may be approved as an add-on test to any one of the above codes &lt;br&gt;68Gallium-labeled DOTATATE PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>All above studies done and negative/inconclusive</td>
<td>FDG-PET/CT scan (CPT® 78815 or CPT® 78816)</td>
</tr>
</tbody>
</table>
## ONC-15.12: Adrenal Tumors - Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>CT Abdomen with contrast (CPT® 74160) and CT of other involved body areas with contrast annually for 10 years</td>
</tr>
</tbody>
</table>
References
### ONC-16: Colorectal Cancer

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONC-16.0: General Considerations</td>
<td>157</td>
</tr>
<tr>
<td>ONC-16.1: Suspected/Diagnosis</td>
<td>158</td>
</tr>
<tr>
<td>ONC-16.2: Initial Work-Up/Staging</td>
<td>159</td>
</tr>
<tr>
<td>ONC-16.3: Restaging/Recurrence</td>
<td>160</td>
</tr>
<tr>
<td>ONC-16.4: Surveillance/Follow Up</td>
<td>161</td>
</tr>
</tbody>
</table>
ONC-16.0: General Considerations

- Duodenal and small bowel adenocarcinoma follows imaging guidelines for colorectal cancer.
- Neuroendocrine tumors of the bowel are covered in: ONC-15: Neuroendocrine Cancers and Adrenal Tumors
- Appendiceal adenocarcinoma (including pseudomyxoma peritonei) follows imaging guidelines for colorectal cancer
**ONC-16.1: Suspected/Diagnosis**

- See **AB-22: GI Bleeding** or **AB-25: CT Colonography (CTC)** for imaging guidelines for evaluation of suspected colorectal malignancies.
# ONC-16.2: Initial Work-Up/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinoma within a polyp that is completely removed</td>
<td>♦ No advanced imaging needed</td>
</tr>
<tr>
<td>Invasive adenocarcinoma</td>
<td>♦ CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td>Further evaluation of an inconclusive liver lesion seen on CT</td>
<td>♦ MRI Abdomen without and with contrast (CPT® 74183)</td>
</tr>
<tr>
<td>One of the following:</td>
<td>♦ PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>♦ Isolated metastatic lesion(s) on other imaging and patient is a candidate for aggressive surgical resection or other localized treatment to metastasis for curative intent</td>
<td></td>
</tr>
<tr>
<td>♦ Inconclusive conventional imaging</td>
<td></td>
</tr>
<tr>
<td>Rectal adenocarcinoma</td>
<td>In addition to above, for preoperative planning:</td>
</tr>
<tr>
<td></td>
<td>♦ Endorectal ultrasound (CPT® 76872)</td>
</tr>
<tr>
<td></td>
<td>♦ MRI Pelvis without and with contrast (CPT® 72197)</td>
</tr>
</tbody>
</table>
## ONC-16.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete resection</td>
<td>See Surveillance below</td>
</tr>
<tr>
<td>Recurrence suspected</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
</tbody>
</table>
| After completion of planned neoadjuvant therapy                          | Patients without metastatic disease, when requested by operating surgeon for operative planning:  
  - CT with contrast or MRI without and with contrast of all operative sites  
  All other patients:  
  - No advanced imaging since surgery is “planned”                                                                                          |
| Unresected primary disease or metastatic disease on chemotherapy         | Every 2 cycles of chemotherapy treatment and at the completion of chemoradiotherapy:  
  - CT Chest with contrast (CPT® 71260)  
  - CT Abdomen/Pelvis with contrast (CPT® 74177)  
  - CT with contrast of other involved or symptomatic areas                                                                                   |
| One of the following:                                                    | MRI Abdomen without and with contrast (CPT® 74183)                                                                                                                                                           |
|   - Further evaluation of an inconclusive liver lesion seen on CT        |                                                                                                                                                                                                            |
|   - Postoperative elevated or rising CEA or LFTs with negative recent conventional imaging                                           |                                                                                                                                                                                                            |
| One of the following:                                                    | PET/CT (CPT® 78815)                                                                                                                                                                                        |
|   - Postoperative elevated or rising CEA or LFTs with negative recent conventional imaging                                           |                                                                                                                                                                                                            |
|   - Isolated metastatic lesion(s) on other imaging and patient is a candidate for aggressive surgical resection or other localized treatment to metastasis for curative intent |                                                                                                                                                                                                            |
|   - Differentiate local tumor recurrence from postoperative and/or post-radiation scarring                                          |                                                                                                                                                                                                            |
| New or worsening pelvic pain and recent CT imaging negative or inconclusive| MRI Pelvis without and with contrast (CPT® 72197)                                                                                                                                                           |
**ONC-16.4: Surveillance/Follow-Up**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging/Lab Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Colon and rectal adenocarcinoma:</strong></td>
<td></td>
</tr>
<tr>
<td>◆ Stage I</td>
<td>No routine advanced imaging indicated</td>
</tr>
<tr>
<td><strong>Colon and rectal adenocarcinoma:</strong></td>
<td></td>
</tr>
<tr>
<td>◆ Stage II-III</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast annually for 5 years</td>
</tr>
<tr>
<td><strong>Colon and rectal adenocarcinoma:</strong></td>
<td></td>
</tr>
<tr>
<td>◆ Stage IV - Metastatic disease (post definitive treatment of all measurable disease or being observed off therapy)</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast every 6 months for 2 years and then annually for 3 years</td>
</tr>
<tr>
<td><strong>Pseudomyxoma peritonei</strong></td>
<td>One of each of the following, every 3 months for first year, then every 6 months for 4 more years:</td>
</tr>
<tr>
<td></td>
<td>◆ CT Chest with (CPT® 71260) or without contrast(CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>◆ CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
</tbody>
</table>
References


## ONC-17: Renal Cell Cancer (RCC)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>ONC-17.1: Suspected/Diagnosis</td>
<td>165</td>
</tr>
<tr>
<td>ONC-17.2: Initial Workup/Staging</td>
<td>166</td>
</tr>
<tr>
<td>ONC-17.3: Restaging/Recurrence</td>
<td>167</td>
</tr>
<tr>
<td>ONC-17.4: Surveillance</td>
<td>168</td>
</tr>
</tbody>
</table>
ONC-17.0: General Considerations

- PET is not routinely indicated for initial diagnosis, staging or restaging of renal cell cancer.
- Data is lacking on improvements in outcomes of renal cell cancer survivors based upon surveillance imaging schedules.
- A minority of adult patients with renal cell cancer (RCC) will have translocations in TFE3 or TFEB, which have a different natural history than “adult type” RCC. Patients of any age with TFE3 or TFEB translocated RCC should be imaged according to guidelines in PEDONC-7.4: Pediatric Renal Cell Carcinoma (RCC).
- Patients of any age with Wilms tumor should be imaged according to guidelines in section PEDONC-7.2: Unilateral Wilms Tumor (UWT) or PEDONC-7.3 Bilateral Wilms Tumor (BWT).
Oncology Imaging

ONC-17.1: Suspected/Diagnosis

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solitary renal mass suspicious for renal cell cancer</td>
<td>See <strong>AB-35: Indeterminate Renal Lesion</strong> for imaging guidelines for evaluation of suspected renal malignancies</td>
</tr>
<tr>
<td></td>
<td>Chest x-ray</td>
</tr>
<tr>
<td></td>
<td>CT chest with contrast with (CPT® 71260) or without contrast (CPT® 71250) may be obtained for one of the following:</td>
</tr>
<tr>
<td></td>
<td>New chest x-ray abnormalities</td>
</tr>
<tr>
<td></td>
<td>Pulmonary symptoms</td>
</tr>
<tr>
<td></td>
<td>Histologically confirmed renal cell cancer</td>
</tr>
</tbody>
</table>
## ONC-17.2: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>If not done previously:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis, contrast as requested</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>- MRI Abdomen without and with contrast (CPT® 74183)</td>
</tr>
<tr>
<td>- Extension of tumor into the vena cava by other imaging</td>
<td></td>
</tr>
<tr>
<td>- Inconclusive findings on CT</td>
<td></td>
</tr>
<tr>
<td>Bone pain</td>
<td>- Bone scan (See <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong>)</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>- MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td>- Signs/symptoms of brain metastases</td>
<td></td>
</tr>
<tr>
<td>- IL-2 therapy being considered</td>
<td></td>
</tr>
</tbody>
</table>
## ONC-17.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unresectable disease or metastatic disease on chemotherapy</td>
<td>Every 2 cycles of treatment (commonly every 6 to 8 weeks):</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- CT with contrast of other involved or symptomatic areas</td>
</tr>
<tr>
<td>Unresectable disease or metastatic disease on immunotherapy</td>
<td>Every 3 months:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- CT with contrast of other involved or symptomatic areas</td>
</tr>
<tr>
<td>Recurrence suspected</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
</tbody>
</table>
## ONC-17.4: Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| **Stage I Disease, active surveillance** | One of the following, once within 6 months of surveillance initiation:  
  ✷ CT Abdomen with (CPT® 74160) or without and with contrast (CPT® 74170)  
  ✷ MRI (CPT® 74183) Abdomen without and with contrast  
  **Annually for 5 years:**  
  ✷ Chest x-ray  
  ✷ Abdominal ultrasound (CPT® 76770 or CPT® 76775)  
  ✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated for any of the following:  
    - New or worsening thoracic symptoms  
    - New or worsening CXR findings  
    - Pulmonary nodule on prior CT Chest, see [ONC-31.1: Lung Metastases](#) for imaging guidelines  
  ✷ CT (CPT® 74170) or MRI (CPT® 74183) Abdomen without and with contrast is indicated for any of the following:  
    - New or worsening abdominal symptoms  
    - New or worsening US findings |
| **Stage I or II Disease, post-ablation therapy** | One of each of the following, 3 to 6 months post-ablation:  
  ✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250)  
  ✷ CT (CPT® 74170) or MRI (CPT® 74183) Abdomen without and with contrast  
  **Annually for 5 years:**  
  ✷ Chest x-ray  
  ✷ Abdominal ultrasound (CPT® 76770 or CPT® 76775)  
  ✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated for any of the following:  
    - New or worsening thoracic symptoms  
    - New or worsening CXR findings  
    - Pulmonary nodule on prior CT Chest, see [ONC-31.1: Lung Metastases](#) for imaging guidelines  
  ✷ CT (CPT® 74170) or MRI (CPT® 74183) Abdomen without and with contrast is indicated for any of the following:  
    - New or worsening abdominal symptoms  
    - New or worsening US findings  
    - Suspicious abnormality on post-ablative CT |
<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>**Stage I Disease, after partial or complete</td>
<td>One of each of the following, 3 to 12 months post-resection:</td>
</tr>
<tr>
<td>nephrectomy**</td>
<td>✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>✷ CT Abdomen contrast as requested.</td>
</tr>
<tr>
<td></td>
<td><strong>Annually for 3 years:</strong></td>
</tr>
<tr>
<td></td>
<td>✷ Chest x-ray</td>
</tr>
<tr>
<td></td>
<td>✷ Abdominal ultrasound (CPT® 76770 or CPT® 76775)</td>
</tr>
<tr>
<td></td>
<td>✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is</td>
</tr>
<tr>
<td></td>
<td>indicated for any of the following:</td>
</tr>
<tr>
<td></td>
<td>▪ New or worsening thoracic symptoms</td>
</tr>
<tr>
<td></td>
<td>▪ New or worsening CXR findings</td>
</tr>
<tr>
<td></td>
<td>▪ Pulmonary nodule on prior CT Chest, see <strong>ONC-31.1: Lung Metastases</strong> for</td>
</tr>
<tr>
<td></td>
<td>imaging guidelines</td>
</tr>
<tr>
<td></td>
<td>✷ CT (CPT® 74170) or MRI (CPT® 74183) Abdomen without and with contrast is</td>
</tr>
<tr>
<td></td>
<td>indicated for any of the following:</td>
</tr>
<tr>
<td></td>
<td>▪ New or worsening abdominal symptoms</td>
</tr>
<tr>
<td></td>
<td>▪ New or worsening US findings</td>
</tr>
<tr>
<td></td>
<td>▪ Suspicious abnormality on post-operative CT</td>
</tr>
<tr>
<td><strong>Stage II Disease, post-nephrectomy</strong></td>
<td>One of each of the following, 3 to 6 months post-resection:</td>
</tr>
<tr>
<td></td>
<td>✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>✷ CT Abdomen with (CPT® 74160) or without contrast (CPT® 74150)</td>
</tr>
<tr>
<td></td>
<td>✷ One of the following, every 6 months for 3 years, then annually to year 5:</td>
</tr>
<tr>
<td></td>
<td>✷ Chest x-ray</td>
</tr>
<tr>
<td></td>
<td>✷ Abdominal ultrasound (CPT® 76770 or CPT® 76775)</td>
</tr>
<tr>
<td></td>
<td>✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is</td>
</tr>
<tr>
<td></td>
<td>indicated for any of the following:</td>
</tr>
<tr>
<td></td>
<td>▪ New or worsening thoracic symptoms</td>
</tr>
<tr>
<td></td>
<td>▪ New or worsening CXR findings</td>
</tr>
<tr>
<td></td>
<td>▪ Pulmonary nodule on prior CT Chest, see <strong>ONC-31.1: Lung Metastases</strong> for</td>
</tr>
<tr>
<td></td>
<td>imaging guidelines</td>
</tr>
<tr>
<td></td>
<td>✷ CT (CPT® 74170) or MRI (CPT® 74183) Abdomen without and with contrast is</td>
</tr>
<tr>
<td></td>
<td>indicated for any of the following:</td>
</tr>
<tr>
<td></td>
<td>▪ New or worsening abdominal symptoms</td>
</tr>
<tr>
<td></td>
<td>▪ New or worsening US findings</td>
</tr>
<tr>
<td></td>
<td>▪ Suspicious abnormality on post-operative CT</td>
</tr>
<tr>
<td><strong>Any of the following:</strong></td>
<td>One of each of the following, 3 to 6 months post-resection:</td>
</tr>
<tr>
<td>✷ Stage III Disease, post-nephrectomy</td>
<td>✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td>✷ Stage IV Disease, not receiving therapy, no</td>
<td>✷ CT Abdomen with (CPT® 74160) or without contrast (CPT® 74150)</td>
</tr>
<tr>
<td>measurable disease</td>
<td>✷ One of the following, every 3 months for 3 years, then annually to year 5:</td>
</tr>
<tr>
<td></td>
<td>✷ CT Chest with (CPT® 71260) or without contrast (CPT® 71250)</td>
</tr>
<tr>
<td></td>
<td>✷ CT Abdomen with (CPT® 74160) or without contrast (CPT® 74150)</td>
</tr>
<tr>
<td>Indication</td>
<td>Imaging Study</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Metastatic disease on a break from therapy with persistent measurable disease</td>
<td>Any or all of the following, every 3 months:</td>
</tr>
<tr>
<td></td>
<td>✦ CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td></td>
<td>✦ CT with contrast of other involved or symptomatic areas</td>
</tr>
</tbody>
</table>
References
# ONC-18: Transitional Cell Cancer

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
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<td><strong>ONC-18.1</strong>: Suspected/Diagnosis</td>
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<tr>
<td><strong>ONC-18.2</strong>: Initial Workup/Staging</td>
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<td><strong>ONC-18.3</strong>: Restaging/Recurrence</td>
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<tr>
<td><strong>ONC-18.4</strong>: Surveillance</td>
<td>177</td>
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</table>
**ONC-18.0: General Considerations**

- Transitional cell cancers can include: tumors of the bladder, ureters, prostate, urethra, or renal pelvis. For primary cancer of the kidney, see [ONC-17: Renal Cell Cancer (RCC)](#).

- Most common histology of bladder cancer is transitional cell (TCC) or urothelial carcinoma (UCC). Rare histologies include squamous cell (imaged according to [ONC-18: Transitional Cell Cancer](#)) or small cell (imaged according to [ONC-31.8: Extrathoracic Small Cell and Large Cell](#)).

- Urachal cancer is rare type of bladder cancer; the most common histology is adenocarcinoma. Rare histologies include transitional cell, sarcoma and small cell carcinoma. These are imaged according to muscle invasive bladder cancer.

- PET not routinely indicated in transitional cell cancer with exception noted below in [ONC-18.2: Initial Workup/Staging](#).
ONC-18.1: Suspected/Diagnosis

See AB-39: Hematuria and Hydronephrosis for imaging guidelines for evaluation of suspected transitional cell malignancies
# ONC-18.2: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| All patients | One of the following:  
- CT Abdomen/Pelvis without and with contrast (CPT® 74178)  
- MRI Abdomen (CPT® 74183) and MRI Pelvis (CPT® 72197) without and with contrast if contraindication to CT contrast  
- CT Abdomen/Pelvis without contrast (CPT® 74176) with retrograde pyelogram or renal ultrasound (CPT® 76770 or CPT® 76775) in patients who cannot receive either CT or MRI contrast |
| Any of the following:  
- Muscle invasive bladder carcinoma  
- Urethral carcinoma  
- Urothelial carcinoma of the prostate | CT Chest without (CPT® 71250) or with contrast (CPT® 71260) |
| Patients without metastatic disease, when requested by operating surgeon for operative planning | CT with contrast or MRI without and with contrast of all operative sites |
| To determine neoadjuvant therapy versus surgery as initial treatment (if conventional imaging negative or inconclusive) | PET/CT (CPT® 78815) |
### ONC-18.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any stage &gt; T1 or treated with definitive surgery</td>
<td>“Baseline” CT Abdomen/Pelvis with contrast (CPT® 74177) after surgery if requested</td>
</tr>
<tr>
<td>Recurrence suspicion</td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) or with and without contrast (CPT® 74178)</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260) if abnormal chest x-ray or lung nodules seen on other imaging</td>
</tr>
<tr>
<td>After neoadjuvant therapy and before resection</td>
<td>CT Chest with contrast (CPT® 71260) and CT Urogram (CPT® 74178)</td>
</tr>
<tr>
<td>Monitoring therapy for metastatic disease</td>
<td>Every 2 cycles of therapy:</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260) if prior involvement or abnormal chest x-ray</td>
</tr>
</tbody>
</table>
## ONC-18.4: Surveillance/Follow Up

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial and minimally invasive (Tis and T1) transitional cell carcinoma of the bladder or upper tracts</td>
<td>✷ CT Urogram (CPT® 74178) every 2 years for high grade lesions for 10 years</td>
</tr>
<tr>
<td>Minimally invasive transitional carcinoma of the bladder treated with cystectomy</td>
<td>✷ CT urogram (CPT® 74178) at 3 months post-cystectomy, and then annually for 5 years</td>
</tr>
<tr>
<td>Any other muscle invasive lower and upper genitourinary tumors</td>
<td>✷ CT Abdomen/Pelvis with contrast (CPT® 74177) or without and with contrast (CPT® 74178) every 6 months for 2 years, then annually for 3 more years</td>
</tr>
<tr>
<td></td>
<td>✷ Chest x-ray</td>
</tr>
<tr>
<td>Urethral cancers (high risk T1 or greater) and urothelial carcinoma of the prostate</td>
<td>✷ CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast every 6 months for 2 years and then annually</td>
</tr>
<tr>
<td></td>
<td>✷ Chest x-ray</td>
</tr>
</tbody>
</table>
References
## ONC-19: Prostate Cancer

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>ONC-19.0: General Considerations</td>
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<td>ONC-19.1: Suspected/Diagnosis</td>
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<td>ONC-19.2: Initial Workup/Staging</td>
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<td>ONC-19.3: Restaging/Recurrence</td>
<td>184</td>
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<tr>
<td>ONC-19.4: Follow Up On Active Surveillance</td>
<td>186</td>
</tr>
<tr>
<td>ONC-19.5: Surveillance/Follow Up For Treated Prostate Cancer</td>
<td>187</td>
</tr>
</tbody>
</table>
ONC-19.0: General Considerations

- The natural history of prostate cancer is highly variable. Therapeutic options may include surgery and radiation therapy along with Active Surveillance (also called observation, watchful waiting, expectant management, or deferred treatment).
- When working up patients with suspected new or recurrent prostate cancer, MRI should not be used to make a decision not to biopsy. If the clinical suspicion is high enough, biopsy must be performed.
- PET/CT scan using $^{18}$F-FDG and $^{18}$F-Na Fluoride radiotracers is considered investigational and experimental for all indications for prostate cancer.
- PET/CT scan using newer radiotracers such as $^{11}$C Choline and $^{18}$F-Fluciclovine (AXUMIN®) have emerging data in restaging previously treated prostate cancer. Performance of these PET/CT scans in detecting early recurrence is poor at low PSA values of <2 ng/mL. False positive rate is high and histological confirmation of positive sites is recommended. Hence, its use is restricted to the evaluation of a rising PSA after conventional imaging is negative. Coverage may vary with individual health care plan.
  - Additionally, while detection of low-volume recurrence after treatment of prostate cancer may influence therapeutic decisions; there is lack of evidence on how this approach has any meaningful impact on overall survival.
- As laser prostate ablation is considered investigational and experimental at this time, advanced imaging for treatment planning and/or surveillance of laser prostate ablation is not indicated.
- As high intensity focused ultrasound prostate ablation is considered investigational and experimental at this time, and advanced imaging for treatment planning and/or surveillance of high intensity focused ultrasound prostate ablation is not indicated.
- MR Spectroscopy (CPT® 76390) is considered investigational and experimental in the evaluation of prostate cancer at this time.
- Based on the local extent of tumor, PSA level and Gleason score, prostate cancer patients can be classified into risk groups as below:

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>T stage</th>
<th>Gleason score</th>
<th>PSA (ng/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>T1c</td>
<td>≤ 6</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Low</td>
<td>T1-T2a</td>
<td>≤ 6</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Intermediate</td>
<td>T2b-T2c</td>
<td>7</td>
<td>10-20</td>
</tr>
<tr>
<td>High</td>
<td>T3a</td>
<td>8 to 10</td>
<td>&gt; 20</td>
</tr>
<tr>
<td>Very High</td>
<td>T3b-T4</td>
<td>8 to 10</td>
<td>&gt; 20</td>
</tr>
</tbody>
</table>
3D Rendering of MRI for MRI / Ultrasound Fusion Biopsy:

- When specific target lesion(s) is (are) detected on mpMRI prostate and classified as PIRADS 4 or 5, then 3D Rendering at independent workstation (CPT® 76377, 3D rendering requiring image post-processing on an independent workstation) for the radiologist to generate prostate segmentation data image set for target identification on MRI/TRUS fusion biopsy is approvable either as subsequent separate standalone request or as retrospective request for medical necessity.

- If there is no target lesion identified on MRI then 3D rendering and MRI/TRUS fusion biopsy is not generally indicated. The urologist may request MRI/TRUS fusion biopsy of a PIRADS 1-3 lesion. Then approval of 3D rendering at independent workstation (CPT® 76377) can be considered on a case-by-case basis. These cases should be referred for Medical Director review.

- The 3D rendering for the TRUS component of the fusion is a part of the UroNav Fusion Equipment Software and an additional 3D code CPT® 76376 or CPT® 76377 should not be approved.

- eviCore maintains that CPT® 76376 (3D rendering not requiring image post-processing on an independent workstation) should not be separately reimbursed, since this function is built into the imaging software.
### ONC-19.1: Suspected/Diagnosis

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Elevated PSA, abnormal exam, or other clinical suspicion and no previous biopsy | - Transrectal ultrasound (TRUS, CPT® 76872)  
- TRUS-guided biopsy (CPT® 76942)  
- MRI is not appropriate as the initial imaging study  
- MRI should not be used to make a decision not to biopsy⁵ |
| At least one negative/non-diagnostic TRUS biopsy and one of the following: | One of the following may be approved:  
- MRI Pelvis without contrast (CPT® 72195)  
- MRI Pelvis without and with contrast (CPT® 72197)  
- MRI/US fusion biopsy (CPT® 77021 and CPT® 76942)  
- MRI guided biopsy (CPT® 77021)  
- Note: MRI should not be used to make a decision not to biopsy⁵ |
|  - Continued increase in PSA  
  - Abnormal DRE                                                                 |  |
| PIRADS 4 or 5 lesion identified on recent diagnostic MRI Pelvis (CPT® 72195 or CPT® 72197) and planning for biopsy to be done by MRI/TRUS fusion technique |  
- 3D Rendering (CPT® 76377)  
- CPT® 76376 should not be separately reimbursed (See Preface-4.1: 3D Rendering for additional details) |
| Any of the following:  
- Multifocal (3 or more lesions) high-grade prostatic intraepithelial neoplasia (PIN)  
- Atypia on biopsy                                                              |  
- Extended pattern rebiopsy within 6 months by TRUS-guided biopsy (CPT® 76942) |
| Focal PIN (1-2 lesions)                                                   | One of the following may be approved:  
- MRI Pelvis without contrast (CPT® 72195)  
- MRI Pelvis without and with contrast (CPT® 72197)  
- MRI/US fusion biopsy (CPT® 77021 and CPT® 76942)  
- MRI guided biopsy (CPT® 77021) |
### ONC-19.2: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pelvic</strong> imaging for any one of the following:</td>
<td>One of the following can be approved:</td>
</tr>
<tr>
<td>- Clinical stage T3 or T4 disease (palpable disease outside of the prostate capsule)</td>
<td>- CT Pelvis with contrast (CPT® 72193)</td>
</tr>
<tr>
<td>- Clinical stage T2b (tumor involving &gt; 50% of one lobe) or stage T2c (tumor involving both lobes)</td>
<td>- MRI Pelvis without and with contrast (CPT® 72197)</td>
</tr>
<tr>
<td>- Gleason score ≥ 7</td>
<td></td>
</tr>
<tr>
<td>- PSA &gt; 10 ng/ml</td>
<td></td>
</tr>
<tr>
<td>- Nomogram predicts &gt;10% probability of pelvic lymph node involvement</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abdominal imaging for any of the following:</th>
<th>One of the following can be approved:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- PSA ≥ 20 ng/mL</td>
<td>- CT Abdomen with contrast (CPT® 74160)</td>
</tr>
<tr>
<td>- Gleason score ≥ 8</td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) if being completed in the same imaging session as CT Pelvis</td>
</tr>
<tr>
<td>- Clinical stage ≥T3 or greater (palpable disease outside of the prostate capsule)</td>
<td></td>
</tr>
<tr>
<td>- At least 2 of the following are present:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clinical stage T2b (tumor involving &gt; 50% of one lobe) or stage T2c (tumor involving both lobes)</td>
</tr>
<tr>
<td></td>
<td>- Gleason score ≥ 7</td>
</tr>
<tr>
<td></td>
<td>- PSA &gt; 10 ng/mL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Any of the following:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Bone pain</td>
<td>- Bone scan (See <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong>)</td>
</tr>
<tr>
<td>- Gleason score ≥ 7</td>
<td>- If neurological compromise, see: <strong>ONC-31.5: Bone (Including Vertebral) Metastases</strong></td>
</tr>
<tr>
<td>- PSA ≥ 20 ng/mL</td>
<td></td>
</tr>
<tr>
<td>- Clinical stage ≥ T3 or greater (palpable disease outside of the prostate capsule)</td>
<td></td>
</tr>
<tr>
<td>- Clinical Stage T2b (tumor involving &gt; 50% of one lobe) or stage T2c (tumor involving both lobes) and with PSA &gt; 10 ng/ml</td>
<td></td>
</tr>
</tbody>
</table>
## ONC-19.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients with one or more of the following:</td>
<td>Any of the following can be approved:</td>
</tr>
<tr>
<td>New finding on most recent CT or MRI that was inconclusive</td>
<td>• CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>PSA rising on 2 consecutive measurements while on endocrine/hormonal therapy</td>
<td>• MRI Pelvis without contrast (CPT® 72195) or without and with contrast (CPT® 72197)</td>
</tr>
<tr>
<td>Clinical suspicion of recurrence or progression</td>
<td></td>
</tr>
</tbody>
</table>

| Patients with prior radical prostatectomy and any of the following:      | Any of the following can be approved:                                         |
| Palpable anastomotic recurrence                                          | • CT Abdomen/Pelvis with contrast (CPT® 74177)                              |
| PSA remains > 0.2 after at least 2 PSAs                                  |   • MRI Pelvis without contrast (CPT® 72195) or without and with contrast (CPT® 72197) if CT findings are inconclusive |
| Initial undetectable PSA increasing on 2 consecutive PSAs               | • Bone scan (See ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology)        |

| Patients with prior Radiation Therapy and any of the following:         | Any of the following can be approved:                                         |
| Clinical suspicion of relapsed disease                                   | • CT Abdomen/Pelvis with contrast (CPT® 74177)                              |
| PSA increasing on at least 2 consecutive values above post-XRT baseline |   • MRI Pelvis without contrast (CPT® 72195) or without and with contrast (CPT® 72197) if CT findings are inconclusive |
|                                                                           | • Bone scan (See ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology)        |
|                                                                           | • Chest x-ray                                                                 |
|                                                                           |   • CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for new findings on CXR, or new/worsening signs/symptoms. |

<p>| ALL of the following:                                                    | ONE of the following:                                                        |
| Prior treatment with prostatectomy and/or radiation therapy and          | • ¹¹C Choline PET/CT scan (CPT® 78815 or CPT® 78816)                         |
| Consecutive rise in PSA and                                              | • ¹⁸F-Fluciclovine PET/CT scan (CPT® 78815 or CPT® 78816)                    |
| PSA ≥2 ng/mL and                                                          |                                                                              |
| CT scan and bone scan are negative for metastatic disease                |                                                                              |</p>
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<thead>
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<th>Imaging Study</th>
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<tbody>
<tr>
<td>Hormone Refractory Prostate Cancer (HRPC):</td>
<td>◦ CT Abdomen/Pelvis with contrast (CPT® 74177) and CT scan of any involved body part every 2 cycles (6 to 8 weeks)</td>
</tr>
<tr>
<td>◦ Receiving treatment with chemotherapy</td>
<td>◦ CT Abdomen/Pelvis with contrast (CPT® 74177) and CT scan of any involved body part every 3 months</td>
</tr>
<tr>
<td>◦ Receiving anti-androgen therapy</td>
<td></td>
</tr>
<tr>
<td>Prior to start of Xoftigo (Radium-223) therapy</td>
<td>◦ One time CT Chest/Abdomen/Pelvis with contrast (CPT® 71260 and CPT® 74177).</td>
</tr>
<tr>
<td>All patients with one or more of the following:</td>
<td>◦ MRI Pelvis without contrast (CPT® 72195) or without and with contrast (CPT® 72197)</td>
</tr>
<tr>
<td>◦ Obvious progression by DRE with plans for prostatectomy or radiation therapy</td>
<td></td>
</tr>
<tr>
<td>◦ Repeat TRUS biopsy for rising PSA shows progression to a higher Gleason’s score with plans for prostatectomy or radiation therapy</td>
<td></td>
</tr>
</tbody>
</table>
**ONC-19.4: Follow-Up On Active Surveillance**

Active surveillance is being increasingly utilized in prostate cancer. This therapeutic option involves regimented monitoring of an individual with known diagnosis of low risk prostate cancer for disease progression, without specific anticancer treatment. While being treated with active surveillance, an individual is generally considered a potential candidate for curative intent treatment approaches in the event that disease progression occurs.

It is important to distinguish active surveillance from watchful waiting (or observation), which is generally employed in patients with limited life expectancy. Watchful waiting involves cessation of routine monitoring and treatment is initiated only if symptoms develop.

Current active surveillance guidelines suggest the following protocol:

- PSA every 6 months
- Digital Rectal Exam (DRE) every 12 months
- Repeat TRUS-guided prostate biopsy every 12 months

Routine use of multi-parametric prostate MRI or MR/US fusion biopsy in active surveillance patients is considered investigational/experimental at this time

**MRI should not be used to make a decision not to biopsy**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging/Lab Study</th>
</tr>
</thead>
</table>
| Patients on active surveillance  | ✷ Routine MRI or MR/US fusion biopsy for annual surveillance is considered investigational at this time  
|                                  | ✷ MRI pelvis without (CPT® 72195) or without and with contrast (CPT® 72197) can be approved if one of the following apply:  
|                                  |  ▪ Progression is suspected based on DRE changes or rising PSA and a recent TRUS biopsy was negative  
|                                  |  ▪ Routine TRUS biopsy reveals progression of Gleason score                       |
## ONC-19.5: Surveillance/Follow Up For Treated Prostate Cancer

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<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| All Stages    | ✦ PSA and DRE every 6 months, even in patients with metastatic disease.  
✦ Routine imaging is not indicated for patients being monitored on or off therapy. |
References
# ONC-20: Testicular, Ovarian and Extragonalad Germ Cell Tumors

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</table>
ONC-20.0: General Considerations

This section applies to primary germ cell tumors occurring outside the central nervous system in patients age > 15 years at the time of initial diagnosis. Patients age ≤ 15 years at diagnosis should be imaged according to pediatric guidelines in: PEDONC-10: Pediatric Germ Cell Tumors

- These guidelines are for germ cell tumors of the testicle, ovary and extragonadal sites as well as malignant sex cord stromal tumors (granulosa cell and Sertoli-Leydig cell tumors).
- Requests for imaging must state the histologic type of the cancer being evaluated.
- Classified as pure seminomas (dysergeminomas, 40%) or Non-seminomatous germ cell tumors (NSGCT, 60%).
  - Pure seminomas are defined as pure seminoma histology with a normal serum concentration of alpha fetoprotein (AFP). Seminomas with elevated AFP are by definition Mixed.
  - Required for TNM staging are the tumor marker levels indicated by “S” (TNMS)
  - Mixed tumors are treated as NSGCTs, as they tend to be more aggressive.
  - The NSGCT histologies include:
    - Yolk-Sac tumors
    - Immature (malignant) teratomas
    - Choriocarcinomas (< 1%)
    - Embryonal cell carcinomas (15% to 20%)
    - Endodermal Sinus Tumors (ovarian)
    - Combinations of all of the above (Mixed)
  - MRI in place of CT scans to reduce risk of secondary malignancy is not supported by the peer-reviewed literature. CT scans are indicated for surveillance and is the preferred modality of imaging to assess for recurrence.
  - PET/CT Scan is not indicated for evaluation of non-seminomatous germ cell tumors
# ONC-20.1: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orchiectomy/oophorectomy is both diagnostic and therapeutic</td>
<td>All patients, following orchiectomy or oophorectomy:</td>
</tr>
<tr>
<td></td>
<td>♦ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>For any of the following:</td>
<td>CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>♦ Non-seminoma histology</td>
<td></td>
</tr>
<tr>
<td>♦ Abdominal lymphadenopathy noted on CT scan</td>
<td></td>
</tr>
<tr>
<td>♦ Abnormal CXR or signs/symptoms suggestive of chest involvement</td>
<td></td>
</tr>
<tr>
<td>Extragonadal Germ Cell Tumor</td>
<td>CT Chest with contrast (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
</tbody>
</table>
## ONC-20.2: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment response for stage II-IV patients with measurable disease on CT</td>
<td>CT with contrast of previously involved body areas every 2 cycles</td>
</tr>
<tr>
<td>Seminoma with residual mass &gt; 3 cm</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td></td>
<td>- PET imaging can be done as early as 6 weeks after completion of XRT if recent CT findings are inconclusive and PET findings will alter immediate care decision making</td>
</tr>
<tr>
<td>End of therapy evaluation for NSGCT post chemotherapy or post retroperitoneal lymph node dissection (RPLND)</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>Recurrence suspected, including increased tumor markers</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td></td>
<td>Ultrasound (CPT® 76856 or CPT® 76857) of the remaining gonad if applicable</td>
</tr>
<tr>
<td>Unexplained pulmonary symptoms despite a negative CXR, or new findings on CXR</td>
<td>CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td>All others</td>
<td>See Surveillance below</td>
</tr>
</tbody>
</table>
## ONC-20.3: Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I Ovarian Dysgerminomas or low grade immature Teratomas</td>
<td>No routine advanced imaging needed</td>
</tr>
<tr>
<td>Stage I Seminoma treated with orchiectomy alone (no radiotherapy or chemotherapy, also called active surveillance)</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) at 3, 6 and 12 months post-orchiectomy, then annually until year 5</td>
</tr>
<tr>
<td>Stage I Seminoma treated with radiotherapy and/or chemotherapy</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) annually for 3 years</td>
</tr>
<tr>
<td>Stage IIA Seminomas treated with radiotherapy or chemotherapy</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) once at 3 months then once at 6 to 12 months after completion of therapy, then annually until year 3</td>
</tr>
<tr>
<td>Stage IIB, IIC, and III Seminomas treated with chemotherapy</td>
<td>For patients with ≤ 3 cm residual mass: CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) every 4 months for 1 year, every 6 months for 1 year and then annually for 2 additional years For patients with &gt; 3 cm residual mass and negative PET scan: CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) at 6 and 12 months after completion of therapy, then annually until year 5 For patients with thoracic disease at diagnosis: CT Chest with contrast (CPT® 71260) every 2 months for 1 year, then every 3 months for 1 year, then annually until year 5</td>
</tr>
<tr>
<td>Stage IA Non-Seminomatous germ cell tumors treated with orchiectomy alone (no radiotherapy or chemotherapy, also called active surveillance)</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) at 6 and 12 months after orchiectomy, then annually until year 3</td>
</tr>
<tr>
<td>Stage IB Non-Seminomatous germ cell tumors treated with orchiectomy alone (no radiotherapy or chemotherapy, also called active surveillance)</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) every 4 months for 1 year, then every 6 months for 2 years, then annually until year 4</td>
</tr>
<tr>
<td>Stage IA/IB Non-Seminomatous germ cell tumors treated with chemotherapy</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) annually for 2 years</td>
</tr>
<tr>
<td>Indication</td>
<td>Imaging Study</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Stage II-III Non-Seminomatous germ cell tumors with complete response to chemotherapy +/- post-chemotherapy RPLND | ✷ CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) once at 6, 12, 24 and 36 months after completion of therapy.  
For patients with thoracic disease at diagnosis:  
✦ CT Chest with contrast (CPT® 71260) every 6 months for 2 years, then annually until year 4. |
| Stage IIA or IIB Non-Seminomatous germ cell tumors with post-primary RPLND complete resection +/- adjuvant chemotherapy | ✷ CT Abdomen/Pelvis with contrast (CPT® 74177) or CT Abdomen with contrast (CPT® 74160) once at 3 to 4 months after completion of therapy. |
| All female germ cell tumors                                               | ✷ No routine imaging unless elevated tumor markers or clinical signs/symptoms of recurrence.                                              |
| Sex cord stromal tumors (male and female)                                | ✷ No routine advanced imaging indicated unless elevated tumor markers or clinical signs/symptoms of recurrence.                           |

MRI in place of CT scans to reduce risk of secondary malignancy is not supported by the peer-reviewed literature. CT scans are indicated for surveillance and is the preferred modality of imaging to assess for recurrence.
References
# ONC-21: Ovarian Cancer

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</table>
ONC-21.0: General Considerations

- Ovarian cancers include: epithelial ovarian cancers, ovarian cancers of low malignant potential and mixed Müllerian tumors, primary peritoneal and fallopian tube cancers.

- Germ cell tumors and sex cord stromal tumors (granulosa cell tumors), are imaged according to ONC-20: Testicular, Ovarian and Extragonadal Germ Cell Cancer.
## ONC-21.1: Screening for Ovarian Cancer

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<th>Indication</th>
<th>Imaging/Lab Study</th>
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</thead>
<tbody>
<tr>
<td><strong>High Risk Factors:</strong></td>
<td>✦ Ovarian cancer screening is considered experimental &amp; investigational and is not recommended.</td>
</tr>
<tr>
<td>✦ Family history of BRCA 1 or BRCA 2 mutations</td>
<td>✦ Genetic counseling is recommended for women with an increased-risk family history (USPSTF, 2015)</td>
</tr>
<tr>
<td>✦ Family history of ovarian cancer</td>
<td>✦ Transvaginal ultrasound (CPT® 76830), combined with CA-125 for ovarian cancer screening may be considered annually starting at age 30, until risk-reducing salpingo-oophorectomy is performed</td>
</tr>
<tr>
<td>✦ Hereditary ovarian cancer syndrome that includes ovarian, breast, and/or endometrial and gastrointestinal cancers [Lynch II syndrome] in multiple members of two to four generations</td>
<td></td>
</tr>
<tr>
<td>✦ Low parity</td>
<td></td>
</tr>
<tr>
<td>✦ Decreased fertility</td>
<td></td>
</tr>
<tr>
<td>✦ Delayed childbearing</td>
<td></td>
</tr>
<tr>
<td><strong>Known BRCA-1 or BRCA-2 mutation</strong></td>
<td></td>
</tr>
</tbody>
</table>
**ONC-21.2: Suspected/Diagnosis**

- See PV-5.2: Complex Adnexal Masses – Premenopausal and PV-5.3: Complex Adnexal Masses – Post Menopausal for imaging guidelines for evaluation of suspected ovarian malignancies

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging/Lab Study</th>
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</thead>
<tbody>
<tr>
<td>Elevated CA-125 and one of the following:</td>
<td>One of the following may be approved:</td>
</tr>
<tr>
<td>- Ultrasound is indeterminate or suspicious for ovarian malignancy</td>
<td>- MRI Pelvis with and without contrast (CPT® 72197) MRI is the test of choice for pre-operative evaluation of indeterminate ovarian lesions on ultrasound given its superior soft tissue contrast and ability to assess site of origin of pelvic masses</td>
</tr>
<tr>
<td>- Preoperatively prior to salpingo-oophorectomy</td>
<td>- CT Abdomen and Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>- Obstructive uropathy**</td>
<td>**CT Abdomen/Pelvis without and with contrast (CPT® 74178) may be approved only for symptoms of obstructive uropathy</td>
</tr>
<tr>
<td>- Elevated LFTs</td>
<td></td>
</tr>
</tbody>
</table>

**Indications:**

- Elevated CA-125
- Ultrasound is indeterminate or suspicious for ovarian malignancy
- Preoperatively prior to salpingo-oophorectomy
- Obstructive uropathy
- Elevated LFTs

**Imaging/Lab Study:**

- MRI Pelvis with and without contrast (CPT® 72197)
- CT Abdomen and Pelvis with contrast (CPT® 74177)
- CT Abdomen/Pelvis without and with contrast (CPT® 74178) may be approved only for symptoms of obstructive uropathy
### ONC-21.3: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
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</thead>
<tbody>
<tr>
<td>Clinical stage II disease or higher</td>
<td>✷ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>✷ CT Chest with contrast (CPT® 71260) if abnormal signs/symptoms of pulmonary disease or abnormal chest x-ray</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>✷ PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>◆ Primary peritoneal disease with biopsy-proven malignancy consistent with ovarian carcinoma</td>
<td></td>
</tr>
<tr>
<td>◆ Elevated tumor markers with negative or inconclusive CT imaging</td>
<td></td>
</tr>
</tbody>
</table>
### ONC-21.4: Restaging/Recurrence

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<tr>
<th>Indication</th>
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</thead>
<tbody>
<tr>
<td>Completely resected or definitively treated with chemotherapy and normal(ized) tumor markers</td>
<td>No advanced imaging needed</td>
</tr>
<tr>
<td>Any of the following:</td>
<td></td>
</tr>
<tr>
<td>✷ Unresected disease</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>✷ Unknown preoperative markers</td>
<td>CT Chest (CPT® 71260) for any of the following:</td>
</tr>
<tr>
<td>✷ Difficult or abnormal examination</td>
<td>■ Prior known thoracic disease</td>
</tr>
<tr>
<td>✷ Elevated LFTs</td>
<td>■ New or worsening thoracic signs/symptoms or CXR findings</td>
</tr>
<tr>
<td>✷ Rising tumor markers (CA-125, inhibin)</td>
<td>■ Rising CA-125/inhibin levels</td>
</tr>
<tr>
<td>✷ Signs or symptoms of recurrence</td>
<td></td>
</tr>
<tr>
<td>✷ CT negative or inconclusive and CA-125 continues to rise or elevated LFTs</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>✷ Conventional imaging failed to demonstrate tumor or if persistent radiographic mass with rising tumor markers</td>
<td></td>
</tr>
</tbody>
</table>
## ONC-21.5: Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stages I-III</td>
<td>✷ No advanced imaging needed</td>
</tr>
<tr>
<td>Locally advanced/Metastatic with measurable disease</td>
<td>✷ See: <a href="#">ONC-1.2: Phases of Oncology Imaging and General Phase-Related Considerations</a></td>
</tr>
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References


## ONC-22: Uterine Cancer

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</table>
ONC-22.0: General Considerations

- Gestational trophoblastic neoplasia (GTN) – see PV-16: Molar Pregnancy and Gestational Trophoblastic Neoplasia (GTN)
- PET is not routinely indicated for initial diagnosis; staging or restaging of uterine cancer.
- Most common cell type is adenocarcinoma
- Imaging not routinely indicated for laparoscopic/minimally invasive surgery unless initial staging criteria are met. Pelvic and para-aortic lymphadenectomy can still be performed.
ONC-22.1: Suspected/Diagnosis

- See PV-14: Uterine Anomalies for imaging guidelines for evaluation of suspected uterine malignancies
## ONC-22.2: Initial Workup

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra-uterine disease suspected and/or Grade 3 tumor.</td>
<td>- MRI Pelvis without and with contrast (CPT® 72197) or CT Pelvis with contrast (CPT® 72193)</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>One of the following may be approved:</td>
</tr>
<tr>
<td>- Abdominal symptoms or abnormal examination findings</td>
<td>- CT Abdomen with contrast (CPT® 74160)</td>
</tr>
<tr>
<td>- Elevated LFTS</td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177) if being completed in the same imaging session as CT Pelvis</td>
</tr>
<tr>
<td>- Other imaging studies suggest liver involvement</td>
<td></td>
</tr>
<tr>
<td>Any of the following histologies:</td>
<td>- CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>- Papillary serous</td>
<td></td>
</tr>
<tr>
<td>- Clear cell</td>
<td></td>
</tr>
<tr>
<td>- Carcinosarcoma</td>
<td></td>
</tr>
<tr>
<td>- Soft tissue sarcoma of the uterus</td>
<td></td>
</tr>
<tr>
<td>- Leiomyosarcoma</td>
<td></td>
</tr>
<tr>
<td>- Undifferentiated sarcoma</td>
<td></td>
</tr>
<tr>
<td>- Endometrial stromal sarcoma</td>
<td></td>
</tr>
<tr>
<td>- Poorly differentiated endometroid</td>
<td></td>
</tr>
<tr>
<td>Tumors detected incidently or incompletely staged surgically AND any of the following high risk features:</td>
<td>- CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>- Myoinvasion &gt; 50%</td>
<td></td>
</tr>
<tr>
<td>- Cervical stromal involvement</td>
<td></td>
</tr>
<tr>
<td>- Lymphovascular invasion</td>
<td></td>
</tr>
<tr>
<td>- Tumor &gt; 2 cm</td>
<td></td>
</tr>
<tr>
<td>Considering fertility sparing surgery for well-differentiated Stage IA (grade 1) uterine cancer</td>
<td>- Transvaginal ultrasound (CPT® 76830) and MRI pelvis without and with contrast (CPT® 72197)</td>
</tr>
<tr>
<td>All other patients</td>
<td>- Routine advanced imaging not needed</td>
</tr>
</tbody>
</table>
### ONC-22.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Unresectable, medically inoperable, or incompletely surgically staged patients | One of the following:  
   - CT Abdomen/Pelvis with contrast (CPT® 74177) or  
   - MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast |
| Unresected disease                                                           | CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177)            |
| Unresected disease                                                           | CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177)            |
| Difficult or abnormal examination                                            | See: [Restaging/Recurrence section in: ONC-21.4: Ovarian Cancer](#)            |
| Elevated LFTs or rising tumor markers                                        | See: [Restaging/Recurrence section in: ONC-12.3: Soft Tissue Sarcoma](#)       |
| Signs or symptoms of recurrence                                              | See: [Restaging/Recurrence section in: ONC-12.3: Soft Tissue Sarcoma](#)       |

- Papillary serous, clear cell and carcinosarcoma of the uterus
- Soft tissue sarcoma of the uterus, leiomyosarcoma, undifferentiated sarcoma, and endometrial stromal sarcoma

See: [Restaging/Recurrence section in: ONC-21.4: Ovarian Cancer](#)  
See: [Restaging/Recurrence section in: ONC-12.3: Soft Tissue Sarcoma](#)
### ONC-22.4: Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papillary serous, clear cell and carcinosarcoma of the uterus</td>
<td>See: <strong>Surveillance</strong> section in: <strong>ONC-21.5:</strong> Ovarian Cancer</td>
</tr>
<tr>
<td>Soft tissue sarcoma of the uterus, leiomyosarcoma, undifferentiated sarcoma, and endometrial stromal sarcoma</td>
<td>See: <strong>ONC-12.4:</strong> Soft Tissue Sarcoma Surveillance/Follow-Up</td>
</tr>
<tr>
<td>All others</td>
<td>No advanced imaging needed</td>
</tr>
</tbody>
</table>
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</thead>
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<td>ONC-23.2: Initial Workup/Staging</td>
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<td>ONC-23.3: Restaging/Recurrence</td>
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<td>ONC-23.4: Surveillance</td>
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</table>
ONC-23.0: General Considerations

- Primary histology for cervical cancer is squamous cell. Other, less common histologies are adenosquamous and adenocarcinoma. If biopsy is consistent with one of these less common histologies, it is necessary to clarify that tumor is not of primary uterine origin.

- If the primary histology is uterine in origin, follow imaging recommendations for uterine cancer, see: ONC-22: Uterine Cancer.
## ONC-23.1: Suspected/Diagnosis

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>Biopsy should be performed prior to imaging</td>
</tr>
</tbody>
</table>
## ONC-23.2: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| **Stage IB1 or less:** < 4 cm confined to the cervix | ✷ Chest x-ray  
  ▪ CT Chest with contrast (CPT® 71260) is indicated if abnormal CXR or new/worsening thoracic signs/symptoms  
  ▪ CT Abdomen/Pelvis with contrast (CPT® 74177)  
  ▪ PET/CT (CPT® 78815) should be approved only to explain inconclusive findings on other advanced imaging studies. Requests will be forwarded to Medical Director. |
| **Stage IB2 or higher stages**                       | Any of the following combination, not both:  
  ✷ PET/CT (CPT® 78815)  
  or  
  ✷ CT Chest with contrast (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)  
    ▪ MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast if CT contrast allergy or inconclusive CT findings |
| **Any size cervical cancer incidentally found in a hysterectomy specimen** | ✷ CT Chest with Contrast (CPT® 71260)  
  ✷ CT Abdomen/Pelvis with contrast (CPT® 74177)  
  ✷ MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast if CT contrast allergy or inconclusive CT findings  
  ✷ PET/CT (CPT® 78815) if inconclusive conventional imaging |
## ONC-23.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult or abnormal examination</td>
<td>CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td>Elevated LFTs</td>
<td>MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast if CT contrast allergy or inconclusive CT findings</td>
</tr>
<tr>
<td>Signs or symptoms of recurrence</td>
<td>PET/CT (CPT® 78815) for inconclusive conventional imaging</td>
</tr>
<tr>
<td>If primary therapy was surgery</td>
<td>See Surveillance guidelines <strong>ONC-23.4: Surveillance</strong></td>
</tr>
<tr>
<td>If primary therapy radiation therapy ± chemotherapy (not adjuvant therapy)</td>
<td><strong>Chest x-ray</strong></td>
</tr>
<tr>
<td></td>
<td>- CT Chest (CPT® 71260) is indicated if abnormal CXR or new/worsening thoracic signs/symptoms</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast if CT contrast allergy or inconclusive CT findings</td>
</tr>
<tr>
<td></td>
<td>- PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td></td>
<td>- If ordered for this restaging indication, only one PET/CT should be approved and only if surgical salvage is an option</td>
</tr>
<tr>
<td></td>
<td>- After the one PET/CT, further follow-up imaging should be with CT or MRI</td>
</tr>
</tbody>
</table>
## ONC-23.4: Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>- No routine advanced imaging needed.</td>
</tr>
</tbody>
</table>
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**ONC-24: Anal & Vaginal Cancer, Cancers of the External Genitalia**

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<td>ONC-24.1: Suspected/Diagnosis</td>
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<td>ONC-24.3: Restaging/Recurrence</td>
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<tr>
<td>ONC-24.4: Surveillance</td>
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</table>
**ONC-24.0: General Considerations**

- Most are squamous cell carcinomas, although some transitional and cloacogenic carcinomas are seen.
- Tumors reported as adenocarcinomas of the anal canal are treated as rectal cancers.
- Squamous cell carcinomas of the perianal and perigenital areas are skin cancers. See **ONC-5: Melanomas and Other Skin Cancers**.
# ONC-24.1: Suspected/Diagnosis

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>✷ Advanced imaging prior to biopsy is not needed</td>
</tr>
</tbody>
</table>
### ONC-24.2: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| All patients | - CT Chest with contrast (CPT® 71260)  
One of the following:  
- CT Abdomen/Pelvis with contrast (CPT® 74177)  
- CT Abdomen with contrast (CPT® 74160) and MRI Pelvis without and with contrast (CPT® 72197) |
| Stage II-IV Squamous Cell Carcinoma of the Anal Canal (not Anal Margin such as Bowen’s disease or Paget’s disease) | - PET/CT (CPT® 78815) |
## ONC-24.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
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<tbody>
<tr>
<td>Stage I and II patients</td>
<td>Routine advanced imaging not needed</td>
</tr>
<tr>
<td>Stage III and IV patients</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177) every 2 cycles (generally 6 to 8 weeks) during treatment and at the end of planned chemotherapy treatment</td>
</tr>
<tr>
<td></td>
<td>CT Chest (CPT® 71260) if chest x-ray is abnormal or if symptoms of chest involvement</td>
</tr>
<tr>
<td>Difficult or abnormal examination</td>
<td>CT Chest (CPT® 71260) with contrast</td>
</tr>
<tr>
<td>Elevated LFTs</td>
<td>One of the following:</td>
</tr>
<tr>
<td>Signs or symptoms of recurrence</td>
<td>CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>Biopsy proven recurrence</td>
<td>MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>Inconclusive findings on conventional imaging</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
</tbody>
</table>
## ONC-24.4: Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anal canal cancer:</td>
<td><strong>Annually for 3 years:</strong> &lt;ul&gt;&lt;li&gt;CT Chest (CPT® 71260) with contrast&lt;/li&gt;&lt;li&gt;CT Abdomen/Pelvis with contrast (CPT® 74177)&lt;/li&gt;&lt;/ul&gt;</td>
</tr>
<tr>
<td>Only for Stage 3 or greater</td>
<td></td>
</tr>
<tr>
<td>Penile cancer:</td>
<td><strong>CT Abdomen/Pelvis with contrast (CPT® 74177) every 3 months for year 1, and then every 6 months for year 2, then no further routine advanced imaging indicated</strong></td>
</tr>
<tr>
<td>Node positive disease only</td>
<td></td>
</tr>
<tr>
<td>All other patients</td>
<td><strong>No routine advanced imaging needed</strong></td>
</tr>
</tbody>
</table>
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## ONC-25: Multiple Myeloma and Plasmacytomases

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<td>ONC-25.4: Surveillance</td>
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</table>
ONC-25.0: General Considerations

- Multiple myeloma (MM) is a neoplastic disorder characterized by the proliferation of a single clone of plasma cells derived from B cells which grows in the bone marrow and adjacent bone, producing skeletal destruction.

- Multiple myeloma group of disorders can be classified as below, which influence imaging modality of choice.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Monoclonal protein</th>
<th>Bone marrow plasma cells</th>
<th>CRAB criteria**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solitary Plasmacytoma (biopsy proven tumor containing plasma cells)</td>
<td>&lt; 3 gm/dL</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Monoclonal Gammopathy of Unknown Significance (MGUS)</td>
<td>&lt; 3 gm/dL</td>
<td>&lt; 10%</td>
<td>Absent</td>
</tr>
<tr>
<td>Smoldering Myeloma (SMM) (stage I MM or asymptomatic MM)</td>
<td>≥ 3 gm/dL</td>
<td>10% - 60%</td>
<td>Absent</td>
</tr>
<tr>
<td>Multiple Myeloma (MM)</td>
<td>≥ 3 gm/dL</td>
<td>≥ 10%</td>
<td>Present</td>
</tr>
</tbody>
</table>

**CRAB criteria = hypercalcemia, renal insufficiency, anemia, lytic bony lesions

- Diagnosis and monitoring of response to therapy is primarily with laboratory studies that include urine and serum monoclonal protein levels, serum free light chain levels, LDH and beta-2 microglobulin. Routine advanced imaging to monitor response to treatment is not indicated.

- PET scans have not been shown to significantly alter therapeutic decisions and may only provide prognostic information.

- Rarely, (< 5%), an individual may have Nonsecretory Myeloma, which does not produce measurable M-protein. These patients require imaging as primary method to monitor disease.

- For myeloma-like and lymphoma-like disease, see ONC-27: Non-Hodgkin Lymphomas.

- Other conditions that may present with Monoclonal Gammopathy include:
  - POEMS syndrome: Polyneuropathy, Organomegaly, Endocrinopathy, Monoclonal protein and Skin Changes – these patients may also have sclerotic bone lesions and Castleman’s disease
  - Waldenstrom’s Macroglobulinemia: IgM monoclonal protein along with bone marrow infiltration of small lymphocytes. See ONC-27: Non-Hodgkin Lymphomas for imaging recommendations.
  - Light chain Amyloidosis: light chain monoclonal protein in serum or urine with clonal plasma cells in bone marrow, systemic involvement of the kidneys, liver, heart, gastrointestinal tract or peripheral nerves due to amyloid deposition. See ONC-25: Multiple Myeloma and Plasmacytomas for imaging recommendations.
# ONC-25.1: Suspected/Diagnosis

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>• X-ray skeletal series</td>
</tr>
</tbody>
</table>
### ONC-25.2: Initial Workup/Staging

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of the following:</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>◆ Abnormal skeletal survey</td>
<td>◆ MRI Cervical (CPT® 72141), Thoracic (CPT® 72146), Lumbar spine (CPT® 72148), and Pelvis (CPT® 72195) without contrast</td>
</tr>
<tr>
<td>◆ Negative/equivocal skeletal survey with abnormal myeloma labs and/or symptoms of multiple myeloma</td>
<td>◆ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), Lumbar spine (CPT® 72158), and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td></td>
<td>◆ MRI Bone Marrow Blood Supply (CPT® 77084)</td>
</tr>
<tr>
<td></td>
<td>◆ CT contrast as requested of a specific area to determine radiotherapy or surgical candidacy, or for suspected extraosseous plasmacytoma</td>
</tr>
<tr>
<td>For any of the following (after the tests listed above are completed):</td>
<td>PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td></td>
<td>◆ Determining if a plasmacytoma is truly solitary</td>
</tr>
<tr>
<td></td>
<td>◆ Suspected extraosseous plasmacytomas</td>
</tr>
<tr>
<td></td>
<td>◆ Suspected progression of MGUS or SMM to a more malignant form and CT/MRI imaging are negative</td>
</tr>
<tr>
<td></td>
<td>◆ Inconclusive conventional imaging</td>
</tr>
</tbody>
</table>
### ONC-25.3: Restaging/Recurrence

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra-osseous plasmacytoma response to initial therapy</td>
<td>✦ CT contrast as requested or MRI without contrast, or MRI without and with contrast of any previously involved area</td>
</tr>
<tr>
<td>Laboratory tests fail to normalize with treatment</td>
<td>✦ CT contrast as requested or MRI without contrast or MRI without and with contrast of symptomatic areas</td>
</tr>
<tr>
<td>Known spine involvement with new neurological signs/symptoms or worsening pain</td>
<td>✦ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), Lumbar spine (CPT® 72158) without and with contrast</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>One of the following:</td>
</tr>
<tr>
<td>✦ Suspected relapse/recurrence</td>
<td>✦ MRI without contrast, or MRI without and with contrast for any previously involved bony area or symptomatic area</td>
</tr>
<tr>
<td>✦ Suspected progression of MGUS or SMM to a more malignant form</td>
<td>✦ MRI Cervical (CPT® 72141), Thoracic (CPT® 72146), Lumbar spine (CPT® 72148), and Pelvis (CPT® 72195) without contrast</td>
</tr>
<tr>
<td>✦ To determine therapy response with inconclusive labs</td>
<td>✦ MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), Lumbar spine (CPT® 72158), and Pelvis (CPT® 72197) without and with contrast</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>✦ MRI Bone Marrow Blood Supply (CPT® 77084)</td>
</tr>
<tr>
<td>✦ Negative PET will allow change in management from active treatment to maintenance or surveillance.</td>
<td>✦ PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>Determine additional therapies in refractory disease or non-secretory disease. These requests will be forwarded for Medical Director review.</td>
<td></td>
</tr>
</tbody>
</table>
## ONC-25.4: Surveillance

<table>
<thead>
<tr>
<th>Indication</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasmacytomases</td>
<td>• Skeletal survey annually</td>
</tr>
<tr>
<td>All others, including Bone Marrow Transplant</td>
<td>• Advanced imaging is not routinely indicated</td>
</tr>
</tbody>
</table>
References


### ONC-26: Leukemias, Myelodysplasia and Myeloproliferative Neoplasms

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<td>ONC-26.3</td>
<td>Chronic Myeloid Leukemias, Myelodysplastic Syndrome and Myeloproliferative Disorders</td>
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<td>ONC-26.4</td>
<td>Chronic Lymphocytic Leukemia (CLL)/Small Lymphocytic Lymphoma (SLL)</td>
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</tbody>
</table>
ONC-26.1: General Considerations

- PET imaging is considered investigational and experimental for all indications in acute lymphoblastic leukemia, acute myeloid leukemia, and chronic myeloid leukemia.
- Routine advanced imaging is not indicated in the evaluation and management of Hairy cell leukemia in the absence of specific localizing clinical symptoms.
ONC-26.2: Acute Leukemias

- Imaging indications for acute lymphoblastic leukemia in adult patients are identical to those for pediatric patients. See PEDONC-3.2: Acute Lymphoblastic Leukemia (ALL) for imaging guidelines.

- Imaging indications for acute myeloid leukemia in adult patients are identical to those for pediatric patients. See PEDONC-3.3: Acute Myeloid Leukemia (AML) for imaging guidelines.
ONC-26.3: Chronic Myeloid Leukemias, Myelodysplastic Syndrome and Myeloproliferative Disorders

- Routine advanced imaging is not indicated in the evaluation and management of chronic myeloid leukemias, myelodysplastic syndromes or myeloproliferative disorders in the absence of specific localizing clinical symptoms or clearance for hematopoietic stem cell transplantation.

- See ONC-29: Hematopoietic Stem Cell Transplantation for imaging guidelines related to transplant.

- For work up of elevated blood counts, see ONC-30.3: Paraneoplastic Syndromes-General Considerations
**Oncology Imaging**

**ONC-26.4: Chronic Lymphocytic Leukemia (CLL)/Small Lymphocytic Lymphoma (SLL)**

- PET imaging is not indicated in the evaluation of CLL/SLL with the exception of suspected Richter's transformation (see Suspected transformation, below).
- CLL/SLL is monitored with serial laboratory studies. Routine advanced imaging is not indicated for monitoring treatment response or surveillance, except when initial studies reveal bulky disease involvement.
- Bulky disease is defined as lymph node mass > 5 cm or spleen > 6 cm below costal margin.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Staging/Diagnosis</td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td>Treatment Response</td>
<td>For patients with bulky nodal disease at diagnosis, CT</td>
</tr>
<tr>
<td></td>
<td>- with contrast of previously involved area(s) every 2 cycles of therapy</td>
</tr>
<tr>
<td></td>
<td>- Routine imaging is not indicated for patients without bulky nodal disease at diagnosis</td>
</tr>
<tr>
<td>End of Therapy Evaluation</td>
<td>For patients with bulky nodal disease at diagnosis, CT</td>
</tr>
<tr>
<td></td>
<td>- with contrast of previously involved area(s)</td>
</tr>
<tr>
<td>Suspected progression</td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td>Suspected transformation (Richter's) from a low grade lymphoma to a more aggressive type based on one or more of the following:</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td></td>
<td>- New B symptoms</td>
</tr>
<tr>
<td></td>
<td>- Rapidly growing lymph nodes</td>
</tr>
<tr>
<td></td>
<td>- Extranodal disease develops</td>
</tr>
<tr>
<td></td>
<td>- Significant recent rise in LDH above normal range</td>
</tr>
<tr>
<td>Surveillance</td>
<td>For patients with bulky nodal disease at diagnosis, every 6 months for two years, then annually:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td></td>
<td>- Routine imaging is not indicated for patients without bulky nodal disease at diagnosis</td>
</tr>
</tbody>
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## ONC-27: Non-Hodgkin Lymphomas

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<td>246</td>
</tr>
</tbody>
</table>
ONC-27.1: General Considerations

- Lymphoma is often suspected when patients have any of the following:
  - Bulky lymphadenopathy (lymph node mass > 5 cm in size), hepatomegaly or splenomegaly
  - The presence of systemic symptoms (fever, drenching night sweats or unintended weight loss of > 10%, called “B symptoms”)

- CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast is indicated for evaluation of suspected or biopsy proven lymphoma. CT Neck with contrast (CPT® 70491) is indicated for patients with signs or symptoms of disease involving the neck. Routine advanced imaging of the neck in patients without clinical signs of neck involvement is not indicated.

- All CT imaging recommended in this section refers to CT with contrast only.
  - Noncontrast CT imaging has not been shown to be adequate in the management of lymphomas
  - Given the limited utility of noncontrast CT imaging in lymphomas, MRI without OR without and with contrast is recommended in place of CT for patients who cannot tolerate CT contrast due to allergy or impaired renal function.

- MRI Brain without and with contrast (CPT® 70553) is indicated for patients with signs or symptoms suggesting CNS involvement with lymphoma. See ONC-1.1: Key Principles. Routine advanced imaging of the brain in patients without clinical signs of CNS involvement is not indicated.

- PET/CT scan is rarely indicated prior to histological confirmation of lymphoma, unless used to determine a more favorable site for biopsy when a relatively inaccessible site is contemplated.

- Patients with AIDS-related lymphoma should be imaged according to the primary lymphoma histology.

- Bone scan is inferior to MRI for evaluation of known or suspected bone involvement with lymphoma. MRI without and with contrast of symptomatic or previously involved bony areas can be approved in known lymphoma patients without prior plain x-ray or bone scan for diagnosis and monitoring treatment response.

- See ONC-31.11: Castleman’s disease (unicentric and multicentric) for guidelines covering Castleman’s disease.

- See ONC-26.4: Chronic Lymphocytic Leukemia (CLL)/Small Lymphocytic Lymphoma (SLL) for guidelines covering Chronic Lymphocytic Leukemia (CLL)/Small Lymphocytic Lymphoma (SLL).
**ONC-27.2: Diffuse Large B Cell Lymphoma (DLBCL)**

- Grey zone lymphomas, primary mediastinal B cell lymphomas, Grade 3 (high) follicular lymphoma and double-hit or triple-hit lymphomas should also be imaged according to these guidelines.
- Post-transplant lymphoproliferative disorder (PTLD) or viral-associated lymphoproliferative disorder can rarely occur following solid organ or hematopoietic stem cell transplantation, or in primary immunodeficiency. These disorders may be treated similarly to high grade NHL when altering immunosuppressive regimens is unsuccessful, are highly FDG-avid, and should be imaged according to this section.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Initial Staging/Diagnosis                      | Any or all of the following may be approved:  
  - PET/CT (CPT® 78815 or CPT® 78816)  
  - CT Chest with contrast (CPT® 71260)  
  - CT Abdomen/Pelvis with contrast (CPT® 74177)                                           |
| Treatment Response                              | Any or all of the following may be approved every 2 cycles of therapy:  
  - CT with contrast of previously involved area(s)  
  - Requests for PET/CT can be considered in rare circumstances. These cases should be forwarded for Medical Director review. |
| End of Chemotherapy and/or Radiation Therapy Evaluation | Any or all of the following may be approved:  
  - PET/CT (CPT® 78815 or CPT® 78816) may be approved at the end of chemo and again at the end of radiation  
  - CT with contrast of previously involved area(s) |
| Suspected or Biopsy-Confirmed Recurrence        | Any or all of the following may be approved:  
  - CT Chest with contrast (CPT® 71260)  
  - CT Abdomen/Pelvis with contrast (CPT® 74177)  
  - CT with contrast of previously involved area(s)  
  - Requests for PET/CT can be considered in rare circumstances. These cases should be forwarded for Medical Director review. |
| Surveillance                                    |  
  - **Stage I and II:**  
    - No routine advanced imaging indicated  
  - **Stage III and IV:**  
    - CT with contrast of previously involved area(s) every 6 months for two years, then no further routine advanced imaging |
### ONC-27.3: Follicular Lymphoma

This section applies to follicular lymphomas with WHO grade of 1 (low) or 2 (intermediate). Grade 3 (high) follicular lymphomas should be imaged according to **ONC-27.2: Diffuse Large B Cell Lymphoma (DLBCL)**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Staging/Diagnosis</strong></td>
<td><strong>Any or all of the following may be approved:</strong></td>
</tr>
<tr>
<td></td>
<td>◆ CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>◆ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>◆ PET/CT (CPT® 78815 or CPT® 78816) can be approved if XRT is being considered for stage I or II disease</td>
</tr>
<tr>
<td><strong>Treatment Response</strong></td>
<td><strong>CT with contrast of previously involved area(s) every 2 cycles of therapy</strong></td>
</tr>
<tr>
<td><strong>End of Therapy Evaluation</strong></td>
<td><strong>One of the following may be approved:</strong></td>
</tr>
<tr>
<td></td>
<td>◆ CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td></td>
<td>◆ PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td><strong>Suspected Recurrence</strong></td>
<td><strong>Any or all of the following may be approved:</strong></td>
</tr>
<tr>
<td></td>
<td>◆ CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>◆ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>◆ CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td></td>
<td>◆ Requests for PET/CT can be considered in rare circumstances. These cases should be forwarded for Medical Director review.</td>
</tr>
<tr>
<td><strong>Suspected transformation (Richter’s) from a low grade lymphoma to a more aggressive type based on one or more of the following:</strong></td>
<td><strong>PET/CT (CPT® 78815)</strong></td>
</tr>
<tr>
<td></td>
<td>◆ New B symptoms</td>
</tr>
<tr>
<td></td>
<td>◆ Rapidly growing lymph nodes</td>
</tr>
<tr>
<td></td>
<td>◆ Extranodal disease develops</td>
</tr>
<tr>
<td></td>
<td>◆ Significant recent rise in LDH above normal range</td>
</tr>
<tr>
<td><strong>Surveillance</strong></td>
<td><strong>For all stages, every 6 months for two years, then annually:</strong></td>
</tr>
<tr>
<td></td>
<td>◆ CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>◆ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>◆ CT with contrast of previously involved area(s)</td>
</tr>
</tbody>
</table>
Oncology Imaging

ONC-27.4: Marginal Zone Lymphomas

- MALT lymphomas in any location should also be imaged according to these guidelines
- Splenic Marginal Zone Lymphoma is diagnosed with splenomegaly, peripheral blood flow cytometry and bone marrow biopsy. Splenectomy is diagnostic and therapeutic. PET scan is not routinely indicated prior to splenectomy.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Staging/Diagnosis</td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- PET/CT (CPT® 78815 or CPT® 78816) can be approved if XRT is being considered for stage I or II disease</td>
</tr>
<tr>
<td>Treatment Response</td>
<td>CT with contrast of previously involved area(s) every 2 cycles of therapy</td>
</tr>
<tr>
<td>End of Therapy Evaluation</td>
<td>One of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>- CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td></td>
<td>- PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td>Suspected Recurrence</td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td></td>
<td>- Requests for PET/CT can be considered in rare circumstances. These cases should be forwarded for Medical Director review.</td>
</tr>
<tr>
<td>Surveillance</td>
<td>Only for Stage III or IV nodal marginal zone lymphoma, the following is indicated every 6 months for two years, then annually:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- CT with contrast of previously involved area(s)</td>
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<tr>
<td></td>
<td>All other stages/sites:</td>
</tr>
<tr>
<td></td>
<td>- No routine advanced imaging indicated</td>
</tr>
</tbody>
</table>
## ONC-27.5: Mantle Cell Lymphoma

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
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<td></td>
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<td>Treatment Response</td>
<td>CT with contrast of previously involved area(s) every 2 cycles of therapy</td>
</tr>
<tr>
<td></td>
<td>Requests for PET/CT can be considered in rare circumstances; these cases should be forwarded for Medical Director review</td>
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<tr>
<td>End of Therapy Evaluation</td>
<td>One of the following may be approved:</td>
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<td>Suspected Recurrence</td>
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<tr>
<td>Surveillance</td>
<td>All Stages of Disease:</td>
</tr>
<tr>
<td></td>
<td>- No routine advanced imaging indicated</td>
</tr>
</tbody>
</table>
## ONC-27.6: Burkitt’s Lymphomas

<table>
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<tr>
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<tr>
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<td>Any or all of the following may be approved:</td>
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<tr>
<td><strong>Treatment Response</strong></td>
<td>CT with contrast of previously involved area(s) every 2 cycles of therapy</td>
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<td>Requests for PET/CT can be considered in rare circumstances. These cases should be forwarded for Medical Director review.</td>
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<tr>
<td><strong>End of Therapy Evaluation</strong></td>
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<tr>
<td></td>
<td>- PET/CT (CPT® 78815 or CPT® 78816) may be approved at the end of chemo and again at the end of radiation</td>
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<td><strong>Suspected Recurrence</strong></td>
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<td><strong>Surveillance</strong></td>
<td>All Stages of Disease:</td>
</tr>
<tr>
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</tbody>
</table>
ONC-27.7: Lymphoblastic Lymphomas

Patients with lymphoblastic lymphoma (even those with bulky nodal disease) are treated using the leukemia treatment plan appropriate to the cell type (B or T cell). Imaging indications in adult patients are identical to those for pediatric patients. See PEDONC-3.2: Acute Lymphoblastic Leukemia (ALL) for imaging guidelines.
### ONC-27.8: Cutaneous Lymphoma and T Cell Lymphomas

- Includes Primary Cutaneous B Cell Lymphomas, Peripheral T-Cell Lymphomas, Mycosis Fungoides/Sézary Syndrome, Primary Cutaneous CD30+ T Cell Lymphoproliferative Disorders

<table>
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<td><strong>Treatment Response</strong></td>
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<td><strong>End of Therapy Evaluation</strong></td>
<td>Any or all of the following may be approved:</td>
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<td></td>
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</tr>
<tr>
<td><strong>Surveillance</strong></td>
<td>- <strong>Stage I and II:</strong></td>
</tr>
<tr>
<td></td>
<td>- No routine advanced imaging indicated</td>
</tr>
<tr>
<td></td>
<td>- <strong>Stage III and IV:</strong></td>
</tr>
<tr>
<td></td>
<td>- CT with contrast of previously involved area(s) every 6 months for two years, then no further routine advanced imaging</td>
</tr>
</tbody>
</table>
References
## ONC-28: Hodgkin Lymphoma

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONC-28.1</td>
<td>General Considerations</td>
<td>249</td>
</tr>
<tr>
<td>ONC-28.2</td>
<td>Classical Hodgkin Lymphoma</td>
<td>250</td>
</tr>
<tr>
<td>ONC-28.3</td>
<td>Nodular Lymphocyte-Predominant Hodgkin Lymphoma</td>
<td>251</td>
</tr>
</tbody>
</table>
ONC-28.1: General Considerations

- Lymphoma is often suspected when patients have any of the following:
  - Bulky lymphadenopathy (lymph node mass > 5 cm in size), hepatomegaly or splenomegaly
  - The presence of systemic symptoms (fever, drenching night sweats or unintended weight loss of > 10%, called “B symptoms”)

- CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast is indicated for evaluation of suspected or biopsy proven lymphoma.

- CT Neck with contrast (CPT® 70491) is indicated for patients with signs or symptoms of disease involving the neck. Routine advanced imaging of the neck in patients without clinical signs of neck involvement is not indicated.

- All CT imaging recommended in this section refers to CT with contrast only.
  - Noncontrast CT imaging has not been shown to be adequate in the management of lymphomas.

- Given the limited utility of noncontrast CT imaging in lymphomas, MRI without or with contrast is recommended in place of CT for patients who cannot tolerate CT contrast due to allergy or impaired renal function.

- MRI Brain without and with contrast (CPT® 70553) is indicated for patients with signs or symptoms suggesting CNS involvement with lymphoma. See ONC-1.1: Key Principles. Routine advanced imaging of the brain in patients without clinical signs of CNS involvement is not indicated.

- PET/CT scan is rarely indicated prior to histological confirmation of lymphoma, unless it is being used to determine a more favorable site for biopsy when a relatively inaccessible site is contemplated.

- Patients with AIDS-related lymphoma should be imaged according to the primary lymphoma histology.

- Bone scan is inferior to MRI for evaluation of known or suspected bone involvement with lymphoma. MRI without and with contrast of symptomatic or previously involved bony areas can be approved in known lymphoma patients without prior plain x-ray or bone scan for diagnosis and monitoring treatment response.

- The Deauville Criteria are internationally accepted criteria, which utilize a five-point scoring system for the FDG avidity of a Hodgkin’s lymphoma or Non-Hodgkin's lymphoma tumor mass as seen on FDG PET.
  - Score 1: No uptake above the background
  - Score 2: Uptake ≤ mediastinum
  - Score 3: Uptake > mediastinum but ≤ liver
  - Score 4: Uptake moderately increased compared to the liver at any site
  - Score 5: Uptake markedly increased compared to the liver at any site
  - Score X: New areas of uptake unlikely to be related to lymphoma
## ONC-28.2: Classical Hodgkin Lymphoma

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Staging/Diagnosis</strong></td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>▶ PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td></td>
<td>▶ CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>▶ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td><strong>Treatment Response</strong></td>
<td>▶ PET/CT (CPT® 78815 or CPT® 78816) as frequently as every 2 cycles</td>
</tr>
<tr>
<td></td>
<td>▶ CT with contrast of previously involved areas can be approved as a substitute for PET/CT for Stage IA or IIA</td>
</tr>
<tr>
<td><strong>End of Chemotherapy and/or Radiation Therapy Evaluation</strong></td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>▶ PET/CT (CPT® 78815 or CPT® 78816) may be approved at the end of chemo and again at the end of radiation (after 12 weeks of completion of radiation therapy)</td>
</tr>
<tr>
<td></td>
<td>▶ CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td><strong>Suspected Recurrence</strong></td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>▶ CT Chest with contrast (CPT® 71260)</td>
</tr>
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<td></td>
<td>▶ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
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<td></td>
<td>▶ CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td></td>
<td>▶ Requests for PET/CT can be considered in rare circumstances. These cases should be forwarded for Medical Director review.</td>
</tr>
<tr>
<td><strong>Surveillance</strong></td>
<td>Any or all of the following may be approved at 6, 12, and 24 months after completion of therapy:</td>
</tr>
<tr>
<td></td>
<td>▶ CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>▶ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>▶ CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td></td>
<td>In addition to the above studies:</td>
</tr>
<tr>
<td></td>
<td>▶ A single follow-up PET/CT may be approved</td>
</tr>
<tr>
<td></td>
<td>&gt; 12 weeks after the end of radiation therapy if end of therapy PET/CT report documents Deauville 4 or 5 FDG avidity</td>
</tr>
</tbody>
</table>
# ONC-28.3: Nodular Lymphocyte-Predominant Hodgkin Lymphoma

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Staging/Diagnosis</strong></td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>♦ PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td></td>
<td>♦ CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>♦ CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td><strong>Treatment Response</strong></td>
<td>♦ Patients treated with surgery alone go directly to Surveillance for additional imaging guidelines</td>
</tr>
<tr>
<td></td>
<td>♦ Patients treated with radiotherapy alone go directly to End of Therapy Evaluation for additional imaging guidelines</td>
</tr>
<tr>
<td></td>
<td>♦ PET/CT (CPT® 78815 or CPT® 78816) as frequently as every 2 cycles</td>
</tr>
<tr>
<td></td>
<td>♦ CT with contrast of previously involved areas can be approved as a substitute for PET/CT for Stage IA or IIA</td>
</tr>
<tr>
<td><strong>End of Chemotherapy and/or Radiation Therapy Evaluation</strong></td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td></td>
<td>♦ PET/CT (CPT® 78815 or CPT® 78816) may be approved at the end of chemo and again at the end of radiation (after 12 weeks of completion of radiation therapy)</td>
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<td></td>
<td>♦ Requests for PET/CT can be considered in rare circumstances. These cases should be forwarded for Medical Director review.</td>
</tr>
<tr>
<td><strong>Suspected transformation (Richter's)</strong> from a low grade lymphoma to a more aggressive type based on one or more of the following:**</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td></td>
<td>♦ New B symptoms</td>
</tr>
<tr>
<td></td>
<td>♦ Rapidly growing lymph nodes</td>
</tr>
<tr>
<td></td>
<td>♦ Extranodal disease develops</td>
</tr>
<tr>
<td></td>
<td>♦ Significant recent rise in LDH above normal range</td>
</tr>
<tr>
<td>Indication</td>
<td>Imaging Study</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Surveillance</td>
<td>Any or all of the following may be approved at 6, 12, and 24 months after completion of therapy:</td>
</tr>
<tr>
<td></td>
<td>- CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>- CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>- CT with contrast of previously involved area(s)</td>
</tr>
<tr>
<td></td>
<td>In addition to the above studies:</td>
</tr>
<tr>
<td></td>
<td>- A single follow-up PET/CT may be approved &gt; 12 weeks after the end of radiation therapy if end of therapy PET/CT report documents Deauville 4 or 5 FDG avidity</td>
</tr>
</tbody>
</table>
References
ONC-29.1: General Considerations for Stem Cell Transplant

**Terminology:**
A number of terms will be used to describe the transplant process of using chemotherapy ± radiation to ablate the recipient’s bone marrow stores, depending on the source of the hematopoietic stem cells and the indication, including bone marrow transplant (BMT), stem cell transplant (SCT), and hematopoietic stem cell transplant (HSCT).

**Transplant types:**
Allogeneic ("allo"): The donor and recipient are different people, and there are multiple types depending on the source of the stem cells and degree of match between donor and recipient. This is most commonly used in diseases originating in the hematopoietic system, such as leukemias and lymphomas, and bone marrow failure syndromes or metabolic disorders. Common types are:

- Matched sibling donor (MSD or MRD): Donor and recipient are full siblings and HLA-matched
- Matched unrelated donor (MUD): Donor and recipient are HLA matched but not related to each other
- Cord blood: Donor stem cells come from frozen umbilical cord blood not related to the recipient, sometimes from multiple different donors at once
- Haploidentical transplant (haplo): Donor is a half-HLA match to the recipient, usually a parent

Autologous ("auto"): The donor and recipient are the same person, as with allogeneic there are multiple types of this transplant. Transplant is really a misnomer since the process involves delivery of high dose chemotherapy that is ablative to the bone marrow, requiring an infusion of stem cells to allow marrow recovery. As such, is more correctly called a rescue. Rescue is most commonly used for metastatic disease involving the hematopoietic system.

**Pre-Transplant Imaging in HSCT:**
This imaging generally takes place within 30 days of transplant, and involves a reassessment of the patient’s disease status as well as infectious disease clearance.

- For oncology indications, imaging listed in eviCore Guidelines under restaging, end of therapy, or treatment response can be approved as pre-transplant imaging, including PET imaging.
- PET should not be approved for transplant in diseases in which eviCore Guidelines do not support the use of PET imaging during initial workup and treatment (such as myeloma**)
- Myeloma PET requests should be forwarded for Medical Director Review
CT of the sinuses, neck, chest, and/or abdomen/pelvis (contrast as requested) is commonly requested in the immediate pre-transplant period and should be approved as requested. These studies are necessary within 30 days of transplant, and frequently have to be repeated if the transplant is delayed for any reason.

Nuclear renal function study (CPT® 78708 or CPT® 78709) to ensure adequate renal function

Echocardiogram (CPT® 93306, CPT® 93307 or CPT® 93308) is routinely indicated to ensure adequate cardiac function to proceed with transplant. MUGA scan (CPT® 78472) may be indicated in specific circumstances. See: PEDONC-1.2: Appropriate Clinical Evaluations and CD-3.5: MUGA Study – Oncologic Indications for more details.

Post-Transplant Imaging in HSCT:
There are many common complications from HSCT, including infection, graft versus host disease, hepatic sinusoidal obstruction syndrome, restrictive lung disease, among others. Site-specific imaging requests to evaluate known or suspected HSCT complications should generally be approved.

Disease response generally takes place at ~Day +30 (autos and some allos) or ~Day +100 (allos) post-transplant.

- For oncology indications, imaging listed in disease-specific guidelines under restaging, end of therapy, or treatment response can be approved as post-transplant imaging, including PET imaging.
  - PET should not be approved in diseases where eviCore Guidelines do not support the use of PET imaging during initial workup and treatment (such as myeloma**)
  - If PET is negative at Day +30, repeat PET at Day +100 is not indicated unless conventional imaging is inconclusive.
- Patients receiving tandem auto transplants (2 to 4 autos back-to-back, spaced 6-8 weeks apart) can have this imaging completed following each separate transplant
- Myeloma PET requests should be forwarded for Medical Director Review
- Imaging after disease response has been completed (~Day +100 for allos and ~Day +30 for autos) should follow eviCore surveillance guidelines for the specific disease unless the patient is receiving ongoing anticancer therapy.

**PET can be considered in myeloma patients who are non-secretors of immunoglobulin proteins (non-secretory disease is rare and accounts for less than 5% of myeloma cases)

- CT Chest without contrast (CPT® 71250) is indicated for patients with bronchiolitis obliterans with organizing pneumonia (BOOP) for surveillance and evaluation of acute changes
## ONC-30: Medical Conditions with Cancer in the Differential Diagnosis

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<th>Description</th>
<th>Page</th>
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<td>ONC-30.2</td>
<td>Unexplained Weight Loss</td>
<td>259</td>
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<tr>
<td>ONC-30.3</td>
<td>Paraneoplastic Syndromes</td>
<td>260</td>
</tr>
</tbody>
</table>
Oncology Imaging

**ONC-30.1: Fever of Unknown Origin (FUO)**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>In addition to physical examination, based on suspicion location, one can</td>
<td>◆ Chest x-ray, Echocardiogram (CPT® 93306), Abdominal ultrasound (CPT® 76700) and/or MRI Brain</td>
</tr>
<tr>
<td>consider:</td>
<td>without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td>Above studies (including PE/ENT exam, pelvic exam, and DRE with laboratory</td>
<td>◆ CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td>studies) have failed to demonstrate site of infection</td>
<td>◆ Radiopharmaceutical Imaging of Inflammatory Process (CPT® 78805 (limited area), CPT® 78806</td>
</tr>
<tr>
<td></td>
<td>(whole body), or SPECT - CPT® 78807)</td>
</tr>
<tr>
<td>“B” symptoms</td>
<td>◆ See ONC-27: Non Hodgkin Lymphomas</td>
</tr>
<tr>
<td>Any CNS sign/symptom accompanied by fever</td>
<td>◆ MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td>All patients</td>
<td>◆ PET is not indicated in the work-up of patients with FUO</td>
</tr>
</tbody>
</table>

**NOTE:** FUO is defined as a persistent fever ≥ 101°F and ≥ 3 weeks with unidentified cause.

While fever is a classic “B” symptom of advanced lymphoma, a cancer-related fever presenting in isolation without any other signs or symptoms of neoplastic disease is rare.

Careful head and neck and pelvic examination, to include digital rectal exam, must be performed. These areas can harbor occult sources of fever and are frequently overlooked when multiple specialists become involved in a patient’s care.

Chest x-ray and repeated battery of laboratory tests listed in most medical textbooks are the initial diagnostic procedures of choice. Any abnormalities found on these studies may focus appropriate imaging decisions, such as:

- Echocardiogram may reveal cardiac valve vegetations;
- Abdominal ultrasound (CPT® 76700) should be performed to evaluate pancreas, liver, spleen, and gallbladder;
- If all tests listed above remain non-contributory, then CT scans outlined above may be considered.
## ONC-30.2: Unexplained Weight Loss

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluations listed below do not identify cause of weight loss (for smokers, see below)</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
</tbody>
</table>

### Potential causes of weight loss to consider

- **Unexplained weight loss from neoplastic disease** is very common in end-stage cancer; however, cancer-related weight loss presenting as the sole symptom without any other signs or symptoms related to the cancer is exceedingly rare.

- Careful attention to symptoms related to dysphagia, early satiety, and food intake may indicate a problem with the upper GI system. Endoscopy and/or barium swallow, and a detailed examination of the oral cavity, pharynx, and upper esophagus should be performed.

- Panhypopituitarism or hyperthyroidism may give rise to weight loss. A thorough endocrine evaluation, including tests for TSH and ACTH, is indicated.

- Any abnormality of pituitary hormones may indicate a need for MRI of the sella turcica without and with contrast (CPT® 70553).

- Elevated thyroglobulin level may indicate a need for nuclear thyroid scan or thyroid ultrasound (CPT® 76536).

- Renal, hepatic, and cardiac pathologies must be carefully ruled out using lab tests and imaging studies such as echocardiogram (CPT® 93306) and abdominal ultrasound (CPT® 76700).

- Weight loss associated with anemia may suggest occult GI bleeding and/or hypogonadism. Serial tests for heme in stools and endocrine evaluations for gonadal function may be helpful.

- Depression and early dementia may be causes of weight loss. Detailed neurological examination should be performed. When considering such etiologies, care must be taken to consider that the weight loss may be intentional but not disclosed for reasons of secondary gain.

- Unintentional weight loss may be an infrequent side effect of commonly prescribed medications and over-the-counter medications. Careful history taking is recommended.

- For non-smokers, chest x-ray should be performed. For current or former smokers, CT Chest with contrast (CPT® 71260) can be approved.

- PET is not appropriate in the work-up of patients with unexplained weight loss.
ONC-30.3: Paraneoplastic Syndromes

General Considerations
Paraneoplastic syndromes are metabolic and neuromuscular disturbances. These syndromes are not directly related to a tumor or to metastatic disease. Patients with a paraneoplastic syndrome should be evaluated initially with chest x-ray and complete metabolic panel.

There may be a lead time between initial finding of a possible paraneoplastic syndrome and appearance of the cancer with imaging. Limited studies suggest annual imaging for 2 years after diagnosis of possible paraneoplastic syndrome may detect cancer, however benefit after 2 years is not well documented.

Almost any tumor can give rise to these syndromes, but they are most commonly associated with lung cancer (especially small cell lung cancer). The following are the most common symptoms of paraneoplastic syndromes known to arise from various malignancies, but especially found in patients with lung cancer:

- Hypertrophic Pulmonary Osteoarthropathy: Often presents as a constellation of rheumatoid-like polyarthritis, periostitis of long bones, and clubbing of fingers and toes
- Amyloidosis
- Hypercalcemia
- Hypophosphatemia
- Cushing’s Syndrome
- Somatostatinoma syndrome (vomiting, abdominal pain, diarrhea, cholelithiasis)
- Syndrome of inappropriate antidiuretic hormone secretion (SIADH)
- Polymyositis/dermatomyositis
- Opsoclonus
- Paraneoplastic sensory neuropathy
- Subacute cerebellar degeneration
- Eaton-Lambert syndrome (a myasthenia-like syndrome)
- Second event of unprovoked thrombosis
- Disseminated Intravascular Coagulation
- Migratory thrombophlebitis
- Polycythemia
- Chronic leukocytosis and/or thrombocytosis

Imaging for malignancy is not indicated for first episode of unprovoked DVT/VTE but may be considered after a second unprovoked DVT/PE in the setting of a negative workup for inherited thrombophilia and antiphospholipid syndrome.

For elevated tumor markers noted on laboratory testing in a patient with no history of cancer, follow the guidelines for paraneoplastic syndrome.

See also: PND-6: Muscle Disorders in the Peripheral Nerve Disorders Guidelines

See also: ONC-25: Multiple Myeloma and Plasmacytomas for evaluation of possible multiple myeloma.
<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoker, past or present</td>
<td>• CT Chest with contrast (CPT® 71260)</td>
</tr>
<tr>
<td></td>
<td>• Abdominal (CPT® 76700) and pelvic (CPT® 76856) ultrasound</td>
</tr>
<tr>
<td></td>
<td>• Mammogram and pelvic exam with transvaginal US (CPT® 76830) in women</td>
</tr>
<tr>
<td>Non-smokers</td>
<td>• Chest x-ray</td>
</tr>
<tr>
<td></td>
<td>• Abdominal (CPT® 76700) and pelvic (CPT® 76536) ultrasound</td>
</tr>
<tr>
<td></td>
<td>• Mammogram and pelvic exam with transvaginal US (CPT® 76830) in women</td>
</tr>
<tr>
<td>If above evaluations are negative</td>
<td>• CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td></td>
<td>• CT may be repeated annually for 2 years post initial imaging for diagnosis of paraneoplastic syndrome</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>• PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
<tr>
<td></td>
<td>Abnormality on conventional imaging difficult to biopsy</td>
</tr>
<tr>
<td></td>
<td>Inconclusive conventional imaging</td>
</tr>
</tbody>
</table>

In addition thyroid US is recommended for elevated CEA, and upper/lower endoscopy is recommended for elevated CEA or CA 19-9.
References
### ONC-31: Metastatic Cancer, Carcinoma of Unknown Primary Site, and Other Types of Cancer

<table>
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<td>Extrathoracic Small Cell and Large Cell Neuroendocrine Tumors</td>
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<td>ONC-31.9</td>
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</tbody>
</table>
Guideline sections **ONC-31.1: Lung Metastases** through **ONC-31.5: Bone (including Vertebral) Metastases** should only be used for patients with metastatic cancer in the following circumstances:
- The primary diagnosis section does not address a particular metastatic site that is addressed in these sections
- The cancer type is rare and does not have its own diagnosis-specific imaging guidelines

## ONC-31.1: Lung Metastases

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| New or worsening signs or symptoms suggestive of metastatic lung involvement or new or worsening chest x-ray abnormality | ✷ CT Chest with contrast (CPT® 71260)  
    ✷ CT Chest without contrast (CPT® 71250) can be approved if there is a contraindication to CT contrast or only parenchymal lesions are being evaluated |
| Chest wall or brachial plexus involvement                                  | ✷ MRI Chest without and with contrast (CPT® 71552)                               |
| One of the following and no diagnosis-specific guideline regarding PET imaging: | ✷ PET/CT (CPT® 78815)  
    ✷ When primary cancer known, PET request should be reviewed by primary cancer guideline |
|   ♦ Lung nodule(s) ≥ 8 mm                                                   |                                                                               |
|   ♦ Confirm solitary metastasis amenable to resection on conventional imaging |                                                                               |
| Previous or current malignancy and pulmonary nodule(s) that would reasonably metastasize to the lungs | ✷ CT Chest with contrast (CPT® 71260) at 3, 6, 12 and 24 months from the first study |
**ONC-31.2: Liver Metastases**

Ablation of liver metastases or primary HCC may be performed utilizing chemical, chemotherapeutic, radiofrequency, or radioactive isotope methods. **Regardless of the modality of ablation, PET is not indicated for assessing response to this mode of therapy.**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>New or worsening signs or symptoms suggestive of metastatic liver involvement or new elevation in LFTs.</td>
<td>CT Abdomen with (CPT® 74160) or without and with contrast (CPT® 74170)</td>
</tr>
<tr>
<td>Any of the following:</td>
<td>MRI Abdomen without and with contrast (CPT® 74183)</td>
</tr>
<tr>
<td>◦ Considering limited resection</td>
<td></td>
</tr>
<tr>
<td>◦ Confirm first site of metastatic failure</td>
<td></td>
</tr>
<tr>
<td>◦ Inconclusive CT findings</td>
<td></td>
</tr>
<tr>
<td>One of the following and <strong>no diagnosis-specific guideline regarding PET imaging:</strong></td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>◦ Confirm solitary metastasis amenable to resection on conventional imaging</td>
<td>When primary cancer known, PET request should be reviewed by primary cancer guideline</td>
</tr>
<tr>
<td>◦ LFT’s and/or tumor markers continue to rise and CT and MRI are negative</td>
<td></td>
</tr>
<tr>
<td>Monitoring of liver metastases that have been surgically resected</td>
<td>Review according to primary cancer guideline</td>
</tr>
<tr>
<td>Evaluation for hepatic artery chemotherapy infusion or chemoembolization with radioactive spheres (TheraSphere or SIR Spheres) for liver metastases or primary liver tumors:</td>
<td>CTA Abdomen (CPT® 74175) can be approved immediately prior to embolization</td>
</tr>
<tr>
<td></td>
<td>One of the following studies may be approved pre-treatment and one post-treatment:</td>
</tr>
<tr>
<td></td>
<td>◦ 78202 (Liver Imaging with Vascular Flow)</td>
</tr>
<tr>
<td></td>
<td>◦ 78206 (Liver Imaging SPECT with Vascular Flow)</td>
</tr>
<tr>
<td></td>
<td>◦ Liver-lung shunt calculation is included in the pre-treatment Liver Scan and does not require additional Lung Perfusion Scan</td>
</tr>
<tr>
<td></td>
<td>◦ PET is not indicated for evaluation of ablated liver lesions</td>
</tr>
<tr>
<td>Indication</td>
<td>Imaging Study</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Monitoring of ablated liver metastases or primary tumors</td>
<td>One of the following, immediately prior to ablation, 1 month post-ablation, then every 3 months for 2 years, and then annually</td>
</tr>
<tr>
<td></td>
<td>◆ CT Abdomen without and with contrast (CPT® 74170).</td>
</tr>
<tr>
<td></td>
<td>◆ MRI Abdomen without and with contrast (CPT® 74183).</td>
</tr>
</tbody>
</table>
### ONC-31.3: Brain Metastases

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual with cancer and signs or symptoms of CNS disease or known brain metastasis with new signs or symptoms.</td>
<td>- MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
</tbody>
</table>
| Assess candidacy for stereotactic radiosurgical approach for brain metastases | - MRI Brain without and with contrast (CPT® 70553) using thin slice cuts if not already done within 30 days  
- If thin slice MRI done within 30 days and MRI needed for SRS treatment planning, planning code CPT® 76498 can be approved. |
| Monitoring of brain metastases treated with surgery or radiation therapy  | Post-treatment, then every 3 months for 1 year and every 6 months thereafter:  
- MRI Brain without and with contrast (CPT® 70553)  
PET Metabolic Brain (CPT® 78608) and MR Spectroscopy (CPT® 76390) are considered investigational and experimental for evaluation of metastatic brain cancer |
| Any of the following:                                                     | - CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast  
- Mammography for female patients  
- PET/CT (CPT® 78815 or CPT® 78816) is indicated for any of the following:  
  - Inconclusive conventional imaging  
  - Confirm either stable systemic disease or absence of other metastatic disease  
  - When primary cancer known, PET request should be reviewed by primary cancer guideline |
| Primary brain tumors                                                       | See: [ONC-2: Primary Central Nervous System Tumors](#)                        |
# ONC-31.4: Adrenal Gland Metastases

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differentiate benign adrenal adenoma from metastatic disease</td>
<td>See <strong>AB-16: Adrenal Cortical Lesions</strong></td>
</tr>
<tr>
<td>Any of the following in an individual with known cancer:</td>
<td>One of the following:</td>
</tr>
<tr>
<td>Adrenal mass ≥ 4 cm</td>
<td>CT-directed needle biopsy (CPT® 77012)</td>
</tr>
<tr>
<td>Enlarging solitary adrenal mass</td>
<td>MRI Abdomen without (CPT® 74181) or without and with contrast (CPT® 74183)</td>
</tr>
<tr>
<td>Inconclusive findings on recent CT scan</td>
<td>PET/CT (CPT® 78815)</td>
</tr>
<tr>
<td>When primary cancer is known, PET request should be reviewed by primary cancer guideline</td>
<td>See also <strong>AB-16.1: Adrenal Cortical Lesions</strong></td>
</tr>
</tbody>
</table>
**ONC-31.5: Bone (including Vertebral) Metastases**

Patients with Stage IV cancer with new onset back pain can forgo a bone scan (and plain films) in lieu of an MRI with and without contrast of the spine.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of the following in a patient with a current or prior malignancy:</td>
<td>- Bone scan (see <strong>ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology</strong>) supplemented by plain x-rays is the initial diagnostic imaging study of choice</td>
</tr>
<tr>
<td>- Bone pain</td>
<td></td>
</tr>
<tr>
<td>- Rising tumor markers</td>
<td></td>
</tr>
<tr>
<td>- Elevated alkaline phosphatase.</td>
<td></td>
</tr>
<tr>
<td>Any of the following:</td>
<td>Any of the following may be approved:</td>
</tr>
<tr>
<td>- Any patient with stage IV cancer with new onset back pain</td>
<td>- MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast</td>
</tr>
<tr>
<td>- Bone scan is not feasible or readily available</td>
<td>- CT Cervical (CPT® 72127), Thoracic (CPT® 72130), and Lumbar spine (CPT® 72133) without and with contrast can be approved <strong>if MRI is contraindicated or not readily available</strong></td>
</tr>
<tr>
<td>- Continued suspicious despite inconclusive or negative bone scan or other imaging modalities</td>
<td>- CT without contrast can be approved if there is a contraindication to CT contrast</td>
</tr>
<tr>
<td>- Neurological compromise</td>
<td></td>
</tr>
<tr>
<td>- Soft tissue component suggested on other imaging modalities or physical exam</td>
<td></td>
</tr>
<tr>
<td>- Differentiate neoplastic disease from Paget’s disease of bone</td>
<td></td>
</tr>
<tr>
<td>- Suspected leptomeningeal involvement</td>
<td></td>
</tr>
<tr>
<td>Monitoring untreated spinal metastases</td>
<td>- MRI without and with contrast or CT without and with contrast of the involved spinal level every 3 months for 1 year. <strong>Imaging beyond 1 year is based on any new clinical signs/symptoms</strong></td>
</tr>
<tr>
<td>Monitoring metastases within the spine treated with surgery and/or radiation therapy</td>
<td>- MRI without and with contrast or CT without and with contrast of the involved spinal level once within 3 months post treatment and then every 3 months for 1 year. <strong>Imaging beyond 1 year is based on any new clinical signs/symptoms</strong></td>
</tr>
<tr>
<td>Leptomeningeal involvement with cancer</td>
<td>On active treatment:</td>
</tr>
<tr>
<td></td>
<td>- MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td></td>
<td>- MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast every 2 cycles</td>
</tr>
<tr>
<td></td>
<td>Once treatment completed:</td>
</tr>
<tr>
<td></td>
<td>- Routine advanced imaging not indicated for surveillance in asymptomatic individuals</td>
</tr>
<tr>
<td>Indication</td>
<td>Imaging Study</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Bone pain when both bone scan and either CT or MRI are inconclusive</td>
<td>¹⁸F-FDG-PET/CT (CPT® 78815 or CPT® 78816) on a case-by-case basis</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> ¹⁸F-NaF PET imaging (sodium fluoride, or “PET bone scan”) is investigational. See: <strong>ONC-1.1: Key Principles</strong></td>
</tr>
<tr>
<td>Suspected metastatic bone disease and negative work up for myeloma</td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast</td>
</tr>
<tr>
<td>No prior cancer history with suspected pathologic fracture on plain x-ray</td>
<td>See <strong>ONC-31.7: Carcinoma of Unknown Primary Site</strong></td>
</tr>
<tr>
<td>Signs/symptoms concerning for spinal cord compression</td>
<td>See <strong>ONC-31.6: Spinal Cord Compression</strong></td>
</tr>
</tbody>
</table>
### ONC-31.6: Spinal Cord Compression

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of the following in a current or former cancer patient:</td>
<td>Any or all of the following may be approved:</td>
</tr>
<tr>
<td>- Any patient with stage IV cancer with new onset back pain</td>
<td>- MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast</td>
</tr>
<tr>
<td>- New back pain persisting over two weeks</td>
<td>- Post myelogram CT of the Cervical (CPT® 72126), Thoracic (CPT® 72129), and Lumbar spine (CPT® 72132)</td>
</tr>
<tr>
<td>- Back pain that is rapidly progressive or refractory to aggressive pain management</td>
<td></td>
</tr>
<tr>
<td>- Signs or symptoms of neurological compromise at the spinal cord level</td>
<td></td>
</tr>
<tr>
<td>- Unexpected, sudden loss of bowel or bladder control</td>
<td></td>
</tr>
<tr>
<td>- Sudden loss of ability to ambulate</td>
<td></td>
</tr>
<tr>
<td>- Complete loss of pinprick sensation corresponding to a specific vertebral level</td>
<td></td>
</tr>
<tr>
<td>- Loss of pain at a site that had previously been refractory to pain management</td>
<td></td>
</tr>
</tbody>
</table>

| Any current or former cancer patient with radicular symptoms suggestive of nerve root involvement but not consistent with cord compression and one of the following: | One of the following: |
| - Unilateral weakness                                                     | - MRI without and with contrast of involved spinal level                      |
| - Unilateral change of reflexes                                           | - MRI without contrast of the involved spinal level                          |
| - Pain unrelieved by change in position                                   | - CT without contrast of the involved spinal level if MRI contraindicated    |
| - Age > 70 years                                                          |                                                                              |
| - Unintentional weight loss                                               |                                                                              |
| - Night pain                                                              |                                                                              |
ONC-31.7: Carcinoma of Unknown Primary Site

General Considerations

- Defined as carcinoma found in a lymph node or in an organ known not to be the primary for that cell type (e.g., adenocarcinoma arising in the brain or in a neck lymph node).

- This guideline also applies to metastatic melanoma when a detailed skin and mucosal surface examination has failed to find a primary site of disease.

- This guideline also applies to a pathologic fracture that is clearly due to metastatic neoplastic disease in a patient without a previous cancer history.

- Detailed history and physical examination including pelvic and rectal exams and laboratory tests to be performed before advanced imaging.

- Patients presenting with a thoracic squamous cell carcinoma described as metastatic appearing on chest imaging, or in lymph nodes above the clavicle, should undergo a detailed head and neck examination by a clinician skilled in laryngeal and pharyngeal examinations, especially in smokers.

- Patients with suspected unknown primary carcinomas based on only suspicious lytic bone lesions should be considered for serum protein electrophoresis (SPEP); urine protein electrophoresis (UPEP) and serum free light chains prior to consideration of extensive imaging.
<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinoma found in a lymph node or in an organ known not to be primary</td>
<td>- CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)&lt;br&gt;- CT Neck with contrast (CPT® 70491) if cervical or supraclavicular involvement&lt;br&gt;- CT with contrast or MRI without and with contrast of any other symptomatic site&lt;br&gt;- For female patients:&lt;br&gt;  ▪ Diagnostic (not screening) mammogram and full pelvic exam&lt;br&gt;  ▪ MRI Bilateral Breasts (CPT® 77049) if pathology consistent with breast primary and mammogram is inconclusive</td>
</tr>
<tr>
<td>Sebaceous carcinoma of the skin (can be associated with underlying primary malignancy)</td>
<td>- CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)&lt;br&gt;- CT Neck with contrast (CPT® 70491) if cervical or supraclavicular involvement&lt;br&gt;- CT with contrast or MRI without and with contrast of any other symptomatic site</td>
</tr>
<tr>
<td>Axillary adenocarcinoma</td>
<td>- CT Neck (CPT® 70491), CT Chest (CPT® 71260), and CT Abdomen with contrast (CPT® 74160)&lt;br&gt;- CT with contrast or MRI without and with contrast of any other symptomatic site&lt;br&gt;- For female patients:&lt;br&gt;  ▪ Diagnostic (not screening) mammogram and full pelvic exam&lt;br&gt;  ▪ MRI Bilateral Breasts (CPT® 77049) if pathology consistent with breast primary and mammogram is inconclusive</td>
</tr>
<tr>
<td>Above studies have failed demonstrate site of primary</td>
<td>- PET/CT (CPT® 78815 or CPT® 78816)</td>
</tr>
</tbody>
</table>
# ONC-31.8: Extrathoracic Small Cell and Large Cell Neuroendocrine Tumors

All poorly-differentiated or high-grade, small cell and large cell neuroendocrine tumors arising outside the lungs or of unknown primary origin are imaged according to these guidelines.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial staging</strong></td>
<td>Any or all of the following are indicated:</td>
</tr>
<tr>
<td></td>
<td>✦ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>✦ MRI Brain without and with contrast (CPT® 70553) should be performed for symptoms of CNS involvement and for poorly differentiated neuroendocrine cancers of the neck or extrapulmonary thorax.</td>
</tr>
<tr>
<td></td>
<td>✦ PET/CT (CPT® 78815) if no evidence of metastatic disease or conventional imaging is inconclusive for determining localized vs. distant metastatic disease</td>
</tr>
<tr>
<td><strong>Restaging during treatment</strong></td>
<td>CT Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) and any known sites of disease with contrast every 2 cycles</td>
</tr>
<tr>
<td><strong>Suspected Recurrence</strong></td>
<td>Any or all of the following are indicated:</td>
</tr>
<tr>
<td></td>
<td>✦ CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)</td>
</tr>
<tr>
<td></td>
<td>✦ MRI Brain without and with contrast (CPT® 70553)</td>
</tr>
<tr>
<td></td>
<td>✦ Bone scan (See ONC-1.3: Nuclear Medicine (NM) Imaging in Oncology)</td>
</tr>
<tr>
<td></td>
<td>✦ <strong>PET imaging is generally not indicated</strong> but can be considered for rare circumstances. These requests should be forwarded for Medical Director review.</td>
</tr>
<tr>
<td><strong>Surveillance</strong></td>
<td>CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177) every 3 months for 1 year, then every 6 months for 4 additional years and then annually</td>
</tr>
</tbody>
</table>
## ONC-31.9: Primary Peritoneal Mesothelioma

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Initial staging    | • CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177)  
|                    | • PET/CT (CPT® 78815) if there is no evidence of metastatic disease or conventional imaging is inconclusive |
| Recurrence/Restaging | • If there is known prior disease, CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177)  
|                    | • PET for inconclusive finding on conventional imaging                |
| Surveillance       | • CT Abdomen/Pelvis with contrast (CPT® 74177) every 3 months for 2 years, then every year of life |
## ONC-31.10: Kaposi’s Sarcoma

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| Kaposi’s Sarcoma | - Advanced imaging is not generally indicated since disease is generally localized to skin.  
|                  | - CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177) can be approved at initial diagnosis. If initial scans are negative then future imaging would be based on signs or symptoms. |
## ONC-31.11: Castleman’s disease (unicentric and multicentric)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Imaging Study</th>
</tr>
</thead>
</table>
| **Initial staging**             | - Either CT Chest (CPT® 71260) and CT Abdomen/Pelvis with contrast (CPT® 74177) or PET/CT (CPT® 78815)  
- CT Neck with contrast (CPT® 70491) if cervical or supraclavicular involvement  
- If CT scans were utilized initially and suggested unicentric disease, and surgical resection is being considered, PET/CT (CPT® 78815) can be approved to confirm unicentric disease.  
- If unicentric disease is surgically removed, proceed to Surveillance section. |
| **Restaging:**                  | One of the following every 2 cycles:                                          |
| - Multicentric disease or surgically unresected unicentric disease on chemotherapy | - CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177)  
- PET/CT (CPT® 78815) |
| **Any of the following:**       | One of the following:                                                         |
| - Suspected recurrence          | - CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177)  
- PET/CT (CPT® 78815) |
| - Recurrent B symptoms          | - Rising LDH/IL-6/VEGF levels                                                |
| - Rising LDH/IL-6/VEGF levels   | - CT with contrast of involved areas no more than every 6 months up to 5 years |
| **Surveillance**                |                                                                               |

Restaging includes if initially staged with any of the above indications.
References


## ONC-32: Medicare Coverage Policies for PET

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</tr>
</tbody>
</table>
ONC-32.1: Oncologic FDG PET


220.6.17 – Positron Emission Tomography (FDG PET) for Oncologic Conditions

General
FDG (2-[F\(^{18}\)] fluoro-2-deoxy-D-glucose) PET is a minimally invasive diagnostic imaging procedure used to evaluate glucose metabolism in normal tissue, as well as in diseased tissues, in conditions such as cancer, ischemic heart disease, and some neurologic disorders. FDG is an injected radionuclide (or radiopharmaceutical that emits subatomic particles, known as positrons, as it decays. FDG PET uses a positron camera (tomograph) to measure the decay of FDG. The rate of FDG decay provides biochemical information on glucose metabolism in the tissue being studied. As malignancies can cause abnormalities of metabolism and blood flow, FDG PET evaluation may indicate the probable presence or absence of a majority of cancer types based upon observed differences in biologic activity compared to adjacent tissues.

The Centers for Medicare and Medicaid Services (CMS) was asked by the National Oncologic PET Registry (NOPR) to reconsider section 220.6 of the National Coverage Determination (NCD) Manual to end the prospective data collection requirements under Coverage with Evidence Development (CED) across all oncologic indications of FDG PET imaging. The CMS received public input indicating that the current framework of prospective data collection under CED be ended for all oncologic uses of FDG PET imaging

1. Framework

Effective for claims with dates of service on and after June 11, 2013, CMS is adopting a coverage framework that ends the prospective data collection requirements by NOPR under CED for all oncologic uses of FDG PET imaging. CMS is making this change for all NCDs that address coverage of FDG PET for oncologic uses addressed in this decision. This decision does not change coverage for any use of PET imaging using radiopharmaceuticals ammonia N\(^{13}\), or rubidium\(^{82}\) (Rb\(^{82}\)).

2. Initial Anti-Tumor Treatment Strategy

CMS continues to believe that the evidence is adequate to determine that the results of FDG PET imaging are useful in determining the appropriate initial anti-tumor treatment strategy for beneficiaries with suspected cancer and improve health outcomes and thus are reasonable and necessary under §1862(a)(1)(A) of the Social Security Act (the “Act”).

Therefore, CMS continues to nationally cover ONE FDG PET study for beneficiaries who have cancers that are biopsy proven or strongly suspected based on other diagnostic testing when the beneficiary’s treating physician determines that the FDG
PET study is needed to determine the location and/or extent of the tumor for the following therapeutic purposes related to the initial anti-tumor treatment strategy:

- To determine whether or not the beneficiary is an appropriate candidate for an invasive diagnostic or therapeutic procedure; or
- To determine the optimal anatomic location for an invasive procedure; or
- To determine the anatomic extent of tumor when the recommended anti-tumor treatment reasonably depends on the extent of the tumor.

See the table at the end of this section for a synopsis of all nationally covered and non-covered oncologic uses of FDG PET imaging.

**Initial Anti-Tumor Treatment Strategy Nationally Covered Indication**

**Effective: June 11, 2013**

- CMS continues to nationally cover FDG PET imaging for the initial anti-tumor treatment strategy for male and female breast cancer only when used in staging distant metastasis.
- CMS continues to nationally cover FDG PET to determine initial anti-tumor treatment strategy for melanoma other than for the evaluation of regional lymph nodes.
- CMS continues to nationally cover FDG PET imaging for the detection of pre-treatment metastasis (i.e., staging) in newly diagnosed cervical cancers following conventional imaging.

**Initial Anti-Tumor Treatment Strategy Nationally Non-Covered Indication**

**Effective: June 11, 2013**

- CMS continues to nationally non-cover initial anti-tumor treatment strategy in Medicare beneficiaries who have adenocarcinoma of the prostate.
- CMS continues to nationally non-cover FDG PET imaging for diagnosis of breast cancer and initial staging of axillary nodes.
- CMS continues to nationally non-cover FDG PET imaging for initial anti-tumor treatment strategy for the evaluation of regional lymph nodes in melanoma.
- CMS continues to nationally non-cover FDG PET imaging for the diagnosis (no biopsy result) of cervical cancer related to initial anti-tumor treatment strategy.
3. Subsequent Anti-Tumor Treatment Strategy

Subsequent Anti-Tumor Treatment Strategy Nationally Covered Indication, Effective: June 11, 2013

THREE FDG PET scans are nationally covered when used to guide subsequent management of anti-tumor treatment strategy after completion of initial anti-tumor therapy. Coverage of more than three FDG PET scans to guide subsequent management of anti-tumor treatment strategy after completion of initial anti-tumor therapy shall be determined by the local Medicare Administrative Contractors.


Effective for claims with dates of service on and after June 11, 2013, the chart below summarizes national FDG PET coverage for oncologic conditions. Additional details may be obtained at https://www.cms.gov/medicare/coverage/determinationprocess/downloads/petforsolidtumorsoncologicdxcodesattachment_NCD220_6_17.pdf

<table>
<thead>
<tr>
<th>FDG PET for Solid Tumors and Myeloma Tumor Type</th>
<th>Initial Treatment Strategy (formerly “diagnosis” &amp; “staging”)</th>
<th>Subsequent Treatment Strategy (formerly “restaging” &amp; “monitoring response to) treatment”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorectal</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Esophagus</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Head and Neck (not thyroid or CNS)</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Non-small cell lung</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Ovary</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Brain</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Cervix with exceptions</td>
<td>Cover with exceptions</td>
<td>Cover</td>
</tr>
<tr>
<td>Small cell lung</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Soft tissue sarcoma</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Pancreas</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Testes</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Prostate</td>
<td>Non-cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Thyroid</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>FDG PET for Solid Tumors and Myeloma Tumor Type</td>
<td>Initial Treatment Strategy (formerly “diagnosis” &amp; “staging”)</td>
<td>Subsequent Treatment Strategy (formerly “restaging” &amp; “monitoring response to) treatment”)</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Breast (male and female)</td>
<td>Cover with exceptions</td>
<td>Cover</td>
</tr>
<tr>
<td>Melanoma</td>
<td>Cover with exceptions</td>
<td>Cover</td>
</tr>
<tr>
<td>All other solid tumors</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>Myeloma</td>
<td>Cover</td>
<td>Cover</td>
</tr>
<tr>
<td>All other cancers not listed</td>
<td>Cover</td>
<td>Cover</td>
</tr>
</tbody>
</table>

**Invasive Breast Cancer:**

Nationally non-covered for initial diagnosis and/or staging of axillary lymph nodes. Nationally covered for initial staging of known or suspected metastatic disease. All other indications for initial anti-tumor strategy for breast cancer are nationally covered.

- Prior to surgical lymph node sampling: **NOT indicated** (unless planning neoadjuvant therapy)
- Metastatic disease or suspicious lesions seen on CT and/or bone scan: **Indicated**
- After completion of surgical lymph node sampling in place of CT scans: **Indicated**

**Melanoma:**

Nationally non-covered for initial staging of regional lymph nodes. All other indications for initial anti-tumor treatment strategy for melanoma are nationally covered.

- Prior to surgical lymph node sampling: **NOT indicated**
- Metastatic disease or suspicious lesions seen on CT and/or bone scan: **Indicated**
- After completion of surgical lymph node sampling in place of CT scans: **Indicated**

**Cervix:**

Nationally non-covered for the initial diagnosis (before biopsy) of cervical cancer related to initial antitumor treatment strategy. All other indications for initial anti-tumor treatment strategy for cervical cancer are nationally covered.
5. CPT codes for FDG-PET scan for Oncologic Conditions

The decision whether to use skull base to mid-femur ("eyes to thighs": procedure code for PET (CPT® 78812 or CPT® 78815) or whole body PET(CPT® 78813 or CPT® 78816) is addressed in the diagnosis-specific guideline sections. Requests requiring CPT® code redirection should be forwarded to Medical Director for review.
ONC-32.2: Oncologic Non-FDG PET

PET/CT Scan using non-FDG Radiotracers:

- Medicare National Coverage Determination for PET (NCD 220.6.17) has recently included coverage of PET-CT scans with three new non-FDG radiotracers. Local Medicare contractors have the authority to make coverage decisions about oncologic studies performed with other agents.
- PET/CT scan using non-FDG radiotracers is reported with the same CPT codes (CPT® 78815 and CPT® 78816).
- Either FDG or non-FDG PET/CT scan may be approved to assess the disease status, both may not be obtained simultaneously.
- As with FDG PET/CT scan, Medicare NCD allows coverage for ONE non-FDG PET/CT scan for initial anti-tumor strategy (except for newly diagnosed prostate cancer as noted above) and THREE additional non-FDG PET/CT scans for subsequent anti-tumor treatment strategy. Coverage of more than three non-FDG PET/CT scans to guide subsequent management of anti-tumor treatment strategy after completion of initial anti-tumor therapy shall be determined by the local Medicare Administrative Contractors.

\[^{11}\text{C Choline for Prostate cancer}\]

- **COVERED FOR:**
  - Subsequent treatment strategy for patients with prostate cancer who have a rising PSA and have previously been treated with prostatectomy and/or radiation therapy
- **NOT COVERED FOR:**
  - Initial treatment strategy for newly diagnosed prostate cancer
  - Surveillance of patients with localized/advanced prostate cancer, who have completed definitive therapy or are receiving maintenance therapy

\[^{18}\text{F-Fluciclovine (AXUMIN®) for Prostate cancer}\]

- **COVERED FOR:**
  - Subsequent treatment strategy for patients with prostate cancer who have a rising PSA and have previously been treated with prostatectomy and/or radiation therapy
- **NOT COVERED FOR:**
  - Initial treatment strategy for newly diagnosed prostate cancer
  - Surveillance of patients with localized/advanced prostate cancer, who have completed definitive therapy or are receiving maintenance therapy
**Gallium DOTATATE (NETSPOT®) for Neuroendocrine tumors**

- **COVERED FOR:**
  - Initial treatment strategy for newly diagnosed low-grade neuroendocrine tumors
  - Subsequent treatment strategy for low-grade neuroendocrine tumors

- **NOT COVERED FOR:**
  - Surveillance of patients with localized/advanced low-grade neuroendocrine tumors, who have completed definitive therapy or are receiving maintenance therapy

**18F Na Fluoride PET/CT Scan for Bone Metastases:**

- PET/CT using F-18 sodium fluoride (NaF-18) has been studied to identify bone metastases. At this time, Medicare NCD **excludes** coverage for PET/CT scan using Na fluoride radiotracer.

**Coverage with Evidence Development (CED):**

- CED is a program designed to make PET/CT available to Medicare beneficiaries while at the same time gathering data regarding PET’s effectiveness.
- Under CED, Medicare will reimburse the claim if the beneficiary is enrolled in, and the PET provider is participating in, a qualifying prospective clinical trial or registry.
- Full details regarding qualifying clinical trials, including the list of required scientific integrity standards and relevance to the Medicare population are available in the Medicare NCD Manual, Section 220.6.17.
- Qualifying research trials must be registered on the www.ClinicalTrials.gov website by the principal sponsor/investigator, prior to the enrollment of the first study subject.

**National Oncologic PET Registry (NOPR):**

- Providers can meet Medicare’s requirements for CED by submitting PET data to the National Oncologic PET Registry (NOPR).
- A participating hospital or imaging center must submit information to the NOPR for all Medicare PET that falls under CED. This information includes pre- and post-study forms completed by the referring provider, as well as the final radiology report.
- Providers cannot bill Medicare for the services until the NOPR notifies the facility that all required information has been received.
- Imaging facilities cannot submit data to the NOPR for studies performed for covered indications.
- For more information about the NOPR, see the registry website: [www.cancerpetregistry.org](http://www.cancerpetregistry.org)
**ONC-32.3: Brain PET**

- CPT® 78608 is used to report FDG PET metabolic brain studies for dementia, seizure disorders, and dedicated PET tumor imaging studies of the brain. See [ONC-2.2: Low Grade Gliomas](#) and [ONC-2.3: High Grade Gliomas](#) for indications of this study.

- CPT® 78609 is used to report PET brain perfusion studies that are not performed with FDG. These scans are nationally noncovered by Medicare.

- CPT® 78811 (Limited PET) or CPT® 78814 (Limited PET/CT hybrid) are used to report Amyloid PET brain studies (these are not metabolic studies).

**Amyloid-beta(Aβ) PET Brain Studies:**
- Medicare will reimburse for brain PET, performed with the radiopharmaceuticals that detect levels of amyloid in the human brain, only through CED.
- Examples of these radiopharmaceuticals include Amyvid™ (florbetapir F\(^{18}\)), Neuraceq™ (florbetaben F\(^{18}\)) and Vizamyl™ (flutemetamol F\(^{18}\)).
- CMS will cover one PET Aβ scan per patient through CED.
- For CMS, approval with Coverage with Evidence Development (CED) is available for patients enrolled in clinical trials approved by CMS. See the following link for a list of the CMS approved clinical trials: [https://www.cms.gov/Medicare/Coverage/Coverage-with-Evidence-Development/Amyloid-PET.html](https://www.cms.gov/Medicare/Coverage/Coverage-with-Evidence-Development/Amyloid-PET.html)

**FDG PET for Dementia and Neurodegenerative Diseases**
- Medicare covers FDG PET for individuals with a recent diagnosis of dementia and documented cognitive decline of at least six months who meet diagnostic criteria for both Alzheimer’s disease (AD) and Frontotemporal dementia (FTD).
- The individual must have been evaluated for specific alternate neurodegenerative diseases or other causative factors, but the etiology of the symptoms remains unclear.
- Other conditions must also be met. For the complete coverage policy, see the Medicare National Coverage Determinations (NCD) Manual, Section 220.6.13*.
- Medicare also covers FDG PET for individuals with mild cognitive impairment or early dementia when the study is performed in the context of a CMS-approved clinical trial. Requirements are detailed in Section 220.6.13 of the NCD Manual*.
- All other uses of FDG PET for patients with a presumptive diagnosis of dementia-causing neurodegenerative disease for which CMS has not specifically indicated coverage continue to be noncovered. Examples of noncovered indications described in the NCD include: possible or probable AD, clinically typical FTD, dementia of Lewy bodies, and Creutzfeld-Jacob disease.

FDG PET for Refractory Seizures

- Medicare covers FDG PET for pre-surgical evaluation for the purpose of localizing a focus of refractory seizure activity.
ONC-32.4: Cardiac PET

PET Myocardial Perfusion

- Medicare covers PET for myocardial perfusion with rubidium (Rb\(^{82}\)) or ammonia (N\(^{13}\)) when one of the following conditions is met:
  - PET is performed in place of, but not in addition to, a SPECT, or
  - An individual has had an inconclusive SPECT. In these cases, the PET must be considered necessary in order to determine what medical or surgical intervention is required to treat the individual

- PET myocardial perfusion is reported with either CPT\(^{®}\) 78491 or CPT\(^{®}\) 78492.

- The complete coverage policy is found in the Medicare National Coverage Determinations (NCD) Manual, Section 220.6.1:

PET Myocardial Viability

- Medicare covers FDG PET for myocardial viability as a primary or initial diagnostic study prior to revascularization surgery, or following an inconclusive SPECT scan.
  - The study must be performed on a full or partial ring PET scanner.
  - When PET is performed following an inconclusive SPECT, Medicare will not cover a follow-up SPECT exam if the results of the PET are inconclusive.

- PET myocardial viability is reported with CPT\(^{®}\) 78459.

- The complete coverage policy is found in the Medicare National Coverage Determinations (NCD) Manual, Section 220.6.8:
**ONC-32.5: PET for Infection and Inflammation**

- Medicare does not cover FDG PET for the following indications:
  - Chronic osteomyelitis
  - Infection of hip arthroplasty
  - Fever of unknown origin

### Pelvis Imaging Guidelines

#### Abbreviations for Pelvis Imaging Guidelines

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<th>Abbreviation</th>
<th>Description</th>
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<td>CA-125</td>
<td>cancer antigen 125 test</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>FSH</td>
<td>follicle-stimulating hormone</td>
</tr>
<tr>
<td>GTN</td>
<td>gestational trophoblastic neoplasia</td>
</tr>
<tr>
<td>HCG</td>
<td>human chorionic gonadotropin</td>
</tr>
<tr>
<td>IC/BPS</td>
<td>interstitial cystitis/bladder pain syndrome</td>
</tr>
<tr>
<td>IUD</td>
<td>intrauterine device</td>
</tr>
<tr>
<td>KUB</td>
<td>kidneys, ureters, bladder (frontal supine abdomen radiograph)</td>
</tr>
<tr>
<td>LH</td>
<td>luteinizing hormone</td>
</tr>
<tr>
<td>MRA</td>
<td>magnetic resonance angiography</td>
</tr>
<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
</tr>
<tr>
<td>MSv</td>
<td>millisievert</td>
</tr>
<tr>
<td>PA</td>
<td>posteroanterior projection</td>
</tr>
<tr>
<td>PID</td>
<td>pelvic inflammatory disease</td>
</tr>
<tr>
<td>TA</td>
<td>transabdominal</td>
</tr>
<tr>
<td>TSH</td>
<td>thyroid-stimulating hormone</td>
</tr>
<tr>
<td>TV</td>
<td>transvaginal</td>
</tr>
<tr>
<td>UCPPS</td>
<td>Urologic Chronic Pelvic Pain Syndrome</td>
</tr>
<tr>
<td>WBC</td>
<td>white blood cell count</td>
</tr>
</tbody>
</table>
PV-1.1: General Guidelines - Overview

- A current clinical evaluation (within 60 days) is required before advanced imaging can be considered. The clinical evaluation may include a relevant history and physical examination, appropriate laboratory studies, and non-advanced imaging modalities such as plain x-ray or pelvic ultrasound (CPT® 76856 or CPT® 76857) and/or transvaginal ultrasound (CPT® 76830).
  - The clinical evaluation may also include a gynecological and/or urological exam with appropriate laboratory studies such as blood count, tumor markers and endocrine evaluations.
  - Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation.

- Abdominal imaging begins at the diaphragm and extends to the umbilicus or iliac crest. Pelvic imaging begins at the umbilicus and extends to the pubis.

- Pregnant women should be evaluated with ultrasound or MRI without contrast to avoid radiation exposure. In carefully selected clinical circumstances, evaluation with CT may be considered with careful attention to technique and radiation protection as deemed clinically appropriate.

Ultrasound

- Transvaginal ultrasound is the recommended modality for imaging; no alternative modality has demonstrated sufficient superiority to justify routine use, and transvaginal ultrasound (TV) (CPT® 76830) is the optimal study to evaluate adult female pelvic pathology.

- Pelvic ultrasound (complete CPT® 76856, or limited CPT® 76857) can be performed if it is a complementary study to the TV ultrasound. It may substitute for TV in pediatric patients or non-sexually active females.

- CPT® 76942 is used to report ultrasound imaging guidance for needle placement during biopsy, aspiration, and other percutaneous procedures.

Soft Tissue Ultrasound

- Pelvic wall, buttocks, penis and perineum—CPT® 76857

- Groin-- CPT® 76882

Scrotal Ultrasound

- See
  - PV-17: Impotence/Erectile Dysfunction
  - PV-18: Penis-Soft Tissue Mass

- CPT® 76870 Ultrasound of scrotum and contents
Other Ultrasound

- CPT® 93975 Duplex scan (complete) scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; complete study.
- CPT® 93976 Duplex scan (limited) of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; limited study.
- CPT® 93975 and CPT® 93976 should not be reported together during the same session.

- 3D Rendering (CPT® 76376/CPT® 76377) See Preface-4.1: 3D Rendering
  - In general, eviCore maintains that CPT® 76376 (3D rendering not requiring image post-processing on an independent workstation) should not be separately reimbursed since this function is built into the imaging software and generally takes less than 15 minutes to perform. CPT® 76377 (3D rendering requiring image post-processing on an independent workstation) can be considered in the following clinical scenarios:
    - Uterine intra-cavitary lesion when initial US is equivocal (See PV-2.1: Abnormal Uterine Bleeding (AUB) and PV-12.1: Leiomyomata)
    - Hydrosalpinges or peritoneal cysts when initial US is equivocal (See PV-5.2: Complex Adnexal Masses – Pre-Menopausal, PV-5.3: Complex Adnexal Masses – Post-Menopausal)
    - Lost IUD (inability to feel or see IUD string) with initial US (See PV-10.1: Intrauterine Device)
    - Uterine anomalies with initial US (See PV-14.1: Uterine Anomalies)
  - Only CPT® 76377 (done on an independent workstation) may be approved when specific guideline criteria is met
  - Requests for CPT® 76376 must go to MD review

CT

- CT Pelvis with contrast is a possible modality unless there is a contrast allergy or CT without contrast to look for a calculus in the distal ureter or bladder.
  - CT is not generally warranted for evaluating pelvic anatomy because it is limited due to soft tissue contrast resolution.

MRI

- Can be used as a more targeted study or for patients allergic to iodinated contrast.
  - MRI Pelvis without contrast (CPT® 72195)
  - MRI Pelvis without and with contrast (CPT® 72197)
  - MRI Pelvis with contrast only (CPT® 72196) is rarely performed.
References


# PV-2: Abnormal Uterine Bleeding

## PV-2.1: Abnormal Uterine Bleeding (AUB)

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PV-2.1: Abnormal Uterine Bleeding (AUB)

- Initial evaluation includes any of the following:
  - Pelvic ultrasound (CPT® 76856 or CPT® 76857) and/or Transvaginal ultrasound (CPT® 76830), saline infusion sonohysterography (CPT® 76831), hysteroscopy, D&C and/or endometrial biopsy.

- If US is equivocal for intracavitary lesion, 3-D Rendering (CPT® 76377) may be approved as an add-on. (In general, eviCore maintains that CPT® 76376 (3D rendering not requiring image post-processing on an independent workstation) should not be separately reimbursed since this function is built into the imaging software and generally takes less than 15 minutes to perform.)

- If US is equivocal for intracavitary lesion, Duplex (Doppler) scan (CPT® 93975 complete; CPT® 93976 limited) may be approved as an add-on to TV US (CPT® 76830).

- CT is not generally warranted for evaluating AUB since uterine anatomy is limited due to soft tissue contrast resolution.
  - An abnormal endometrium found incidentally on CT should be referred for TVUS for further evaluation.

References


### PV-3: Amenorrhea

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</table>
**PV-3.1: Amenorrhea**

- If a pregnancy test is negative:
  - Ultrasound, Pelvis (CPT® 76856 or CPT® 76857) and/or TV (CPT® 76830), hysterosalpingogram (CPT® 74740), sonohysterosalpingography (CPT® 76831), and/or hysteroscopy.

The results of test(s) above determine the next steps, which may include:

- If ultrasound is indeterminate or equivocal for Asherman’s Syndrome, Polycystic Ovary Syndrome, or Androgen Secreting Ovarian Tumor, then MRI Pelvis without contrast (CPT® 72195) or without and with contrast (CPT® 72197).

- Hormonally active adrenal tumor suspicion should be evaluated by criteria in **AB-16: Adrenal Cortical Lesions** in the Abdomen Imaging Guidelines.

- Patients with absent uterus or a foreshortened vagina should have karyotype evaluation. (See **PV-14.1: Uterine Anomalies**)

- MRI head (pituitary protocol) without and with contrast (CPT® 70553) if:
  - Normal or low FSH and LH levels and evidence of increased intracranial pressure (e.g. headache, vomiting, vision changes).
  - Prolactin (PRL) level is elevated above normal range in the absence of untreated hypothyroidism and/or drug-induced causes of elevated prolactin.

- See **HD-19: Pituitary** in the Head Imaging Guidelines.

**PV-3.2: Amenorrhea - Delayed Puberty**

Delayed puberty can be further evaluated with thyroid function tests, LH, FSH and prolactin.

- Ultrasound, Pelvis (CPT® 76856 or CPT® 76857) and/or TV (CPT® 76830), hysterosalpingogram (CPT® 74740), sonohysterosalpingography (CPT® 76831), and/or hysteroscopy.

- MRI head (pituitary protocol) without and with contrast (CPT® 70553) if:
  - Normal or low FSH and LH levels and evidence of increased intracranial pressure (e.g. headache, vomiting, vision changes).
  - Prolactin (PRL) level is elevated above normal range in the absence of untreated hypothyroidism and/or drug-induced causes of elevated prolactin.

- See **HD-19: Pituitary** in the Head Imaging Guidelines.

**Practice Notes**

In some cases of hypothyroidism, there may be an increase in the PRL level. Treatment of hypothyroidism restores PRL to normal, therefore, pituitary MRI should not be performed unless elevated PRL level persists after euthyroid status has been achieved.

Many medications are known to often result in hyperprolactinemia. More common offenders include antipsychotics (first generation and second generation e.g. Haloperidol and Risperidone, respectively), antidepressants (cyclic, SSRIs, e.g.
Amitriptyline, Citalopram), anti-emetics and other gastrointestinal agents (such as Metoclopramide and Prochlorperazine), opioid analgesics (methadone, morphine), and antihypertensives (Verapamil, Methyldopa).

Normal uterus and normal puberty can be further be evaluated with an endocrine work-up (TSH, LH, FSH, and prolactin) and pregnancy test.

References
PV-4: Adenomyosis

PV-4.1: Adenomyosis
PV-4.1: Adenomyosis

- TV Ultrasound (CPT® 76830) and/or Pelvic ultrasound (CPT® 76856 or CPT® 76857) is the diagnostic procedure of choice for the initial evaluation of suspected adenomyosis. Doppler ultrasound (CPT® 93975 or CPT® 93976) can be added if requested.

- MRI Pelvis without contrast (CPT® 72195) or MRI Pelvis without and with (CPT® 72197) is considered a second-line imaging option after transvaginal ultrasound if:
  - Inconclusive US and the patient has failed several months (3 months) of hormone suppression; or
  - Enlarged uterus or with coexisting fibroids and further delineation would affect patient management.

Adenomyosis – Practice Notes

Adenomyosis is when endometrial tissue, which normally lines the uterus, moves into the outer muscular walls of the uterus. Adenomyosis is a histologic diagnosis and is suspected by history and physical examination. Ultrasound findings of adenomyosis include heterogeneous myometrium, myometrial cysts, asymmetric myometrial thickness, and subendometrial echogenic linear striations.

Reference


# PV-5: Adnexal Mass/Ovarian Cysts

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PV-5.1: Suspected Adnexal Mass – Initial Evaluation in All Women

- A potential mass is found on exam and/or other imaging
- Transvaginal (TV) ultrasound imaging (CPT® 76830) is the initial study of choice.\(^1,2\)
  - Pelvic ultrasound (CPT® 76856 or CPT® 76857) can be performed if requested as a complimentary study to the TV ultrasound.
  - Once confirmed, Color Doppler ultrasonography (CPT 93975) may be useful to evaluate the vascular characteristics of adnexal masses.
- If ultrasound does not identify the origin of the pelvic mass (adnexal, uterine, or other in etiology),\(^1\) MRI Pelvis without contrast (CPT® 72195), OR without and with contrast (CPT® 72197; CPT® 72195 if pregnant).
  - If the mass is unrelated to female pelvic anatomy, See **AB-13: Abdominal Mass**
- Transvaginal ultrasound is the recommended modality for imaging; no alternative modality has demonstrated sufficient superiority to justify routine use

If a Complex Adnexal Mass is identified in a pre-menopausal woman, See **PV-5.2: Complex Adnexal Mass – Pre-Menopause**

If a Complex Adnexal Mass is identified in a post-menopausal woman, See **PV-5.3: Complex Adnexal Mass – Post-Menopause**

**Practice Notes**

“Indeterminate” is commonly used by radiologists to describe a complex adnexal mass when they should be providing greater descriptive to the complex mass. A complex mass should describe whether or not there are septations, mural projections, papillary excrescences, and comment of vascularity, instead of just describing the mass as “indeterminate”.

“Equivocal” is another commonly used term. Further information should indicate what the mass or lesion is equivocal for, for instance, ectopic pregnancy, functional cysts, tuboovarian abscess, hydrosalpinx, dermoid, endometrioma, hemorrhagic cyst or pedunculated fibroids.

**PV-5.2: Complex Adnexal Masses – Pre-Menopausal**

A complex adnexal mass is any mass that’s is not considered to be a simple cyst. Description of a complex mass should include the presence or absence of septations, mural projections and/or papillary excrescences, and a comment on its vascularity.

For women of reproductive age (Pre-Menopausal), evaluation may include a pregnancy test (a quantitative hCG may be necessary if an ectopic pregnancy is suspected), CBC, serial hematocrit measurements, and appropriate cultures.
Symptomatic patients often require immediate interventions (antibiotics, surgery, and/or expectant management).

Ultrasound characteristics usually suggest the diagnosis (ectopic pregnancy, functional cysts, tuboovarian abscess (See PV-7: Pelvic Inflammatory Disease), hydrosalpinx, dermoid, endometrioma, hemorrhagic cyst and pedunculated fibroids (See PV-12: Leiomyomata/uterine Fibroids)) and direct the treatment.

- **Hemorrhagic cyst:**
  - If initial imaging confirms hemorrhagic cyst, follow up with pelvic ultrasound (CPT® 76856 or CPT® 76857 and/or [transvaginal] CPT® 76830) in six weeks or following a menstrual cycle to evaluate for resolution. Duplex (Doppler) scan (CPT® 93975 complete; CPT® 93976 limited) may be approved as an add-on to TV US (CPT® 76830).
    - If follow-up imaging confirms a hemorrhagic cyst that has not completely resolved, a repeat ultrasound (CPT® 76856 or CPT® 76857 and/or CPT® 76830 [transvaginal]) can be performed in 6 months (sooner if signs or symptoms persist or if new symptoms occur).

- **Endometriomas**
  - If initial imaging confirms an Endometrioma, follow-up ultrasound (CPT® 76856 or CPT® 76857 and/or CPT® 76830 [transvaginal]) can be performed at 6 to 12 weeks then every 6 months if not surgically resected; duplex (Doppler) scan (CPT® 93975 complete; CPT® 93976 limited) may be approved as an add-on to TV US (CPT® 76830).
  - If ultrasound equivocal for Endometriomas, Pelvic MRI without and with contrast (CPT® 72197)

- **Dermoids**
  - If initial imaging confirms a dermoid, follow-up ultrasound (CPT® 76856 or CPT® 76857 and/or CPT® 76830 [transvaginal]) can be performed at 6 to 12 months; duplex (Doppler) scan (CPT® 93975 complete; CPT® 93976 limited) may be approved as an add-on to TV US (CPT® 76830).
    - If surgical resection is not performed, then follow-up pelvic ultrasound (CPT® 76856 or CPT® 76857 and/or CPT® 76830 [transvaginal]) can be obtained every 6 to 12 months.
    - If initial ultrasound imaging (CPT® 76857 or CPT® 76856 and/or transvaginal CPT® 76830) equivocal for Dermoids, the diagnosis can be confirmed by CT Pelvis (contrast as requested) or MRI Pelvis without contrast (CPT® 72195) or MRI Pelvis without and with contrast (CPT® 72197).
  - If surgical resection is not performed, then follow-up pelvic ultrasound (CPT® 76856 or CPT® 76857 and/or CPT® 76830 [transvaginal]) can be obtained every 6 to 12 months.

- **Hydrosalpinges (Hydrosalpinx) or Peritoneal cysts**
  - If initial imaging confirms hydrosalpinx or peritoneal cysts, advanced imaging is rarely indicated in these clinical scenarios. Send for physician review.
  - If initial ultrasound imaging (CPT® 76857 or CPT® 76856 and/or transvaginal CPT® 76830) equivocal for Hydrosalpinges, one repeat US is indicated in 6
weeks or following a menstrual cycle to evaluate for resolution. Duplex (Doppler) scan (CPT® 93975 complete; CPT® 93976 limited) may be approved as an add-on to TV US (CPT® 76830). 3-D Rendering (CPT® 76377) may be approved as an add-on. (In general, eviCore maintains that CPT® 76376 (3D rendering not requiring image post-processing on an independent workstation) should not be separately reimbursed since this function is built into the imaging software and generally takes less than 15 minutes to perform.)

Advanced imaging may be considered for elevated tumor makers if an ultrasound equivocal and/or ovarian malignancy is suspected. See ONC- 21.2: Suspected/Diagnosis

- CT Abdomen and Pelvis with contrast (CPT® 74177) as a pre-operative study to evaluate for metastatic disease when cancer is known or suspected.
- CT Abdomen and Pelvis with contrast (CPT® 74177) can detect omental metastases, peritoneal implants, pelvic and periaortic lymph node enlargement.
- CT Abdomen and Pelvis without and with contrast (CPT® 74178) can be considered for suspected hepatic metastases and obstructive uropathy.

Advanced imaging may be indicated for an ovarian mass suspicious for metastatic disease (e.g. from breast, uterine, colorectal or gastric cancer) and should be evaluated based on the appropriate Oncology Imaging guideline.

**Practice Notes**

- Germ cell tumors are more common in young women which can be confirmed by beta hCG, AFP, and LDH
- CA-125 tumor marker can confirm for other malignancy suspicion.

**PV-5.3: Complex Adnexal Masses – Post-Menopausal**

- A complex adnexal mass is any mass that’s is not considered to be a simple cyst. Description of complex mass should include presence or absence of septations, mural projections and/or papillary excrescences, and a comment on its vascularity.

- Dermoids
  - If initial imaging confirms a dermoid, follow-up ultrasound (CPT® 76856 or CPT® 76857 and/or CPT® 76830 [transvaginal]) can be performed at 6 to 12 months; duplex (Doppler) scan (CPT® 93975 complete; CPT® 93976 limited) may be approved as an add-on to TV US (CPT® 76830).
  - If surgical resection is not performed, then follow-up pelvic ultrasound (CPT® 76856 or CPT® 76857 and/or CPT® 76830 [transvaginal]) can be obtained every 6 to 12 months.
  - If initial ultrasound imaging (CPT® 76857 or CPT® 76856 and/or transvaginal CPT® 76830) equivocal for dermoids, the diagnosis can be confirmed by CT Pelvis (contrast as requested) or MRI Pelvis without contrast (CPT® 72195) or MRI Pelvis without and with contrast (CPT® 72197).
  - If surgical resection is not performed, then follow-up pelvic ultrasound (CPT® 76856 or CPT® 76857 and/or CPT® 76830 [transvaginal]) can be obtained every 6 to 12 months.
Hydrosalpinges (Hydrosalpinx) or Peritoneal cysts
- If initial imaging confirms hydrosalpinx or peritoneal cysts, advanced imaging is rarely indicated in these clinical scenarios. Send for physician review.
- If initial ultrasound imaging (CPT® 76857 or CPT® 76856 and/or transvaginal CPT® 76830) equivocal for Hydrosalpinges, one repeat US is indicated in 6 weeks to evaluate for resolution. Duplex (Doppler) scan (CPT® 93975 complete; CPT® 93976 limited) may be approved as an add-on to TV US (CPT® 76830). 3-D Rendering (CPT® 76377) may be approved as an add-on. (In general, eviCore maintains that CPT® 76376 (3D rendering not requiring image post-processing on an independent workstation) should not be separately reimbursed since this function is built into the imaging software and generally takes less than 15 minutes to perform.)

For post-menopausal women, most pelvic complex cysts or solid masses should be evaluated for surgical intervention and have tumor markers (CA-125) measured.

An ovarian mass suspicious for metastatic disease (e.g. from breast, uterine, colorectal or gastric cancer) should be evaluated based on the appropriate Oncology Imaging guideline.

If ultrasound is equivocal, advanced imaging may be appropriate for high risk treatment planning. Send for Medical Director Review.

Some women for whom the usual management of a pelvic mass would include surgery may be at increased risk for perioperative morbidity and mortality. In such cases, repeat imaging may be a safer alternative than immediate surgery, although the frequency of follow-up imaging has not been determined.

Advanced imaging may be considered for elevated tumor makers if an ultrasound is equivocal and/or ovarian malignancy is suspected. See **ONC-21.2: Suspected/Diagnosis**
- CT Abdomen and Pelvis with contrast (CPT® 74177) as a pre-operative study to evaluate for metastatic disease when cancer is known or suspected.
- CT Abdomen and Pelvis (CPT® 74177) can detect omental metastases, peritoneal implants, pelvic and periaortic lymph node enlargement.
- CT Abdomen and Pelvis without and with contrast (CPT® 74178) can be considered for suspected hepatic metastases and obstructive uropathy.

**PV-5.4: Screening for Ovarian Cancer**
- See **ONC-21: Ovarian Cancer** in the Oncology Imaging Guidelines

**PV-5.5: Simple Cysts**
- For simple or thin walled cystic mass, follicular cyst (ovarian), tubular cystic mass (fallopian tube) on initial TV ultrasound (CPT® 76830):
  - Repeat TV ultrasound (CPT® 76830) and/or Pelvic ultrasound (CPT® 76857 or CPT® 76856)
    - According to the below schedule if <=10 cm
CA-125 in all postmenopausal patients

Cysts >10cm have not been studied and the current recommendation is to consider surgical intervention.

Advanced imaging may be appropriate for preoperative planning if requested by the operating surgeon or for elevated tumor marker(s). Requests will be sent to Medical Director Review.

**Simple Cyst Follow-Up**

<table>
<thead>
<tr>
<th>Size</th>
<th>Pre-Menopausal</th>
<th>Post-Menopausal</th>
</tr>
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<tbody>
<tr>
<td>≤ 5 cm</td>
<td>N/A</td>
<td>TV ultrasound (CPT® 76830 and/or Pelvic ultrasound (CPT® 76857 or CPT® 76856) at 6 months</td>
</tr>
<tr>
<td>&gt; 5 cm to 7 cm</td>
<td>TV ultrasound (CPT® 76830 and/or Pelvic ultrasound (CPT® 76857 or CPT® 76856) annually</td>
<td>TV ultrasound (CPT® 76830 and/or Pelvic ultrasound (CPT® 76857 or CPT® 76856) or MRI Pelvis without and with contrast (CPT® 72197) for follow-up as clinically indicated; follow-up intervals may be adjusted on basis of degree of cyst change</td>
</tr>
<tr>
<td>&gt; 7 cm to 10 cm</td>
<td>TV ultrasound (CPT® 76830 and/or Pelvic ultrasound (CPT® 76857 or CPT® 76856) every 6 months or MRI Pelvis without and with contrast (CPT® 72197) one time.</td>
<td>MRI Pelvis without and with contrast (CPT® 72197) one time.</td>
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</tbody>
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**Practice Notes**

**Suspected Adnexal Mass – Tumor Markers**

The adnexa include the ovaries, Fallopian tubes, and ligaments that hold the uterus in place.

- CA-125 is a tumor marker that is useful for the evaluation of adnexal mass:
  - Elevation occurs with both malignant (epithelial cancer) and benign entities (leiomyoma, endometriosis, PID, inflammatory disease such as lupus, and inflammatory bowel disease).
  - Increase in the markers over time occurs with malignancy only
  - Obtain CA-125 in all post-menopausal patients with simple cyst.
  - Consider tumor markers patients with an abnormal US that is not a simple cyst
  - Other markers include Beta hCG, LDH, and AFP (germ cell tumors) and Inhibin A and B (granulosa cell tumor).
Simple and Complex Adnexal Cysts

Simple cysts are smooth walled and clear without debris. Simple cysts up to 10 cm in diameter as measured by ultrasound are almost universally benign and may safely be followed with ultrasound, without intervention, even in postmenopausal women and pediatric patients with normal tumor markers.

Complex cysts can have solid areas or excrescences, and/or debris in them, greater than 3 mm irregular septations, mural nodules with Doppler-detected blood flow, and/or free abdominal/pelvic fluid.

References
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PV-6.1: Endometriosis

- TV (CPT® 76830) and/or Pelvic (CPT® 76856 or CPT® 76857) US is then the first line diagnostic exam for pain or abnormality on exam.
  - In most patients, US followed by medical treatment or laparoscopy should be considered prior to advanced imaging.
  - Laparoscopy remains the definitive test for diagnosis and evaluation of endometriosis in most patients.

- MRI Pelvis without contrast (CPT® 72195) or without and with (CPT® 72197) is helpful when:
  - Rectal involvement, rectovaginal endometriosis, deeply infiltrative bladder endometriosis, and cul-de-sac obliteration. MRI has been shown to accurately detect rectovaginal endometriosis and cul-de-sac obliteration in the more than 90% of cases.
  - To characterize complex adnexal masses as endometrioma if ultrasound equivocal.
  - MRI can also enable complete lesion mapping prior to surgical excision of known endometriosis that was diagnosed during a previous surgery.

References


   http://journals.lww.com/greenjournal/Citation/2010/07000/Practice_Bulletin_No__114__Mana
   gement_of.41.aspx.

   C5C89C83FE032D1F1.f02t02.

PV-7: Pelvic Inflammatory Disease (PID)

PV-7.1: Pelvic Inflammatory Disease
**PV-7.1: Pelvic Inflammatory Disease**

- Pelvic ultrasound (CPT® 76856 or CPT® 76857) and/or TV ultrasound (CPT® 76830) is the initial study for imaging of suspected pelvic inflammatory disease (PID).
- CT Abdomen and Pelvis with contrast (CPT® 74177) or CT Pelvis with contrast (CPT® 72193) when:
  - US equivocal, or
  - Extensive abscess formation as determined by ultrasound

**Practice Notes**

PID may be clinically suspected based on findings of abdominal pain, abnormal discharge, inter-menstrual and/or post coital bleeding, fever, low back pain, nausea/vomiting, urinary frequency, cervical motion tenderness, uterine and/or abdominal tenderness on exam

**References**

PV-8.1: Polycystic Ovary Syndrome

- Pelvic ultrasound (CPT® 76856 or CPT® 76857) and/or TV US (CPT® 76830) may be performed based on history, exam, and laboratory findings suspicious for this disease.

- If elevated serum levels of androgens are found and an adrenal etiology is suspected, the initial study is CT Abdomen without contrast (CPT® 74150). If this initial CT is equivocal, non-diagnostic, or concerning for malignancy, CT Abdomen with (bolus arterial phase), contrast (CPT® 74160) can be considered. See AB-16: Adrenal Cortical Lesions.
  - Serum levels of androgens. Free testosterone level is thought to be the best measure.

Practice Notes
Polycystic ovary syndrome is the most common hormonal disorder among women of reproductive age, and is one of the leading causes of infertility.

Ovaries are often enlarged and contain numerous small cysts located along the outer edge of each ovary. Signs and symptoms may include:

- Anovulation resulting in infrequent or prolonged menstrual periods.
- Excessive amounts or effects of androgenic (masculinizing) hormones (e.g. excess hair growth).
- Acne
- Obesity

References
PV-9.1: Infertility Evaluation, Female

Initial work-up of infertility in female:

- Pelvic ultrasound (CPT® 76856 or CPT® 76857) and transvaginal ultrasound (CPT® 76830). If indicated, color Doppler (CPT® 93975/CPT® 93976) and/or 3D imaging (CPT® 76377).
- Hysterosalpingography (HSG) (CPT® 74740).
  - Injection of contrast through a catheter (CPT® 58340) is not currently prior authorized by eviCore healthcare for any health plan.
- Sonohysterosalpingography (CPT® 76831)
  - Injection of contrast through a catheter (CPT® 58340) is not currently prior authorized by eviCore healthcare for any health plan.

Practice Notes

Some payers do not provide coverage for infertility evaluation and/or treatment.

These guidelines are not intended for fertility follow-up and management.

If infertility is a covered service, the specialist may, over the course of several menstrual cycles, request multiple ultrasounds to follow follicular maturation and monitor endometrial thickness.

References

PV-10: Intrauterine Device (IUD) and Tubal Occlusion

PV-10.1: Intrauterine Device  32
PV-10.2: Tubal Occlusion Device  32
**PV-10.1: Intrauterine Device**

- Pelvic ultrasound (CPT® 76856 or CPT® 76857) and/or TV (CPT® 76830) US if:
  - Abnormal pelvic exam prior to IUD insertion, such as pelvic mass, irregularly shaped uterus, or enlarged uterus.
  - Suspected complication at the time or immediately following IUD insertion:
    - Abnormal IUD position
    - Uterine perforation
    - Severe pain
    - Excessive bleeding
  - Failure to improve with conservative treatment (7 days) such as antibiotics for cramping, light bleeding, and/or low grade fever following IUD placement.
  - NOT as routine imaging to evaluate position prior to, immediately after and, for example, 6 weeks after insertion.

- TV US (CPT® 76830); 3-D Rendering (CPT® 76377) may be added for “Lost” IUD (inability to feel or see IUD string). (In general, eviCore maintains that CPT® 76376 (3D rendering not requiring image post-processing on an independent workstation) should not be separately reimbursed since this function is built into the imaging software and generally takes less than 15 minutes to perform.)
  - If TV US is negative or non-diagnostic, pelvic US (CPT® 76856 or CPT® 76857):
    - If pelvic US is negative or non-diagnostic, plain x-ray should be performed if pregnancy test is negative.
    - Thereafter, CT Pelvis without contrast (CPT® 72192) or CT Abdomen and Pelvis without contrast (CPT® 74176) or MRI Pelvis without contrast (CPT® 72195) can be considered when both ultrasound and plain x-ray are equivocal or non-diagnostic.

- If pregnancy test is positive: See **OB-14.1: Locate an Intrauterine Device**
  - Ultrasound can be performed to locate an intrauterine device (IUD) (CPT® 76801 if a complete ultrasound has not yet been performed, CPT® 76815 or CPT® 76816 if a complete anatomic ultrasound was done previously, and/or CPT® 76817 for a transvaginal ultrasound).

**PV-10.2: Tubal Occlusion Device**

- TV ultrasound (CPT® 76830) if:
  - Suspected complication of tubal occlusion device:
    - Abnormal tubal occlusion device position
    - Uterine perforation
    - Severe pain
    - Excessive bleeding

- TV ultrasound (CPT® 76830) is not typically indicated for routine follow up after insertion of tubal occlusion device.
References


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<td>PV-11.1: Pelvic Pain/Dyspareunia, Female</td>
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For unexplained pelvic pain and/or dyspareunia, the initial imaging test should be Pelvic ultrasound (CPT® 76856 or CPT® 76857) and/or TV Ultrasound (CPT® 76830):
- Add Duplex (Doppler) scan (CPT® 93975 or CPT® 93976) if there is a suspicion of ovarian torsion on the initial ultrasound
- For chronic pelvic pain (pelvic pain for 6 months or greater), add Duplex Doppler (CPT® 93975 or CPT® 93976)

If initial ultrasound is normal, consider urological work-up, gastroenterology work-up or laparoscopic evaluation(s) in evaluation of pelvic pain.

If the initial ultrasound is equivocal for unexplained chronic pelvic pain, then the following can be considered:
- CT Pelvis with contrast (CPT® 72193) for unexplained chronic pelvic pain.

If the initial ultrasound is equivocal for unexplained chronic pelvic pain and if pelvic congestion is suspected:
- MRI Pelvis without contrast or with and without contrast (CPT® 72195 or CPT® 72197) or Pelvis MRV (CPT® 72198), or CTV Pelvis (CPT® 72191) for pelvic congestion.
  - MRV Abdomen (CPT® 74185) or CTV Abdomen (CPT® 74175) if vascular intervention is planned.
    - If CTV Pelvis has not been performed, CTV Abdomen and Pelvis CPT® 74174 is appropriate

If pelvic AVM is suspected, and if one of the following is present, then CTA Pelvis (CPT® 72191) can be considered.
- Pulsatile pelvic mass
- Incidental finding on prior imaging including ultrasound

Pelvic Pain/Hip Pain—Rule Out Piriformis Syndrome
- See PN-2: Focal Neuropathy in the PND Imaging Guidelines and
- See MS-24: Hip in the Musculoskeletal Imaging Guidelines.

Work-up of interstitial cystitis/bladder pain syndrome (IC/BPS) should include history, physical exam, laboratory exam (urinalysis and urine culture), and measurement of post void residual urine by bladder catheterization or by ultrasound (CPT® 76856 or CPT® 76857 or CPT® 76830 [female]).
- CT Pelvis with contrast (CPT® 72193) and/or CT Abdomen and Pelvis with contrast (CPT® 74177) may be indicated if ultrasound is equivocal for complicated interstitial cystitis/bladder pain syndrome (when ordered by Specialist) or uncomplicated when ultrasound is equivocal or abnormal.

Proctalgia Syndromes
- The proctalgia syndromes are characterized by recurrent episodes of rectal/perineal pain, and may be due to sustained contractions of the pelvic floor musculature. Prior to advanced imaging, the evaluation of rectal/perineal pain should include:
  - Digital rectal examination (assess for mass, fissures, hemorrhoids, etc.)
  - Pelvic examination in females to exclude PID
Recent flexible sigmoidoscopy or colonoscopy subsequent to the start of reported symptoms to exclude inflammatory conditions or malignancy
- Endoanal US (CPT® 76822), MRI Pelvis with and without contrast (CPT® 72197), or CT Pelvis with contrast (CPT® 72193) are appropriate after the above studies have been performed or if laboratory or clinical information suggest infection, abscess, or inflammation

Practice Notes
Interstitial Cystitis/Bladder Pain Syndrome (IC/BPS) has an unpleasant sensation (pain, pressure, discomfort), perceived to be related to the urinary bladder. It is associated with lower urinary tract symptoms of more than six weeks duration, in the absence of infection or other identifiable causes.

References
PV-12.1: Leiomyomata

Leiomyomata are also known as “fibroids.”

- Pelvic ultrasound (CPT® 76856 or CPT® 76857) and/or TV US (CPT® 76830) can be performed for the following:
  - Suspected leiomyomata
  - Pre-operative prior to myomectomy
  - Persistent or recurrent symptoms such as abnormal bleeding, pain, or pelvic pressure
  - 3-D Rendering (CPT® 76377) may be added if ultrasound is equivocal and intra-cavitary lesion is suspected, or if arterial embolization is being considered, or for surgical planning for myomectomy (In general, eviCore maintains that CPT® 76376 (3D rendering not requiring image post-processing on an independent workstation) should not be separately reimbursed since this function is built into the imaging software and generally takes less than 15 minutes to perform.)
  - If US is equivocal for intracavitary lesion, Duplex (Doppler) scan (CPT® 93975 complete; CPT® 93976 limited) may be approved as an add-on to TV US (CPT® 76830).

- MRI Pelvis without and with contrast (CPT® 72197), or without contrast (CPT® 72195) can be used in the evaluation of leiomyomas for the following:
  - Guide the treatment of myomas in an enlarged uterus with multiple myomas and/or precise myoma mapping is of clinical importance (for complex surgical planning)
  - Equivocal sonohysterography or panoramic hysteroscopy with suspected submucous leiomyoma and imaging is needed for surgical planning
  - equivocal US prior to myomectomy
  - Leiomyoma necrosis is suspected
  - Arterial embolization is being considered
    - If MRI is equivocal, MRA Pelvis (CPT® 72198) or CTA Pelvis (CPT® 72191) can be considered if requested by the interventional radiologist planning the arterial embolization

- There is no evidence to support interval MRI after embolization unless persistent or recurrent symptoms
References


### PV-13: Periurethral Cysts and Urethral Diverticula

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PV-13.1: Periurethral cysts, Skene duct cyst and Gartner’s duct cyst

Initial evaluation includes any of the following:
- Ultrasound (CPT® 76856 or CPT® 76857) and/or transvaginal (CPT® 76830)

PV-13.2: Urethral Diverticula

Initial evaluation includes pelvic ultrasound (CPT® 76856 or CPT® 76857) and/or transvaginal ultrasound (CPT® 76830)
- Urethrography, or CT Urethrography can be performed to evaluate any urethral abnormalities
- If ultrasound equivocal for urethral abnormalities, MRI Pelvis without and with contrast (CPT® 72197) can be performed if ordered by operating surgeon

Practice Notes
Symptomatic infection of congenital periurethral glands can result in urethral diverticula. Symptoms include pain, urinary urgency, frequency of urination, recurrent urinary tract infection, dribbling after urination, or incontinence.

References
   https://acsearch.acr.org/docs/69491/Narrative/.
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5367903/.
PV-14.1: Uterine Anomalies

- Initial evaluation includes pelvic ultrasound (CPT® 76856 or CPT® 76857) and/or TV ultrasound (CPT® 76830). 3-D Rendering (CPT® 76377) may be approved as an add-on if uterine anomaly is suspected on ultrasound. (In general, eviCore maintains that CPT® 76376 (3D rendering not requiring image post-processing on an independent workstation) should not be separately reimbursed since this function is built into the imaging software and generally takes less than 15 minutes to perform.)

- Retroperitoneal ultrasound (CPT® 76770 or CPT® 76775) is indicated to evaluate for coexisting renal anomalies.

- Pelvis MRI without and with contrast (CPT® 72197):
  - Ultrasound defines a complex anomaly or is not definitive for a complex anomaly, or
  - Requested for surgical planning

References
## PV-15: Fetal MRI

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PV-15.1: Fetal MRI

- See OB-24.13: Fetal MRI

Fetal MRI (CPT® 74712; CPT® 74713 for each additional gestation)
  - Do not report CPT® 74712 and CPT® 74713 in conjunction with CPT® 72195, CPT® 72196, CPT® 72197

Indications for Fetal MRI

- Fetal MRI may be considered for surgical planning (re: fetal anomalies), and/or if an ultrasound is equivocal and additional information is needed for counseling purposes, for indications including the following:
  - Brain
    - Congenital anomalies
      - ventriculomegaly
      - corpus callosal dysgenesis
      - holoprosencephaly
      - posterior fossa anomalies
      - malformations of cerebral cortical development
    - Screening fetuses with a family risk for brain anomalies
      - tuberous sclerosis
      - corpus callosal dysgenesis
      - malformations of cerebral cortical development
  - Vascular abnormalities
    - vascular malformations
    - hydranencephaly
    - infarctions
    - monochorionic twin pregnancy complications
  - Spine
    - Congenital anomalies
      - neural tube defects
      - sacrococcygeal teratomas
      - caudal regression/sacral agenesis
      - sirenomelia
      - vertebral anomalies
  - Skull, face and neck
    - Masses of the face and neck
      - venolymphatic malformations
      - hemangiomas
      - goiter
      - teratomas
      - facial clefts
    - Airway obstruction
      - conditions that may impact parental counseling, prenatal management, delivery planning, and postnatal therapy
  - Thorax
    - Masses
■ congenital pulmonary airway malformations (congenital cystic adenomatoid malformation; sequestration, and congenital lobar emphysema);
■ congenital diaphragmatic hernia
■ effusion
■ Volumetric assessment of lung
■ cases at risk for pulmonary hypoplasia secondary to oligohydramnios, chest mass, or skeletal dysplasias

• Abdomen, retroperitoneal and pelvis
■ Mass
■ abdominal–pelvic cyst
■ tumors (e.g. hemangiomas, neuroblastomas, sacrococcygeal teratomas, and suprarenal or renal masses)
■ complex genitourinary anomalies (e.g. cloaca)
■ renal anomalies in cases of severe oligohydramnios
■ bowel anomalies such as megacystis microcolon

• Complications of monochorionic twins
■ delineation of vascular anatomy prior to laser treatment of twins
■ assessment of morbidity after death of a monochorionic co-twin
■ improved delineation of anatomy in conjoined twins

• Fetal surgery assessment
■ meningomyelocele
■ sacrococcygeal teratomas
■ processes obstructing the airway (e.g. neck mass or congenital high airway obstruction)
■ complications of monochorionic twins needing surgery
■ chest masses

References
PV-15.2: Placenta Accreta/Placenta Percreta

- If the ultrasound is inconclusive or equivocal, send to MD review. MD can approve MRI Pelvis without contrast (CPT® 72195).
- If only placenta or maternal pelvis is imaged without fetal imaging, use MRI Pelvis (CPT® 72195).

References

PV-16: Molar Pregnancy and Gestational Trophoblastic Neoplasia (GTN)

PV-16.1: Molar Pregnancy and GTN
**PV-16.1: Molar Pregnancy and GTN**

- Molar pregnancy - patients should undergo chest x-ray post-evacuation.
- Patients with a molar pregnancy and rising hCG levels post evacuation and/or Gestational trophoblastic neoplasia should undergo the following for metastatic work-up.
  - CT Chest (CPT®71260) and CT Abdomen and Pelvis with contrast (CPT®74177)
  - MRI Brain without and with contrast (CPT®70553) if pulmonary metastasis

**Practice Notes**

Gestational trophoblastic neoplasia (GTN) cells are malignant and can metastasize to other organs such as lungs, brain, bone, and vagina. Treatment is usually methotrexate with or without hysterectomy. Weekly hCG tests are performed until they fall to zero.

**References**


   [http://journals.lww.com/greenjournal/Citation/2004/06000/ACOG_Practice_Bulletin__53__Dia gnosis_and_51.aspx](http://journals.lww.com/greenjournal/Citation/2004/06000/ACOG_Practice_Bulletin__53__Diagnosis_and_51.aspx).


   [https://www.nccn.org/professionals/physician_gls/pdf/gtn.pdf](https://www.nccn.org/professionals/physician_gls/pdf/gtn.pdf). Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Central Nervous System Tumors Cancer V1.2018. – March 20, 2018©2018 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org
PV-17.1: Impotence/Erectile Dysfunction

- Imaging depends on the suspected disease:
  - If erectile dysfunction suspected, penile Doppler ultrasound (CPT® 93980) can be performed²
  - If large vessel vascular insufficiency is suspected following ultrasound, then CTA Pelvis (CPT® 72191) with contrast may be indicated.
  - Peyronie disease - Duplex ultrasound (CPT® 93980) can be used to assess penile vasculature in Peyronie disease¹
  - If male hypogonadism is suspected, See HD-19: Pituitary

- Functional MRI or PET studies are considered investigational for this indication.

References

PV-18.1: Penis-Soft Tissue Mass

- Soft-tissue lesions of the penis should be evaluated initially by penile ultrasound (CPT® 76857)
- MRI Pelvis without and with contrast (CPT® 72197) can be performed:
  - Penile ultrasound (CPT® 76857) is equivocal (not clearly benign, simple cyst), or
  - Primary penile cancer is suspected.
- Peyronie Disease
  - Ultrasound (CPT® 76857) recommended,
  - MRI Pelvis without and with contrast (CPT® 72197) if US is equivocal and surgery or injection therapy is being contemplated

References
PV-19: Male Pelvic Disorders

PV-19.1: Male Pelvic Disorders
**PV-19.1: Male Pelvic Disorders**

▶ **Prostate Disorders**
- Suspected Benign Prostatic Hypertrophy with obstructive voiding symptoms who have failed medication treatment can undergo:
  - Transrectal ultrasound (CPT® 76872) or US Pelvis transabdominal (bladder and prostate [CPT® 76856 or CPT® 76857]).
- Prostatitis with urinary retention or suspected abscess can undergo any of the following imaging studies:
  - Transrectal ultrasound (CPT® 76872) or US Pelvis transabdominal (bladder and prostate [CPT® 76856 or CPT® 76857]).
  - If ultrasound is equivocal for abscess or mass, then CT Pelvis with contrast (CPT® 72193) or MRI Pelvis without contrast (CPT® 72195) or with and without contrast (CPT® 72197) may be performed.

▶ **Hematospermia**, transrectal ultrasound (TRUS) (CPT® 76872) can be the initial imaging study in all cases.
- Pelvis MRI without contrast (CPT® 72195) can be considered to evaluate:
  - Suspected hemorrhage within the seminal vesicles
  - Radiation injury, neoplasia
  - Failure of conservative treatment for 2 weeks
  - Abnormal findings on transrectal ultrasound.

▶ **Scrotal pain or mass** initial evaluation by scrotal ultrasound (CPT® 76870) and/or Duplex (Doppler) scan ultrasound (CPT® 93975 or CPT® 93976) of the scrotum.
- MRI of the Pelvis without and with contrast (CPT® 72197) or Tc-99m scrotal scintigraphy (CPT® 78761) if ultrasound is inconclusive.

▶ **Proctalgia Syndromes**
- The proctalgia syndromes are characterized by recurrent episodes of rectal/perineal pain, and may be due to sustained contractions of the pelvic floor musculature. Prior to advanced imaging, the evaluation of rectal/perineal pain should include:
  - Digital rectal examination (assess for mass, prostate, fissures, hemorrhoids, etc.)
  - Recent flexible sigmoidoscopy or colonoscopy subsequent to the start of reported symptoms to exclude inflammatory conditions or malignancy
- Endoanal US (CPT® 76822), MRI Pelvis without and with contrast (CPT® 72197), or CT Pelvis with contrast (CPT® 72193) are appropriate after the above studies have been performed or if laboratory or clinical information suggest infection, abscess, or inflammation.

**Practice Notes**
- The causes of scrotal pain include torsion, epididymitis, strangulated hernia, segmental testicular infarction, trauma, testicular tumor, and idiopathic scrotal edema.
References


PV-20: Scrotal Pathology

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**PV-20.1: Scrotal Pathology**

- Scrotal pain or mass initial evaluation by scrotal ultrasound (CPT® 76870) and/or Duplex (Doppler) scan ultrasound (CPT® 93975 or CPT® 93976) of the scrotum.
  - MRI of the Pelvis without and with contrast (CPT® 72197) or Tc-99m scrotal scintigraphy (CPT® 78761) if ultrasound is inconclusive.¹,²
- Cryptorchidism/undescended testis in the adult can undergo scrotal ultrasound (CPT® 76870), MRI of the Pelvis without and with contrast (CPT® 72197), or Pelvis CT with contrast (CPT® 72193).
- Varicocele suspected (for example, in inguinal hernia evaluation) can undergo Duplex (Doppler) scan ultrasound (CPT® 76870 and/or CPT® 93975 or CPT® 93976) of the scrotum with color flow mapping in supine and upright positions to assess venous reflux into plexus pampiniformis.
  - Imaging for right-sided varicocele, when there is suspicion for intra-abdominal pathology, may require advanced imaging with CT Abdomen and Pelvis with contrast (CPT® 74177)

**Practice Notes**

- The causes of scrotal pain include torsion, epididymitis, strangulated hernia, segmental testicular infarction, trauma, testicular tumor, and idiopathic scrotal edema.¹

**PV-20.2: Para testicular and spermatic cord masses**

- Scrotal US (CPT® 76870) is the appropriate initial imaging procedure,
  - If inconclusive, MRI Pelvis without and with contrast (CPT® 72197), exploration and biopsy are additional considerations.

**PV-20.3: Testicular Microlithiasis**

- Initial evaluation by scrotal ultrasound (CPT® 76870)
- Annual ultrasound (CPT® 76870) follow-up until age 55, only if a risk factor is present which include:
  - family history of germ cell tumor
  - maldescent
  - orchidopexy
  - testicular atrophy
- For Personal history of germ cell tumor See **ONC-20: Testicular, Ovarian and Extragonadal Germ Cell Tumors**
References


PV-21.1: Fistula in Ano

MRI Pelvis without and with contrast (CPT® 72197) is indicated for the assessment of complex or recurrent fistulas.

- Preoperative MRI frequently alters the surgical approach and MRI guided surgery can significantly decrease postoperative recurrence in complex cases by 75%.

Practice Notes
Ideally, MRI Pelvis without and with contrast should also be performed with rectal contrast consisting of ultrasound gel for optimum characterization and pre-operative planning.

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<td>PV-22.4: Fecal Incontinence</td>
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PV-22.1: Urinary Incontinence – Initial Imaging

Initial Imaging, associated with other evaluations, are:

- **Non-Neurogenic Incontinence**
  - Measurements of post void residual urine by bladder ultrasound (CPT® 76856 or CPT® 76857 or CPT® 76830 [female]) OR Bladder catheterization.
  - In addition to post void residual volume determination, screening for UTI should be considered.
  - Urodynamic studies for complex conditions or unclear case of incontinence after basic evaluation.
  - Preoperative multichannel urodynamic testing is not needed in women with stress incontinence (uncomplicated) prior to initial incontinence surgery.

- **Neurogenic Incontinence**
  - Ultrasound of the urinary tract (CPT® 76770 or CPT® 76775) and/or urodynamic studies.

**Practice Notes**
Urinary incontinence can be “stress,” “urgency,” or mixed; neurogenic or non-neurogenic; and complicated or uncomplicated. Neurogenic incontinence can occur from cerebral, spinal or peripheral neurological diseases.

PV-22.2: Urinary Incontinence – Further Imaging

CT Abdomen and/or Pelvis, contrast as requested, can be performed for the following:

- Non-diagnostic ultrasound or abnormality on ultrasound that requires further evaluation
- Complicated incontinence
- Suspected fistulae
- Detecting ectopic ureters if ultrasound is non-diagnostic
- Pre-operative planning when ordered by the operating physician

MRI may be indicated for evaluation of the brain, spine, or other regions of the nervous system in neurogenic urinary incontinence.

**Practice Notes**
Complicated urinary incontinence includes:

- Failed conservative treatment
- Pain or dysuria
- Hematuria
- Recurrent infection
- Previous radical pelvic surgery
- Suspected fistula
- Suspected mass
- Previous pelvic or prostate irradiation
**PV-22.3: Pelvic Prolapse**

- Transvaginal (TV) ultrasound (CPT® 76830) is the initial study of choice.\(^1,2\)
  - Pelvic ultrasound (CPT® 76856 or CPT® 76857) can be performed if requested as a complimentary study to the TV ultrasound.

- Urodynamic testing may be helpful if there is incontinence with a stage II or greater prolapse or voiding dysfunction

- MRI Pelvis (CPT® 72195 or CPT® 72197) may be indicated for the following:
  - Pelvic floor anatomy and pelvic organ prolapse evaluations if exam and TV US (CPT® 76830) and/or Pelvic ultrasound (CPT® 76856 or CPT® 76857) are equivocal; or
  - Pre-operative planning for complex organ prolapse when ordered by the operating physician; or
  - Persistent incontinence following surgery

- Mesh and Graft complications
  - Diagnostic evaluation for mesh and graft complications may include colonoscopy, cystoscopy, urodynamics, and radiologic imaging
  - All requests are sent to Medical Director review

- Sacral osteomyelitis may be a complication of sacrocolpopexy. Back pain in women after this procedure should prompt evaluation with MRI Pelvis with and without contrast (CPT® 72197) and referral to a specialist

**PV-22.4: Fecal Incontinence**

The evaluation of fecal incontinence generally proceeds as follows:

- Determine the severity of the incontinence (Bristol Stool Scale, Fecal Incontinence Severity Index, etc.)

- History and Physical to include digital rectal examination and perianal pinprick (to assess for neurogenic causes).

- Trial of conservative management

- Diagnostic Testing if symptoms persist to include:
  - Ano-rectal Manometry
  - Balloon Expulsion Test
  - Endoanal ultrasound (CPT® 76822) to confirm sphincter defects in patients with suspected sphincter injury (e.g. history of vaginal delivery or anorectal surgery)
  - MRI Pelvis (CPT® 72197) or MRI Defecography (CPT® 72195) can be considered if:
    - Ano-rectal manometry suggests weak sphincter pressures AND/OR there is an abnormal balloon expulsion test
    - There has been a failure of a recent trial of conservative management
    - Surgery is being considered
**Practice Notes**

With regards to fecal incontinence ACG Guidelines note that “the internal sphincter is visualized more clearly by endoanal ultrasound, whereas MRI is superior for discriminating between an external anal sphincter tear and a scar and for identifying external sphincter atrophy.

However, guidelines adopted by the American Society of Colon and Rectal Surgeons note that “Endoanal ultrasound is a useful and sensitive tool in the evaluation of patients with FI (fecal incontinence), especially when there is a history of vaginal delivery or anorectal surgery. Ultrasound can reliably identify internal and external sphincter defects that may be associated with sphincter dysfunction.” In addition, the guidelines note “Other modalities (eg, MRI) have shown substantial interobserver variability and, at this point, are likely inferior to ultrasound imaging, but they may provide additional information where endoanal ultrasound is unavailable.”

**References**


PV-23.1: Patent Urachus

Drainage from the umbilicus, redness around umbilicus, abdominal pain, or urinary tract infection from persistent fetal connection between the bladder and the umbilicus can be evaluated by:

- For suspected patent urachus, ultrasound (CPT® 76856 or CPT® 76857 and/or CPT® 76700 or CPT® 76705) or voiding cystourethrography (VCUG) (CPT® 74455)
- If there is a suspected urachal carcinoma or other urachal abnormality, CT Pelvis with contrast (CPT® 72193) or MRI Pelvis without contrast (CPT® 71295) or with and without contrast (CPT® 71297) may be performed if the ultrasound is equivocal or if additional imaging is needed for surgical planning.

References
Nuclear Medicine

Nuclear medicine studies are rarely used in imaging of the pelvis, but are indicated in some clinical circumstances, including the following:

- Lymph system mapping (CPT® 78195) is indicated for lower extremity lymphedema with recent negative Doppler ultrasound, or a history of Milroy’s disease or prior pelvic lymph node dissection.

- Nuclear testicular imaging (CPT® 78761) is indicated for evaluation of scrotal pain when testicular torsion is suspected and recent Doppler ultrasonography is inconclusive or unavailable.

- Radiopharmaceutical Voiding Cystogram (CPT® 78730) with Urinary Bladder Residual study is indicated for suspicion of urinary retention and a recent non-diagnostic ultrasound.

References


# Peripheral Nerve Disorders (PND) Imaging Guidelines

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<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
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</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
</tr>
<tr>
<td>ALS</td>
<td>Amyotrophic Lateral Sclerosis</td>
</tr>
<tr>
<td>CIDP</td>
<td>Chronic Inflammatory Demyelinating Polyneuropathy</td>
</tr>
<tr>
<td>CNS</td>
<td>central nervous system</td>
</tr>
<tr>
<td>CPK</td>
<td>creatinine phosphokinase</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>EMG</td>
<td>electromyogram</td>
</tr>
<tr>
<td>LEMS</td>
<td>Lambert-Eaton Myasthenic Syndrome</td>
</tr>
<tr>
<td>MG</td>
<td>myasthenia gravis</td>
</tr>
<tr>
<td>MRI</td>
<td>magnetic resonance imaging</td>
</tr>
<tr>
<td>MRN</td>
<td>magnetic resonance neurography</td>
</tr>
<tr>
<td>MRS</td>
<td>magnetic resonance spectroscopy</td>
</tr>
<tr>
<td>NCV</td>
<td>nerve conduction velocity</td>
</tr>
<tr>
<td>PET</td>
<td>positron emission tomography</td>
</tr>
<tr>
<td>PNS</td>
<td>peripheral nervous system</td>
</tr>
<tr>
<td>PNST</td>
<td>Peripheral Nerve Sheath Tumor</td>
</tr>
<tr>
<td>POEMS</td>
<td>Polyneuropathy, Organomegaly, Endocrinopathy, M-protein, Skin changes</td>
</tr>
<tr>
<td>TOS</td>
<td>Thoracic Outlet Syndrome</td>
</tr>
</tbody>
</table>
PN-1: General Guidelines

A current clinical evaluation (within 60 days) is required before advanced imaging can be considered. The clinical evaluation may include a relevant history and physical examination, including a neurological examination, appropriate laboratory studies, non-advanced imaging modalities, electromyography and nerve conduction (EMG/NCV) studies. Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation.

- MRI is, most often, preferable to CT.

References

# PN-2: Focal Neuropathy

<table>
<thead>
<tr>
<th>Focal Disorder</th>
<th>EMG/NCV Initially?</th>
<th>Advanced Imaging</th>
</tr>
</thead>
</table>
| Carpal Tunnel Syndrome      | YES                | ▶ No established role for advanced imaging.  
▶ Ultrasound of the wrist to estimate size of the carpal tunnel and diameter of the median nerve may be helpful in the evaluation and confirmation of carpal tunnel syndrome pre-operatively when EMG findings are equivocal and clinical findings are uncertain.  
▶ See MS-21: Wrist and SP-3: Neck (Cervical Spine) Pain Without/With Neurological Features and Trauma. |
| Ulnar Neuropathy            | YES                | Ultrasound for evaluation when clinical findings and EMG/NCV findings are uncertain. MRI of the elbow without contrast (CPT® 73221) or MRI of the upper arm forearm without contrast (CPT® 73218) for complex cases when diagnosis remains uncertain after EMG and US or for pre-op planning. |
| Radial Neuropathy           | YES                | ▶ MRI of the upper arm or forearm without contrast (CPT® 73218) in severe cases when surgery is being considered.  
▶ MRI of the upper arm or forearm without and with contrast (CPT® 73220) if there is a suspicion of a nerve tumor such as a neuroma. |
| Sciatric Neuropathy         | YES                | CT pelvis with contrast (CPT® 72193) or MRI pelvis without contrast (CPT® 72195) should be performed in the evaluation of these entities. CT pelvis without contrast is not indicated due to lack of soft tissue contrast. It should only be performed in the rare circumstance of contrast allergy and contraindication to MRI such as pacemaking device. |
| Femoral Neuropathy          | NO                 | CT pelvis with contrast (CPT® 72193) or MRI pelvis without contrast (CPT® 72195) should be performed in the evaluation of these entities. |

**Radial Neuropathy Notes:** Leads to wrist drop with common sites of entrapment the inferior aspect of the humerus (Saturday night palsy) or the forearm (Posterior Interosseus Syndrome). Trauma or fractures of the humerus, radius, or ulna can damage the radial nerve.

**Sciatic Neuropathy Notes:** Trauma to the gluteal area with hematoma, injection palsy, hip or pelvic fractures, or hip replacement (arthroplasty) and rarely Piriformis Syndrome involves entrapment of the sciatic nerve at the sciatic notch in the pelvis by a tight piriformis muscle band.

**Femoral Neuropathy Notes:** as a complication of pelvic surgery in women or those on anticoagulants with retroperitoneal bleeding.
### Meralgia Paresthetica

<table>
<thead>
<tr>
<th>Meralgia Paresthetica</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT pelvis with contrast (CPT® 72193) or MRI pelvis without contrast (CPT® 72195) may be performed in cases of diagnostic uncertainty or for pre-op planning. CT pelvis without contrast is not indicated due to lack of soft tissue contrast. It should only be performed in the rare circumstance of contrast allergy and contraindication to MRI such as pacemaking device.</td>
<td></td>
</tr>
</tbody>
</table>

**Meralgia Paresthetica Notes:** Sensory loss in the lateral femoral cutaneous nerve as it exits the pelvis under the inguinal ligament (lateral thigh without extension into lower leg).

### Peroneal Neuropathy

<table>
<thead>
<tr>
<th>Peroneal Neuropathy</th>
<th>YES</th>
</tr>
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<tbody>
<tr>
<td>Knee MRI without contrast (CPT® 73721) or MRI lower extremity other than joint without contrast (CPT® 73718) in severe cases when surgery is considered.</td>
<td></td>
</tr>
</tbody>
</table>

**Peroneal Neuropathy Notes:** Foot drop which usually resolves unless L5 radiculopathy.

### Tarsal Tunnel Syndrome

<table>
<thead>
<tr>
<th>Tarsal Tunnel Syndrome</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>See <strong>MS-27: Foot (Tarsal Tunnel Syndrome)</strong>.</td>
<td></td>
</tr>
</tbody>
</table>

### Other Peripheral Mononeuropathies

<table>
<thead>
<tr>
<th>Other Peripheral Mononeuropathies</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI without or without and with contrast if preoperative.</td>
<td></td>
</tr>
</tbody>
</table>

### References


# PN-3: Polyneuropathy

<table>
<thead>
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<th>Poly-Disorder</th>
<th>EMG/NCV Initially?</th>
<th>Advanced Imaging</th>
<th>Comments</th>
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<tbody>
<tr>
<td><strong>PNS/CNS Crossover Syndromes</strong></td>
<td>YES</td>
<td>MRI without and with contrast of brain and/or spinal cord if clinical findings point to abnormalities in those areas.</td>
<td>Guillain-Barré syndrome</td>
</tr>
<tr>
<td><strong>AIDS Related Cytomegaloviral Neuropathy/Radiculopathy</strong></td>
<td>YES</td>
<td>Lumbar spine MRI without and with contrast (CPT® 72158) if suspected.</td>
<td>Urinary retention and a clinically confusing picture in the legs.</td>
</tr>
<tr>
<td><strong>Chronic Inflammatory Demyelinating Polyneuropathy (CIDP)</strong></td>
<td>YES</td>
<td>Lumbar spine MRI without and with contrast (CPT® 72158) if uncertain following EMG.</td>
<td></td>
</tr>
<tr>
<td><strong>Multifocal Motor Neuropathy</strong></td>
<td>YES</td>
<td>MRI of the brachial plexus without and with contrast (CPT® 71552 or CPT® 73220) if uncertain following EMG.</td>
<td></td>
</tr>
<tr>
<td><strong>POEMS (Polyneuropathy, Organomegaly, Endocrinopathy, M-protein, Skin changes)</strong></td>
<td>YES</td>
<td>Advanced imaging is for the non-neurological entities of this rare osteosclerotic plasmacytoma syndrome.</td>
<td>See <a href="#">ONC-25: Multiple Myeloma and Plasmacytomas</a></td>
</tr>
<tr>
<td><strong>Subacute Sensory Neuronopathy &amp; Other Paraneoplastic Demyelinating Neuropathies</strong></td>
<td>YES</td>
<td>Advanced imaging should be guided by specific clinical concern (See relevant guideline). For evaluation of suspected paraneoplastic syndromes: See <a href="#">ONC-30.3: Paraneoplastic Syndromes</a></td>
<td></td>
</tr>
</tbody>
</table>
References
PN-4: Brachial Plexus

- Brachial plexus studies can be coded either as upper extremity other than joint MRI without or without and with contrast (CPT® 73218 or CPT® 73220), Chest MRI without or without and with contrast (CPT® 71550 or CPT® 71552) or Neck MRI without (CPT® 70540) or without and with contrast (CPT® 70543) if upper trunk after EMG/NCV examination for:
  - Malignant infiltration (EMG not required)
  - Radiation plexitis to r/o malignant infiltration
  - Brachial plexitis (Parsonage-Turner Syndrome or painful brachial amyotrophy).
    - Self-limited syndrome characterized by initial shoulder region pain followed by weakness of specific muscles in a pattern which does not conform to involvement of a single root or distal peripheral nerve
    - Consider MRI of the cervical spine if radiculopathy.
  - See SP-3: Neck (Cervical Spine) Pain Without/With Neurological Features and Trauma
  - Traumatic injury
  - Neurogenic Thoracic Outlet Syndrome (TOS) failed a 2 to 3 month trial of conservative management and are being considered for surgical treatment.
  - See CH-31: Thoracic Outlet Syndrome (TOS)
  - Preoperative study which requires evaluation of the brachial plexus

References

PN-5: Lumbar and Lumbosacral Plexus

The following studies can be considered: MRI Pelvis without and with contrast with fat suppression imaging (CPT® 72197) OR MRI Abdomen and Pelvis without and with contrast with fat suppression imaging (CPT® 74183 and CPT® 72197) OR if MRI is not available, CT Pelvis with contrast (CPT® 72193) OR CT Abdomen and Pelvis with contrast (CPT® 74177) can be considered after EMG/NCV based on whether the upper lumbar plexus (abdominal retroperitoneal space) or the lumbosacral plexus (pelvis), respectively, is involved based on:
- Malignant infiltration (EMG not required)
- Radiation plexopathy to r/o malignant infiltration
- Traumatic injury

References
## PN-6: Muscle Disorders

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</table>
PN-6.1: Neuromuscular Disease

- Myasthenia Gravis (MG) is associated with thymic disease and can undergo:
  - Chest CT with contrast (CPT® 71260) after an established diagnosis of MG.
    - Can be repeated if initial CT previously negative and now symptoms of chest
      mass, rising anti-striated muscle antibody titers, or need for preoperative
      evaluation (clinical presentation, electro-diagnostic studies, and antibody
      titers).
  - Chest CT without contrast (CPT® 71250) may be used if there is concern
    regarding adverse effects of contrast in patients with MG.

- Lambert–Eaton myasthenic syndrome (LEMS) is associated with small cell lung
  cancer and can undergo:
  - Chest CT with contrast (CPT® 71260) with a suspected diagnosis (CXR,
    symptoms of lung mass, clinical presentation, electro-diagnostic studies, and
    antibody titers).
    - Can be repeated if initial CT previously negative after 3 months with
      persistent suspicion.

- Stiff man syndrome is associated with small cell lung cancer and breast cancer
  - Chest CT with contrast (CPT® 71260) if Stiff Man Syndrome is suspected based
    on clinical findings.

PN-6.2: Inflammatory Muscle Diseases

- MRI and ultrasound are increasingly being used in the evaluation of muscle disease.
  MRI may be helpful in demonstrating abnormalities in muscles that are difficult to
  examine or not clinically weak, and MRI can also help distinguish between different
  types of muscle disease. MRI is also useful in determining sites for muscle biopsy.

- MRI Lower Extremity non-joint without contrast (CPT® 73718) or MRI Lower
  Extremity non-joint without and with contrast (CPT® 73720) and/or MRI Upper
  Extremity non-joint (CPT® 73218) or MRI Upper Extremity non-joint without and with
  contrast (CPT® 73220), usually the most affected muscle is imaged (when criteria is
  met imaging can be approved for bilateral studies) for:
  - Additional evaluation of myopathy or myositis (based on clinical exam and
    adjunct testing with EMG/NCV and labs)
  - To plan muscle biopsy
  - See PEDMS-10.3: Inflammatory Muscle Diseases

- All cases with dermatomyositis and polymyositis can undergo search for occult
  neoplasm (See ONC–30.3: Paraneoplastic Syndromes):
  - Initially with Chest CT with contrast (CPT® 71260) for lung cancer and pelvic
    ultrasound (in women) (CPT® 76856 or CPT® 76857 and/or CPT® 76830
    [transvaginal]) for ovarian cancer should be done initially
  - Abdomen and Pelvis CT with contrast (CPT® 74177) if the above fail to make a
    diagnosis
PN-6.3: Gaucher Disease (Storage Disorders)

- See AB-11: Gaucher Disease and Hemochromatosis in the Abdomen Imaging Guidelines.
- See PEDPN-4: Gaucher Disease in the pediatric PND Imaging Guidelines.

References


PN-7: Newer Imaging Techniques

See HD-24.6: Magnetic Resonance Neurography (MRN).
PN-8: Amyotrophic Lateral Sclerosis (ALS)

MRI of the Brain, Cervical, Thoracic, and Lumbar Spine most often without contrast, but may be without and with contrast with meningeal symptoms.

- Can be considered when ALS is suspected (combination of upper and lower motor neuron findings) to establish a diagnosis.
- Repeat imaging can be evaluated based on the appropriate Spine Imaging Guidelines.

References
PN-9: Peripheral Nerve Sheath Tumors (PNST)

- Tumors (Schwannomas or Neurofibromas) that arise from Schwann cells or other connective tissue of the nerve are located anywhere in the body and can undergo advanced imaging when suspected, which may include:
  - MRI Brain without and with contrast (CPT® 70553). (Vestibular Schwannomas Refer to HD-33.1: Acoustic Neuroma and Other Cerebellopontine Angle Tumors)
  - Cervical, thoracic, and lumbar spine MRI without and with contrast (CPT® 72156, CPT® 72157, and CPT® 72158) if paraspinal neurofibroma is found any spine level or multiple simplex perineural neurofibromas.
  - Follow-up imaging is not needed unless:
    - New symptoms or neurological findings develop
    - Post operatively, at the discretion of the surgeon and to reestablish baseline if the tumor was not completely removed
    - Malignant transformation (5%) is known or suspected; includes a metastatic work-up with CT Chest and Abdomen with contrast (CPT® 71260 and CPT® 74160).
- See PEDONC-2.3: Neurofibromatosis 1 and 2 (NF1 and NF2)

References
PN-10: Nuclear Imaging

- Nuclear Medicine
  - Nuclear medicine studies are not generally indicated in the evaluation of peripheral nerve disorders. See PEDPN-2: Neurofibromatosis for specific imaging guidelines regarding PET/CT in evaluation of peripheral nerve tumors.
## Peripheral Vascular Disease (PVD) Imaging Guidelines

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### Abbreviations and Glossary for the PVD Imaging Guidelines

(See also: Cardiac Imaging Guidelines Glossary)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>AAA</td>
<td>abdominal aortic aneurysm</td>
</tr>
<tr>
<td>ABI</td>
<td>ankle brachial index: a noninvasive, non-imaging test for arterial insufficiency – (see toe-brachial index below). This testing can also be done after exercise if resting results are normal.</td>
</tr>
<tr>
<td>Claudication</td>
<td>or <strong>Intermittent claudication</strong>: usually a painful cramping sensation of the legs with walking or severe leg fatigue</td>
</tr>
<tr>
<td>CTA</td>
<td>computed tomography angiography</td>
</tr>
<tr>
<td>CTV</td>
<td>computed tomography venography</td>
</tr>
<tr>
<td>DLCO</td>
<td><strong>diffusion capacity</strong>: defined as the volume of carbon monoxide transferred into the blood per minute per mmHg of carbon monoxide partial pressure</td>
</tr>
<tr>
<td>DVT</td>
<td>deep venous thrombosis</td>
</tr>
<tr>
<td>ECG</td>
<td>electrocardiogram</td>
</tr>
<tr>
<td>ENT</td>
<td>Ears, Nose, Throat</td>
</tr>
<tr>
<td>HbA1C</td>
<td><strong>hemoglobin A1C</strong>: test used to determine blood sugar control for patients with diabetes</td>
</tr>
<tr>
<td>MRA</td>
<td>magnetic resonance angiography</td>
</tr>
<tr>
<td>MRV</td>
<td>magnetic resonance venography</td>
</tr>
<tr>
<td>PAD</td>
<td>peripheral artery disease</td>
</tr>
<tr>
<td>PAH</td>
<td>pulmonary artery hypertension</td>
</tr>
<tr>
<td>PFT</td>
<td>pulmonary function tests</td>
</tr>
<tr>
<td>PVD</td>
<td>peripheral vascular disease</td>
</tr>
<tr>
<td>SVC</td>
<td>superior vena cava</td>
</tr>
<tr>
<td>TIA</td>
<td>transient ischemic attack</td>
</tr>
<tr>
<td>TTE</td>
<td>transthoracic echocardiogram</td>
</tr>
<tr>
<td>Toe-Brachial Index</td>
<td>useful in patients with ABI above the normal range due to non-compressible posterior tibial or dorsalis pedis arteries</td>
</tr>
<tr>
<td>V/Q Scan</td>
<td>ventilation and perfusion scan</td>
</tr>
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## PVD-1: General Guidelines

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<tr>
<td>PVD-1.3: General Guidelines – Imaging</td>
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</tr>
</tbody>
</table>
PVD-1.1: General Information

- A current clinical evaluation (within 60 days), including medical treatments, are required prior to considering advanced imaging, which includes:
  - Relevant history and physical examination including:
    - The palpation of pulses
    - Evaluation for the presence of arterial bruits
    - Appropriate laboratory studies
    - Non-advanced imaging modalities, such as recent ABIs (within 60 days) after symptoms started or worsened
  - Unless there is documented need for routine imaging that is supported by the guidelines.
  - Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation.
- The same general risk factors for coronary disease also apply to vascular disease
  - Diabetes is a particularly high risk factor.
  - Age > 50, with at least one risk factor, are considered “at risk” for vascular disease.
  - Erectile dysfunction can be associated with vascular disease.
  - See also: PV-17: Impotence/Erectile Dysfunction in the Pelvis Imaging Guidelines.
- Simultaneous venous and arterial systems evaluation are unusual but are occasionally needed.
- Post angioplasty/reconstruction: follow-up imaging is principally guided by symptoms. See also:
  - PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms
  - CH-29: Thoracic Aorta in the Chest Imaging Guidelines.
  - PVD-7.3: Post-Procedure Surveillance Studies
### PVD-1.2: Procedure Coding

<table>
<thead>
<tr>
<th>Non-Invasive Physiologic Studies of Extremity Arteries</th>
<th>CPT®</th>
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<tbody>
<tr>
<td>➤ Limited bilateral noninvasive physiologic studies of upper or lower extremity arteries.</td>
<td>93922</td>
</tr>
<tr>
<td>➤ Non-invasive physiologic studies of upper or lower extremity arteries, single level, bilateral (e.g., ankle/brachial indices, Doppler waveform analysis, volume plethysmography, transcutaneous oxygen tension measurement).</td>
<td>93923</td>
</tr>
<tr>
<td>➤ Complete bilateral noninvasive physiologic studies of upper or lower extremity arteries, 3 or more levels.</td>
<td>93923</td>
</tr>
<tr>
<td>➤ Non-invasive physiologic studies of upper or lower extremity arteries, multiple levels or with provocative functional maneuvers, complete bilateral study (e.g., segmental blood pressure measurements, segmental Doppler waveform analysis, segmental volume plethysmography, segmental transcutaneous oxygen tension measurements, measurements with postural provocative tests, measurements with reactive hyperemia).</td>
<td>93923</td>
</tr>
</tbody>
</table>

- CPT® 93922 and CPT® 93923 can be requested and reported only once for the upper extremities and once for the lower extremities.
- CPT® 93922 and CPT® 93923 should not be ordered on the same request nor billed together for the same date of service.
- CPT® 93924 and CPT® 93922 and/or CPT® 93923 should not be ordered on the same request and should not be billed together for the same date of service.
- ABI studies performed with handheld dopplers, where there is no hard copy output for evaluation of bidirectional blood flow, are not reportable by these codes.

### Non-Invasive Physiologic Studies of Extremity Arteries

**CPT®**

- Non-invasive physiologic studies of lower extremity arteries, at rest and following treadmill stress testing, complete bilateral study.

<table>
<thead>
<tr>
<th>Arterial Duplex – Upper and Lower Extremities</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplex scan of lower extremity arteries or arterial bypass grafts; complete bilateral.</td>
<td>93925</td>
</tr>
<tr>
<td>➤ A complete duplex scan of the lower extremity arteries includes examination of the full length of the common femoral, superficial femoral and popliteal arteries.</td>
<td>93925</td>
</tr>
<tr>
<td>➤ The iliac, deep femoral, and tibioperoneal arteries may also be examined.</td>
<td>93925</td>
</tr>
<tr>
<td>Duplex scan of lower extremity arteries or arterial bypass grafts; unilateral or limited study.</td>
<td>93926</td>
</tr>
<tr>
<td>➤ The limited study is reported when only one extremity is examined or when less than a full examination is performed (e.g. only one or two vessels or follow-up).</td>
<td>93926</td>
</tr>
</tbody>
</table>

- Duplex scan of upper extremity arteries or arterial bypass grafts; complete bilateral.

<table>
<thead>
<tr>
<th>Arterial Duplex – Upper and Lower Extremities</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplex scan of upper extremity arteries or arterial bypass grafts; complete bilateral.</td>
<td>93930</td>
</tr>
<tr>
<td>➤ A complete duplex of the upper extremity arteries includes examination of the subclavian, axillary, and brachial arteries.</td>
<td>93930</td>
</tr>
<tr>
<td>➤ The radial and ulnar arteries may also be included.</td>
<td>93930</td>
</tr>
<tr>
<td>Duplex scan of upper extremity arteries or arterial bypass grafts; unilateral or limited study.</td>
<td>93931</td>
</tr>
<tr>
<td>➤ The limited study is reported when only one extremity is examined or when less than a full examination is performed (e.g. only one or two vessels or follow-up).</td>
<td>93931</td>
</tr>
</tbody>
</table>
### Cerebrovascular Artery Studies

<table>
<thead>
<tr>
<th>Procedure Description</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplex scan of extracranial arteries; complete bilateral study.</td>
<td>93880</td>
</tr>
<tr>
<td>Duplex scan of extracranial arteries; unilateral or limited study.</td>
<td>93882</td>
</tr>
</tbody>
</table>

- This study is often referred to as a “carotid ultrasound” or “carotid duplex”.
- Typically, it includes evaluation of the common, internal, and external carotid arteries.

### Transcranial Doppler Studies

<table>
<thead>
<tr>
<th>Procedure Description</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transcranial Doppler study of the intracranial arteries; complete study</td>
<td>93886</td>
</tr>
<tr>
<td>Transcranial Doppler study of the intracranial arteries; limited study</td>
<td>93888</td>
</tr>
<tr>
<td>Transcranial Doppler vasoreactivity study</td>
<td>93890</td>
</tr>
<tr>
<td>Transcranial Doppler study of the intracranial arteries; emboli detection without</td>
<td>93892</td>
</tr>
<tr>
<td>intravenous microbubble injection</td>
<td></td>
</tr>
<tr>
<td>Transcranial Doppler study of the intracranial arteries; emboli detection with</td>
<td>93893</td>
</tr>
<tr>
<td>intravenous microbubble injection</td>
<td></td>
</tr>
</tbody>
</table>

### Venous Studies - Extremities

<table>
<thead>
<tr>
<th>Procedure Description</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-invasive physiologic studies of extremity veins, complete bilateral study (e.g.</td>
<td>93965</td>
</tr>
<tr>
<td>Doppler waveform analysis with responses to compression and other maneuvers,</td>
<td></td>
</tr>
<tr>
<td>phleborheography, impedance plethysmography). This study is rarely performed.</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of extremity veins, including responses to compression and other</td>
<td>93970</td>
</tr>
<tr>
<td>maneuvers; complete bilateral study.</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of extremity veins, including responses to compression and other</td>
<td>93971</td>
</tr>
<tr>
<td>maneuvers; unilateral or limited study.</td>
<td></td>
</tr>
</tbody>
</table>

- These codes are used to report studies of lower or upper extremity veins.
- A complete bilateral study of the lower extremity veins includes examination of the
  common femoral, proximal deep femoral, great saphenous and popliteal veins. Calf
  veins may also be included.
- A complete bilateral study of upper extremity veins includes examination of the
  subclavian, jugular, axillary, brachial, basilica, and cephalic veins. Forearm veins
  may also be included.

### Visceral Vascular Studies

<table>
<thead>
<tr>
<th>Procedure Description</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal</td>
<td>93975</td>
</tr>
<tr>
<td>contents and/or retroperitoneal organs; complete study.</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal</td>
<td>93976</td>
</tr>
<tr>
<td>contents and/or retroperitoneal organs; limited study</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts;</td>
<td>93978</td>
</tr>
<tr>
<td>complete study</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts;</td>
<td>93979</td>
</tr>
<tr>
<td>unilateral or limited study</td>
<td></td>
</tr>
</tbody>
</table>

### Duplex for Hemodialysis Access

<table>
<thead>
<tr>
<th>Procedure Description</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplex scan of hemodialysis access (including arterial inflow, body of access and</td>
<td>93990</td>
</tr>
<tr>
<td>venous outflow).</td>
<td></td>
</tr>
</tbody>
</table>
PVD-1.3: General Guidelines – Imaging

ABI should be measured first:
- If normal, then further vascular studies are generally not indicated.

Imaging Studies:
- Carotid studies (MRA Neck or CTA Neck) capture the area from the top of the aortic arch (includes the origin of the innominate artery, common carotid artery, and subclavian artery, which gives off the vertebral artery) to the base of the skull.
- CTA/ MRA Abdomen (CPT® 74175/ CPT® 74185) images from the diaphragm to the umbilicus or iliac crest.
- CTA/MRA Chest (CPT® 71275/ CPT® 71555) images from the base of the neck to the dome of the liver.
- Runoff studies (CPT® 75635 for CTA or CPT® 74185, CPT® 73725, and CPT® 73725 for MRA) image from the umbilicus to the feet.
  - CTA Abdomen and lower extremities should be reported as CPT® 75635, rather than using the individual CPT® codes for the abdomen, pelvis, and legs.
  - MRA Abdomen, MRA Pelvis and MRA Lower extremities should be reported as CPT® 74185, CPT® 73725, and CPT® 73725. The CPT® code for MRA Pelvis (CPT® 72198) should not be included in this circumstance.
- If a prior imaging study (Ultrasound, MRA, CTA, Catheter angiogram, etc.) has been completed for a condition, a follow-up, additional, or repeat study for the same condition is generally not indicated unless there has been a change in the patient’s condition, previous imaging showed an indeterminate finding, or eviCore healthcare guidelines support routine follow-up imaging.

References
PVD-2: Screening for Suspected Peripheral Artery Disease

PVD-2.1: Asymptomatic Screening
PVD-2.1: Asymptomatic Screening

The incidence of PAD increases with age. Screening for PAD is important especially for patients with diabetes and smokers, and is generally done as part of a good history and physical examination. Asymptomatic patients with normal pulses generally do not need further testing to assess for PAD. Resting ABI (CPT® 93922) may be appropriate in an asymptomatic patient if the physical exam is consistent with significant PAD.

References
PVD-3: Cerebrovascular and Carotid Disease

PVD-3.1: Initial Imaging  

PVD-3.2: Surveillance Imaging with NO History of Carotid Surgery or Intervention  

PVD-3.3: Surveillance Imaging WITH History of Carotid Surgery or Intervention
PVD-3.1: Initial Imaging

Prior to considering advanced imaging, duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) can be used to evaluate possible carotid artery disease when any of the following apply:
- Hemispheric neurologic symptoms including stroke, TIA, or amaurosis fugax.
- Non-hemispheric or unexplained neurologic symptoms
- Known or suspected retinal arterial emboli or Hollenhorst plaque
- Suspected carotid dissection
- Pulsatile neck masses
- Carotid or cervical bruit
- Abnormal findings on physical exam of the carotid arteries (e.g. aneurysm or absent carotid pulses)
- Preoperative evaluation of patients with evidence of severe diffuse atherosclerosis, scheduled for major cardiovascular surgical procedures
- Preoperative evaluation of patients prior to elective coronary artery bypass graft (CABG) surgery in patients older than 65 years of age and in those with peripheral artery disease, history of cigarette smoking, history of stroke or TIA, or carotid bruit
- Suspected Subclavian Steal Syndrome
  - See also: CH-27: Subclavian Steal Syndrome in the Chest Imaging Guidelines
- Blunt neck trauma
- Vasculitis potentially involving carotid arteries

- Carotid ultrasound screening in asymptomatic individuals due only to risk factors is not indicated

- New signs and symptoms consistent with carotid artery disease (e.g. TIA, amaurosis fugax, change in nature of a carotid bruit) are an indication to re-image the cervical vessels (regardless of when the previous carotid imaging was performed) using any of the following:
  - Duplex ultrasound (CPT® 93880 bilateral study or CPT® 93882 unilateral study),
  - MRA Neck with contrast (CPT® 70548)
  - CTA Neck (CPT® 70498).

- If duplex Ultrasound shows =/> 70% occlusion/stenosis of the internal carotid artery, then MRA Neck with contrast (CPT® 70548) or CTA Neck (CPT® 70498) can be performed.
  - MRA Head (CPT® 70544) or CTA Head (CPT® 70496) can be added if carotid intervention is planned.

- MRA Neck (CPT® 70548) or CTA Neck (CPT® 70498) can be performed if ultrasound findings suggest ulcerated plaque.

- Surveillance imaging once a year for patients with fibromuscular dysplasia of the extracranial carotid arteries.

- For follow-up imaging of known carotid disease
See also: PVD-3.2: Surveillance Imaging with NO History of Carotid Surgery or Intervention.

PVD-3.2: Surveillance Imaging with NO History of Carotid Surgery or Intervention

For Typical Symptoms of TIA/Stroke or Carotid Dissection:
› See also: HD-21: Stroke/TIA

For Suspected Vertebrobasilar Pathology:
› Initial Imaging see also: HD-21: Stroke/TIA
› Surveillance Imaging
   ♦ Asymptomatic or unchanged symptoms and known vertebrobasilar disease or post-stenting interval determined by Vascular Specialist.

For Suspected Subclavian Steal Syndrome:
› Initial Imaging see also: CH-27: Subclavian Steal Syndrome

After Intracranial Hemorrhage:
› Initial Imaging see also: HD-13.1: Head Trauma
› Surveillance Imaging
   ♦ Interval determined by neurosurgeon or neurologist.

Surveillance Imaging
› Surveillance of Asymptomatic Individuals with Carotid Artery Disease that have NOT had Carotid Surgery or Intervention
› < 70% Carotid Stenosis
   ♦ Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) can be performed at the following intervals:
     ▪ Annually for the first 3 years
     ▪ Every 2 years thereafter if stable.
     ▪ If increased stenosis is seen on imaging, may image annually until stable for 3 years.
› ≥70% Carotid Stenosis
   ♦ Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) or MRA Neck with contrast (CPT® 70548) or CTA Neck (CPT® 70498) can be performed at the following intervals:
     ▪ Every 6 months until intervention is performed or a decision is made to not intervene.
PVD-3.3: Surveillance Imaging WITH History of Carotid Surgery or Intervention

- < 70% residual carotid stenosis after intervention
  - Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) can be performed at the following intervals:
    - At 1 month after procedure
    - Every 6 months for 2 years after procedure
    - Then annually until stability has been established.

- ≥ 70% residual carotid stenosis or aggressive restenosis pattern
  - Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) can be performed at the following intervals:
    - At 1 month after procedure.
    - Every 6 months after procedure until stable
    - Annually after stability has been established.

Practice Notes

- Carotid intima-media thickness using duplex ultrasound imaging (Category III code 0126T) is not recommended in clinical practice for risk assessment for a first ASCVD event. Although outcomes data are lacking, Texas has adopted this method in Texas Heart Attack Preventive Screening Bill (HR 1290).

- Texas Heart Attack Preventive Screening Law (HR 1290) mandates that insurers in Texas cover either a calcium scoring study (CPT® 75571 or HCPCS S8092) or a carotid intima-media thickness study (ultrasound—Category III code 0126T) every five years for certain populations. To qualify, the following must apply:
  - Must be a Texas resident.
  - Must be a member of a fully-insured Texas health plan.
  - Must be a man age 45 to 75 or a woman age 55 to 75.
  - Must have either diabetes or a Framingham cardiac risk score of intermediate or higher.
  - Must not have had a calcium scoring study or a carotid intima-media thickness study within the past 5 years

- If ultrasound is technically difficult or confirmation of the degree of stenosis on ultrasound is needed because an interventional procedure is being considered, then MRA Neck (CPT® 70548) or CTA Neck (CPT® 70498) may be performed.
Peripheral Vascular Disease (PVD) Imaging

References


PVD-4: Upper Extremity Peripheral Vascular Disease

PVD-4.1: Upper Extremity PVD – Imaging
PVD-4.1: Upper Extremity PVD – Imaging

- One or more of the following imaging studies may be required when clinical evidence points to arterial insufficiency (arm or hand claudication, discoloration, unilateral cold painful hand) or venous insufficiency (swelling, etc.), which may also include emboli from aortic arch plaque rupture:
  - Arterial ultrasound of the upper extremities (CPT® 93930 or CPT® 93931), or
  - CTA/CTV of Upper extremity (CPT® 73206) or MRA/MRV of Upper extremity (CPT® 73225), and/or
  - CTA/CTV Chest (CPT® 71275) or MRA/MRV Chest (CPT® 71555)

- For Superior Vena Cava Syndrome (upper extremity and facial symptoms):
  - CT Chest with contrast (CPT® 71260)
  - MRV (CPT® 71555) or CTV (CPT® 71275) Chest may be considered when stenting of the SVC is being considered

- For Upper Extremity DVT:
  - Venous duplex ultrasound (CPT® 93970 bilateral or CPT® 93971 unilateral).
  - If duplex ultrasound is nondiagnostic:
    - MRV Upper extremity (CPT® 73225) and/or MRV Chest (CPT® 71555), or
    - CTV Upper extremity (CPT® 73206) and/or CTV Chest (CPT® 71275)

- For suspected Fibromuscular Dysplasia of the brachial artery, appropriate studies include:
  - MRA of Upper extremity (CPT® 73225)
  - CTA of Upper extremity (CPT® 73206)
  - Arterial Ultrasound (CPT® 93930 bilateral study or CPT® 93931 unilateral study)

- After Upper Extremity Arterial Revascularization, Arterial Duplex (CPT® 93931) can be obtained using the following schedule:
  - Baseline (within one month)
  - At 6 months, then annually if stable
  - Anytime for new or worsening symptoms

References
PVD-5: Pulmonary Artery Hypertension

PVD-5.1: Pulmonary Artery Hypertension – Imaging
PVD-5.1: Pulmonary Artery Hypertension – Imaging

- Pulmonary artery hypertension (PAH) comprises a spectrum of diseases which will need direct evaluation, including ECG (right ventricular hypertrophy with / without strain, right atrial dilatation); chest x-ray; arterial blood gas, PFT’s or V/Q scan. Imaging is based on suspected etiology.

- Transthoracic echocardiogram (TTE) (CPT® 93306) should be performed initially and may be accompanied by:
  - Pulmonary venous hypertension - Stress echocardiogram (CPT® 93350 or CPT® 93351) or left and/or right heart catheterization
  - Pulmonary hypertension associated with hypoxemia - High-resolution CT Chest (CPT® 71250) to rule out restrictive lung disorders such as idiopathic pulmonary fibrosis

- Acute or chronic pulmonary embolism – CTA Chest (CPT®71275); see also: CH-25: Pulmonary Embolism (PE) in the Chest Imaging Guidelines.

- See also CD-2.2: Transthoracic Echocardiogram (TTE)-Indications and PEDCD 2.3: Congenital Heart Disease Modality Considerations

References


# PVD-6: Aortic Disorders, Renal Vascular Disorders and Visceral Artery Aneurysms

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</table>
PVD-6.1: Aortic Disorders/Renal Disorders/Visceral Artery Aneurysms

- Duplex ultrasound for visceral vascular studies
  - **CPT® 93975**: Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; complete study.
  - **CPT® 93976**: Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; limited study.
  - **CPT® 93978**: Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; complete study.
  - **CPT® 93979**: Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; unilateral or limited study.

- In clinical practice, CT, CTA, MRA are usually preferred to evaluate for stenosis of these vessels rather than ultrasound which can be difficult to perform (Exception: Duplex ultrasound is appropriate to rule out testicular or ovarian torsion or to evaluate an abdominal bruit or a pulsatile abdominal mass).

- Thoracic Aortic Disease
  - See also [CH-29: Thoracic Aorta](#) in the Chest Imaging Guidelines.

- Mesenteric Ischemia
  - See also: [AB-6: Mesenteric/Colonic Ischemia](#) in the Abdomen Imaging Guidelines.

**References**


PVD 6.2: Abdominal Aortic Aneurysm (AAA)

Non-Obese Individual

- Ultrasound Abdominal aorta (CPT® 76706) is the preferred initial imaging study to screen and retroperitoneal ultrasound (CPT® 76775) to surveil for AAA or to evaluate a pulsatile abdominal mass.

Obese Individual (≥ 35)

- CT Abdomen and Pelvis with contrast (CPT® 74177) can be substituted for US using the same timeline as a non-obese individual. Ultrasound of the abdominal aorta should ideally first be attempted to see if the image quality is adequate.

Screening

- One-time screening recommendations for AAA (Ultrasound CPT® 76706)
  - Men and women 65 to 75 years of age with a history of tobacco use
  - Men and women older than 75 years with a history of tobacco use and in otherwise good health who have not previously received a screening ultrasound examination
  - All first-degree relatives of individuals who present with an AAA and are between 65 and 75, or in those older than 75 in good health
- Medicare covers a one-time AAA screening ultrasound (CPT® 76706) if there are at least one of the following risk factors
  - Family history of AAA
  - The individual is a male age 65 to 75 who has smoked at least 100 cigarettes in his lifetime
- If there is a documented thoracic aortic aneurysm, AAA screening is reasonable with ultrasound (CPT® 76706); however, there is insufficient evidence to support the use of advanced imaging to screen for a thoracic aortic aneurysm in individuals with known abdominal aortic aneurysm.

Surveillance recommendations for AAA (CPT® 76775)

- > 2.5 cm but < 3.0 cm: 10 years
- 3.0 cm to 3.9 cm: 3 year intervals
- 4.0 cm to 4.9 cm: every 12 months
- 5.0 cm to 5.4 cm: every 6 months
- > 5.4 cm or aortic diameter has increased in size by 0.7 cm in six months, or at least 1 cm in a year may undergo more frequent monitoring and should be evaluated by a Vascular Specialist.

Additional Imaging

- CT of the Abdomen and Pelvis with contrast (CPT® 74177), CT of the Abdomen and Pelvis without and with contrast (CPT® 74178), or CTA (Abdomen and Pelvis CPT® 74174, Abdomen CPT® 74175, and Pelvis CPT® 72191).
  - Individuals suspected to have AAA presenting with recent-onset abdominal or back pain, particularly in the presence of a pulsatile epigastric mass or significant risk factors for AAA
  - Pre-operative imaging for AAA repair
PVD-6.3: Iliac Artery Aneurysm (IAA)

- Evaluation of a suspected IAA should begin with ultrasound (CPT® 76882 or CPT® 93925)
  - If ultrasound is equivocal, CT Pelvis with contrast (CPT® 72193) may be performed.
  - Follow-up imaging studies can be performed annually if an aneurysm is > 2cm
- Additional Imaging
  - CT of the Abdomen and Pelvis with contrast (CPT® 74177), CT of the Abdomen and Pelvis without and with contrast (CPT® 74178), or CTA Abdomen and Pelvis (CPT® 74174).
  - Preoperative imaging if endovascular or open repair is being considered

Practice Notes

- Isolated IAA’s are rare and are typically associated with AAA
- Approximately one third to one half of isolated IAA’s are bilateral at time of presentation.
- Aneurysm rupture usually occurs at a diameter of 5 cm or larger, whereas common iliac aneurysms that are less than 3 cm in diameter almost never rupture.

PVD 6.4: Visceral Artery Aneurysm

- Suspected/Screening for visceral artery aneurysm (spleen, kidney, liver or intestines) imaging can include:
  - Ultrasound (CPT® 76700 or CPT® 76705), or
  - CTA Abdomen (CPT® 74175), or
  - CT Abdomen with contrast (CPT® 74160).
- Further monitoring can be with Ultrasound (CPT® 76700 or CPT® 76705) or CTA Abdomen (CPT® 74175) or CT Abdomen with contrast (CPT® 74160) based on the intervals below or as determined by a vascular specialist:
  - Initial evaluation with six-month follow-up is reasonable
  - Further follow-up annually if no significant enlargement is seen
- Post-stent placement is without guidelines and therefore reasonable to follow the same timetable as for endovascular aortic repair. CTA Abdomen (CPT® 74175), MRA Abdomen (CPT® 74185), or CT Abdomen (CPT® 74160) are indicated following stent placement at:
  - 1 month
    - An additional study can be done at 3 months if there was evidence of endoleak on the 1-month study
  - 6 months
  - 12 months
  - Then every year
**Visceral Artery Aneurysms - Practice Notes**

- Visceral Artery Aneurysms are defined by an increase of more than 50% of the original arterial diameter.
- Vascular specialty consultation is beneficial in order to determine the time frame to intervention.

**References**


**PVD-6.5: Renovascular Hypertension**

- Because renal artery revascularization has not been shown to be more effective than medical therapy in most situations, this should not be pursued except in extreme cases, or if there is concern for Takayasu arteritis or fibromuscular dysplasia
  - MRA without or with contrast (CPT® 74185) or CTA with contrast (CPT® 74175) of the Abdomen if
    - The individual is adherent to full doses of three blood pressure medications (including a diuretic) yet has still not achieved goal.
    - Sudden and persistent worsening of previously controlled hypertension
    - Onset of hypertension younger than 30 years of age.
    - Malignant hypertension with coexistent evidence of acute end-organ damage (acute renal failure, new visual or neurological disturbance and/or advanced retinopathy) or flash pulmonary edema.
    - Women who develop hypertension (≥ 140/90) within the first 20 weeks of pregnancy, if hypertension persists > 12 weeks post-partum.
    - New or worsening renal function/increasing creatinine (especially after the administration of an ACE inhibitor or with angiotensin receptor blocking agent).
    - Unexplained atrophic kidney or discrepancy in size between kidneys of greater than 1.5 cm.
  - Gadolinium agents may be contraindicated in patients with severe renal disease or on dialysis due to the risk of developing nephrogenic systemic sclerosis
  - US kidney retroperitoneal (CPT® 76775) and/or Doppler (CPT® 93975 or CPT® 93976) if expertise is available
- In individuals with documented or highly suspicious renal artery stenosis due to fibromuscular dysplasia (mostly women between 15 and 50 years of age), a screening carotid duplex (CPT® 93880) is reasonable to assess for carotid involvement. Hypertensive patient with documented cervicocephalic fibromuscular dysplasia should be screened for renovascular fibromuscular dysplasia with CTA (CPT® 74175) or MRA (CPT® 74185). The assessment of other vascular beds should be considered if supported by suggestive symptoms or medical history.
References

PVD 6.6: AAA IAA, Post Endovascular or Open Aortic Repair

Any one of the following studies can be used after aortic intervention:
- CT of the Abdomen and/or Pelvis with contrast (CPT® 74160 or CPT® 72193 or CPT® 74177), or
- CT of the Abdomen and/or Pelvis without and with contrast (CPT® 74170 or CPT® 72194 or CPT® 74178) or
- CTA of the Abdomen and/or Pelvis (CPT® 74175 or CPT® 72191 or CPT® 74174), or
- MRA of the Abdomen and/or Pelvis (CPT® 74185 and CPT® 72198)

Post-operative surveillance
- Endovascular Aortic Repair (EVAR)
  - CT as per above coding as requested and color duplex ultrasound (CPT® 93975 or CPT® 93976) one month after EVAR
  - If no endoleak, or sac enlargement, repeat either preferred CT or duplex ultrasound (but not both) at 12 months
  - If a type II endoleak is observed 1 month after EVAR, CT with contrast and color duplex US at 6 months
  - If no endoleak or AAA enlargement is detected at 1 year after EVAR, continue surveillance with color duplex US (CT can be performed if DUS is not available), for annual surveillance.
  - If a type II endoleak is associated with an aneurysm sac that is shrinking or stable in size, continue surveillance with color duplex US every 6 months for 2 years, and then annually thereafter.
  - If US detects a new endoleak, graft migration, or aneurysm sac growth > 5mm, CT scan as requested.
  - Non-contrast CT of the entire aorta at 5-year intervals (CPT® 74176)
Peripheral Vascular Disease (PVD) Imaging

- **Open Aortic Aneurysm Repair**
  - Non-contrast enhanced CT of the entire aorta at 5-year intervals (CPT® 74176).
  - Imaging as requested to assess for suspected infection of the graft

- Any one of the following studies can be used after endovascular iliac repair (stent):
  - CT Pelvis (CPT® 72193 or CPT® 72194), or
  - CTA Pelvis (CPT® 72191), or
  - MRA Pelvis (CPT® 72198)

- **Endovascular (Stent) Iliac Repair** - 1 week, 1 month, 3 months, and 6 months after endovascular treatment, and then every 6 months thereafter.³

**References**

**PVD-6.7: Aortic Dissection and Other Aortic Conditions**

- Any of the following studies can be used if acute dissection is suspected:
  - CT Chest (CPT® 71260 or CPT® 71270) and/or
  - CT Abdomen (CPT® 74160 or CPT® 74170) and/or
  - CT Pelvis (CPT® 72193 or CPT® 72194) or
  - If CT Abdomen and Pelvis with or without is requested, codes: (CPT® 74177 or CPT® 74178) are appropriate.
  - CTA Chest (CPT® 71275) and/or CTA Abdomen and/or Pelvis (CPT® 74175 or CPT® 72191 or CPT® 74174), or
  - MRA Chest and/or Abdomen and/or Pelvis (CPT® 71555 and/or CPT® 74185 and/or CPT® 72198)
  - See CH-29: Thoracic Aortic in the Chest Imaging Guidelines.

**PVD-6.8: Imaging for Other Aortic Conditions**

- Chest CTA (CPT® 71275) prior to minimally invasive or robotic surgery.
  - See: CD-2.2: Transthoracic Echocardiography (TTE) – Indications; CD-5.4: Cardiac MRI – Aortic Root and Proximal Ascending Aorta in the Cardiac Imaging Guidelines
  - For diverticulitis, see: AB-2.2: Abdominal Pain
  - For mesenteric/colonic ischemia, see: AB-6: Mesenteric/Colonic Ischemia
### PVD-7: Lower Extremity Peripheral Vascular Disease

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Peripheral Vascular Disease (PVD) Imaging

PVD-7.1: Claudication

- Initial evaluation for suspected PAD should be with a resting ABI. This can be accomplished at the bedside as part of the physical examination or requested as CPT® 93922 (limited Doppler ultrasound) or CPT® 93923 (multi-level complete Doppler ultrasound). CPT® 93923 may be performed once. Follow-up studies may be performed with CPT® 93922.

- If the resting ABI is > 0.89 and PAD is still highly suspected clinically then a post-exercise ABI (CPT® 93924) can be performed.

- History and physical suggestive of PAD including:
  - History
    - Claudication
    - Other non-joint-related exertional lower extremity symptoms (not typical of claudication)
    - Impaired ability to walk
    - Rest pain suggestive of ischemia
  - Physical Examination
    - Abnormal lower extremity pulse examination
    - Vascular bruit
    - Non-healing lower extremity wound
    - Lower extremity gangrene
    - Other suggestive lower extremity physical findings (e.g., elevation pallor/dependent rubor)

- If resting ABI (CPT® 93922) is normal (0.9 to 1.3) and disease is still suspected:
  - Differentiate from “pseudoclaudication”. See also: SP-9: Lumbar Spinal Stenosis in the Spine Imaging Guidelines.
  - Re-measure ABI after exercise (CPT® 93924).\(^1\)
  - A toe-brachial index may be used as further screening in patients with ABI’s greater than 1.3.
  - Otherwise, advanced imaging is necessary only if there is consideration for invasive therapy.\(^2,3,4,5\)

- Duplex ultrasound (CPT® 93925 bilateral study or CPT® 93926 unilateral study) and Doppler studies are adjuncts to abnormal ABI that may be used to identify location and extent of disease once there has been a decision for revascularization.\(^6,7\)

- MRA Aorta, Pelvic vessels, and Lower extremities (CPT® 74185, CPT® 73725 and CPT® 73725), or CTA with run-off (CPT® 75635) to further evaluate the lower extremity arteries for any of the following:\(^2,8\)
  - ABI < 0.5
  - Intermittent claudication (i.e. non-limb threatening ischemia) and either:
    - Failed 3 months conservative medical therapy (physician supervised walking / exercise program plus medical therapy), or
- Functional disability (e.g. exercise impairment sufficient to threaten the patient’s employment or to require significant alterations in the patient’s lifestyle)
- Potentially limb-threatening vascular disease evidenced by:
  - Skin breakdown
  - Non-healing ischemic ulcers
  - Resting leg pain
  - Gangrene
- Blue Toe Syndrome:
  - Emboli from aortic plaque or mural thrombus
  - Hyperviscosity syndrome
  - Hypercoagulable states
  - Vasculitis
- Preoperative planning for an invasive procedure (endovascular or open surgery)
- **Note**: MRA Pelvis should not be requested/billed with CPT® 74185, CPT® 73725 and CPT® 73725

**Practice Notes**
Claudication symptoms usually remain stable (70% to 80% of patients) and do not worsen or improve at rapid rates. Repeat studies to assess the efficacy of medical therapy are not indicated unless there is a negative change in clinical status.

**PVD-7.2: Popliteal Artery Entrapment Syndrome**
- Diagnosis of popliteal artery stenosis or occlusion due to compression by adjacent muscle and tendons seen in young men (ages 20 to 40).
  - Ultrasound (CPT® 93926 unilateral study), CTA Lower extremity (CPT® 73706), or MRA Lower extremity (CPT® 73725).
  - CT or MRI of the lower extremity (contrast as requested) if requested by the operating surgeon.

**PVD-7.3: Post-Procedure Surveillance Studies**
- Intervals determined by a Vascular Specialist
  - Resting (CPT® 93922), and post-exercise ABI (CPT® 93924)
    - Angioplasty, aortoiliac and infrainguinal
    - Synthetic graft (e.g. PTFE), lower extremity bypass graft
- Scheduled Interval
  - ABI (CPT® 93922) is generally appropriate following any revascularization procedure.
  - Venous conduit, lower extremity bypass graft
    - ABI (CPT® 93922) or Duplex ultrasound (CPT® 93926 unilateral study) at each routine follow up is appropriate.
    - Further imaging studies such as CTA or MRA can be considered based on the evaluation by the vascular specialist, but not both annually.
  - Endovascular stenting
- Duplex ultrasound (CPT® 93926 unilateral study) at 1 month, 6 months, and every year on routine follow up after complex lesion intervention.

**PVD-7.4: Lower Extremity Artery Aneurysms**

- For iliac artery aneurysm see also: **PVD-6.3: Iliac Artery Aneurysm (IAA)**

- Femoral artery aneurysm
  - Initial imaging
    - Ultrasound (CPT® 93925 bilateral study or CPT® 93926 unilateral study).
  - Surveillance imaging
    - Symptomatic true femoral aneurysms smaller than 2.5 cm in diameter
      - Ultrasound (CPT® 93926 unilateral study) annually
    - Symptomatic true femoral aneurysms larger than 2.5 cm
      - Ultrasound (CPT® 93926 unilateral study) every 6 months
  - Other imaging
    - CTA Lower extremity [CPT® 73706] or MRA Lower extremity without or with contrast [CPT® 73725] can be performed when:
      - Preoperative study for patients with no plans for invasive angiography.
      - Technically limited or abnormal ultrasound results.

- Popliteal artery aneurysm
  - Initial imaging
    - Ultrasound (CPT® 93925 bilateral study or CPT® 93926 unilateral study) and Ultrasound to assess for other aneurysms especially aortic aneurysm (CPT® 76770 or CPT® 76775).
  - Surveillance imaging
    - Ultrasound (CPT® 93926 unilateral study) annually.
    - Post-interventional functional testing (ABI) (CPT® 93922) may be useful as clinically indicated.
  - Other imaging
    - CTA (CPT® 73706) or MRA (CPT® 73725) can be performed for:
      - Preoperative study for patients with no plans for invasive angiography.
      - Technically limited or abnormal ultrasound results.

**PVD-7.5: Lower Extremity Deep Venous Thrombosis (DVT) and/or Lower Extremity Edema**

- Duplex ultrasound (CPT® 93970 bilateral study or CPT® 93971 unilateral study) is the initial imaging study for any suspected DVT
  - Deep venous thrombosis can present as
    - Symptomatic
      - Swelling
      - Pain
      - Warmth
      - Erythema
      - Pain with dorsiflexion of the foot (Homan’s Sign)
      - Or with progression, such as phlegmasia cerulean dolens
1/3 of all cases are asymptomatic—symptoms are often not apparent until there is involvement above the knee.

- Risk factors for DVT include inactivity, posture, obstruction as well as those outlines outlined in CH-25: Pulmonary Embolism (PE) in Chest Imaging Guidelines.

- If Duplex ultrasound is normal, repeat Duplex ultrasound testing is not supported. For suspected concomitant arterial disease consider ABI (CPT® 93922) see also: PVD-7.1: Claudication

- Unilateral or bilateral calf edema with negative or indeterminate venous duplex study
  - Abdomen and Pelvic Ultrasound (CPT® 76700 and/or CPT® 76856 or CPT® 93975 or CPT® 93976 and/or CPT® 76830 [transvaginal]), and if not previously performed:
    - Pelvis CT with contrast (CPT® 72193) or Abdomen and Pelvis CT with contrast (CPT® 74177), or
    - MRV or CTV of the Pelvis or Abdomen and Pelvis (CPT® 74185 and CPT® 72198 or CPT® 74175 and CPT® 72191). If the extent of thrombosis needs a more detailed assessment, then
      - CT or MRI Lower extremity without contrast (CPT® 73700 or CPT® 73718)

- May-Thurner Syndrome (Iliac Vein Compression Syndrome) suspected—is an uncommon condition of left common iliac vein compression by the overlying right common iliac artery. It may cause discomfort and unilateral edema of the left lower extremity or DVT in the left iliofemoral vein, which may be recurrent.
  - For May-Thurner Syndrome (Iliac Vein Compression Syndrome), imaging can include:
    - MRI Pelvis without contrast (CPT® 72195) or MRI Pelvis without and with contrast (CPT® 72197), or
    - MRA/MRV Pelvis (CPT® 72198), or
    - CTA/CTV Pelvis (CPT® 72191), or
    - Duplex ultrasound (CPT® 93975 or CPT® 93976), or
    - Traditional venography.

- Popliteal (Baker’s) Cyst suspected - dedicated ultrasound of the popliteal fossa (CPT® 76882).

- Diabetic muscle necrosis suspected - MRI of the extremity (contrast as requested).

- Chronic venous insufficiency—advanced imaging is not routinely indicated unless suspected thigh or abdominal/pelvic clot(s) or masses.

- Phlegmasia cerulean dolens can be evaluated by MRV, CTV or CTA with run off to assess the arterial system. MRA (CPT® 74185, CPT® 73725, and CPT® 73725) may also be required for this problem, which can reflect both arterial and venous compromise and produce substantial lower extremity edema.

- Generally not considered:
  - Impedance plethysmography (IPG) — CPT® 93965) may be useful but is currently uncommonly utilized.
  - Venography is more accurate but carries the risk of phlebitis.
Superficial venous thrombosis should not require advanced imaging.
There is insufficient data at this time to justify routinely performing CTA-CTV, including CTV of the pelvis and lower extremities.
Duplex study of the arteries (CPT® 93925 bilateral study or CPT® 93926 unilateral study) is not indicated unless there is evidence of arterial insufficiency.
See also: PVD-7.1: Claudication

Follow-up imaging of known DVT:

- Duplex ultrasound (CPT® 93970 bilateral study or CPT® 93971 unilateral study) can be repeated in order to rule out proximal extension of the clot:
  - One week after the initial diagnosis.
  - Serial imaging (up to 3 studies) over the first two weeks if calf DVT is not treated.
- Imaging during or to terminate long-term anticoagulation therapy to determine venous recanalization is not supported by evidence.

PVD-7.6: Other Diseases of the Lower Extremity Veins

- Venous duplex scan (CPT® 93970 bilateral study or CPT® 93971 unilateral study) can be performed in patients who are candidates for anticoagulation or invasive therapeutic procedures for the following:
  - Post-thrombotic (post-phlebitic) syndrome.
  - Confirm the diagnosis of venous insufficiency/valvular incompetence in patients with signs and symptoms of this disease (ulceration, thickening, and skin discoloration).
  - Venous mapping prior to autologous vein graft harvesting (e.g. for cardiac bypass surgery).
  - Following ablation of varicosities when the greater saphenous vein was closed (not indicated if only superficial veins underwent ablation), one venous duplex scan for DVT surveillance can be performed between 3 days to 6 weeks (CPT® 93971 unilateral study, or CPT® 76970 US study follow up).
References


PVD-8: Imaging for Hemodialysis Access

PVD-8.1: Preoperative Arterial Evaluation and Venous Mapping Prior to AV Fistula Creation
**PVD-8.1: Preoperative Arterial Evaluation and Venous Mapping Prior to AV Fistula Creation**

- There is a Level II HCPCS code for vessel mapping prior to AV fistula creation that does not have a CPT® Level I equivalent, (HCPCS code G0365 [vessel mapping of vessels for prehemodialysis access {services for preoperative vessel mapping prior to creation of hemodialysis access using an autogenous hemodialysis conduit, including arterial inflow and venous outflow}]). Therefore, CPT® codes for duplex venous and arterial are used for this purpose.

- In some instances, MRA may be needed (CPT® 73225) if duplex imaging is equivocal.

- Arterial evaluation to assess arterial suitability (size, degree of stenosis and calcification) prior to AV fistula creation may be appropriate.
  - CPT® 93930 or CPT® 93931 can be used to report upper extremity arterial evaluation.
  - Venous mapping to assess venous suitability prior to AV fistula creation may be appropriate.
    - CPT® 93970 or CPT® 93971 can be used to report venous mapping.

- Indications for Duplex ultrasound (CPT® 93990) of hemodialysis access include but are not limited to:
  - Patients with decreased flow rates during hemodialysis.
  - Development of arm swelling or discomfort after access placement surgery or a hemodialysis session.
  - Prolonged immaturity of a surgically created AV fistula.
  - Suspected pseudoaneurysm.
  - Suspected AV fistula or graft stenosis.
  - Known or suspected fluid collection adjacent to an AV fistula or graft.
  - Though it is, generally, not needed, one Duplex US (CPT® 93990) can be performed after a surgically created AV fistula for assessment.

**References**

PVD-9: Arteriovenous Malformations (AVMs)

See: PEDPVD-2.5: Arteriovenous Malformations (AVMs) and Fistulas
Nuclear medicine

Nuclear medicine studies are rarely used in the evaluation of peripheral vascular disorders, but are indicated in the following circumstances:

- Lymphoscintigraphy (CPT® 78195) is indicated for evaluation of lower extremity lymphedema when a recent Doppler ultrasound is negative for valvular insufficiency.
- Vascular flow imaging (CPT® 78445) is an obsolete study that has been replaced by MRA, CTA, or Duplex ultrasonography, and is not supported for any indication at this time.
- Venous thrombosis imaging (CPT® 78456, CPT® 78457, and CPT® 75458) are obsolete studies that have been replaced by MRA, CTA, or Duplex ultrasonography, and are not supported for any indication at this time.
- Indium 111 ($^{111}$In)–labeled white blood cell (WBC) or Gallium-67 citrate studies (CPT® 78805, CPT® 78806, or CPT® 78807) can be approved for evaluation of the following:
  - Mycotic aneurysms.
  - Vascular graft infection.
  - Infection of central venous catheter or other indwelling device.
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<td>Thoracic CT with contrast (Post-Myelography CT)</td>
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<td>Thoracic CT without and with contrast</td>
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SP-1.1: General Considerations

- Before advanced diagnostic imaging can be considered, there must be an initial face-to-face clinical evaluation as well as a clinical re-evaluation after a trial of failed conservative therapy; the clinical re-evaluation may consist of a face-to-face evaluation or other meaningful contact with the provider’s office such as email, web or telephone communications.

- A face-to-face clinical evaluation is required to have been performed within the last 60 days before advanced imaging is considered. This may have been either the initial clinical evaluation or a clinical re-evaluation.

- The initial clinical evaluation should include a relevant history and physical examination (including a detailed neurological examination), appropriate laboratory studies, non-advanced imaging modalities, results of manual motor testing, the specific dermatomal distribution of altered sensation, reflex examination, and nerve root tension signs (e.g., straight leg raise test, slump test, femoral nerve tension test). The initial clinical evaluation must be face-to-face; other forms of meaningful contact (telephone call, electronic mail or messaging) are not acceptable as an initial evaluation.

- For those spinal conditions/disorders for which the Spine Imaging Guidelines require a plain x-ray of the spine prior to consideration of an advanced imaging study, the plain x-ray must be performed after the current episode of symptoms started or changed (see SP-2.1: Anatomic Guidelines).

- Clinical re-evaluation is required prior to consideration of advanced diagnostic imaging to document failure of significant clinical improvement following a recent (within 3 months) six week trial of provider-directed treatment. Clinical re-evaluation can include documentation of a face-to-face encounter or documentation of other meaningful contact with the requesting provider’s office by the patient (e.g., telephone call, electronic mail or messaging).

- Provider-directed treatment may include education, activity modification, NSAIDs (non-steroidal anti-inflammatory drugs), narcotic and non-narcotic analgesic medications, oral or injectable corticosteroids, a provider-directed home exercise/stretching program, cross-training, avoidance of aggravating activities, physical/occupational therapy, spinal manipulation, interventional pain procedures and other pain management techniques.

- Any bowel/bladder abnormalities or emergent or urgent indications should be documented at the time of the initial clinical evaluation and clinical re-evaluation.

- Altered sensation to pressure, pain, and temperature should be documented by the specific anatomic distribution (e.g., dermatomal, stocking/glove or mixed distribution).

- Motor deficits (weakness) should be defined by the specific myotomal distribution (e.g., weakness of toe flexion/extension, knee flexion/extension, ankle dorsi/plantar...
flexion, wrist dorsi/palmar flexion) and gradation of muscle testing should be
documented as follows:

<table>
<thead>
<tr>
<th>Grading of Manual Muscle Testing</th>
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<tbody>
<tr>
<td>0</td>
<td>No evidence of muscle function</td>
</tr>
<tr>
<td>1</td>
<td>Muscle contraction but no or very limited joint motion</td>
</tr>
<tr>
<td>2</td>
<td>Movement possible with gravity eliminated</td>
</tr>
<tr>
<td>3</td>
<td>Movement possible against gravity</td>
</tr>
<tr>
<td>4</td>
<td>Movement possible against gravity with some resistance</td>
</tr>
<tr>
<td>5</td>
<td>Movement possible against gravity with full or normal resistance</td>
</tr>
</tbody>
</table>

Pathological reflexes (e.g. Hoffmann’s, Babinski, and Chaddock sign) should be
reported as positive or negative.

Asymmetric reflexes and reflex examination should be documented as follows:

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<thead>
<tr>
<th>Grading of Reflex Testing</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>No response</td>
</tr>
<tr>
<td>1+</td>
<td>A slight but definitely present response</td>
</tr>
<tr>
<td>2+</td>
<td>A brisk response</td>
</tr>
<tr>
<td>3+</td>
<td>A very brisk response without clonus</td>
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<tr>
<td>4+</td>
<td>A tap elicits a repeating reflex (clonus)</td>
</tr>
</tbody>
</table>

Advanced diagnostic imaging is often urgently indicated and may be necessary if
serious underlying spinal and/or non-spinal disease is suggested by the presence of
certain patient factors referred to as “red flags.” See **SP-1.2: Red Flag Indications**.

Spinal specialist evaluation can be helpful in determining the need for advanced
diagnostic imaging, especially for patients following spinal surgery.

The need for repeat advanced diagnostic imaging should be carefully considered
and may not be indicated if prior advanced diagnostic imaging has been performed.
Requests for simultaneous, similar studies such as spinal MRI and CT need to be
documented as required for preoperative surgical planning. These studies may be
helpful in the evaluation of complex failed spinal fusion cases or needed for
preoperative surgical planning when the determination of both soft tissue and bony
anatomy is required.

Serial advanced imaging, whether CT or MRI, for surveillance of healing or recovery
from spinal disease is not supported by the currently available scientific evidence-
based medicine for the majority of spinal disorders.

Advanced imaging is generally unnecessary for resolved or improving spinal pain
and/or radiculopathy.

For patients experiencing chronic spine pain, advanced diagnostic imaging has not
been shown to be of value in patients with stable, longstanding spinal pain without
neurological features or without clinically significant or relevant changes in
symptoms or physical examination findings.
Practice Notes

**Straight leg raise test** (also known as the Lasegue’s test) – With the patient in the supine position, the hip medially rotated and adducted, and the knee extended, the examiner flexes the hip until the patient complains of pain or tightness in the back or back of the leg. If the pain is primarily back pain, it is more likely a disc herniation or the pathology causing the pain is more central. If pain is primarily in the leg, it is more likely that the pathology causing the pressure on neurological tissues is more lateral. Disc herniation or pathology causing pressure between the two extremes are more likely to cause pain in both areas. The examiner then slowly and carefully drops the leg back (extends it) slightly until the patient feels no pain or tightness. The patient is then asked to flex the neck so the chin is on the chest, or the examiner may dorsiflex the patient’s foot, or both actions may be done simultaneously. Both of these maneuvers are considered to be provocative tests for neurological tissue.

**Slump test** – The patient is seated on the edge of the examination table with the legs supported, the hips in neutral position, and the hands behind the back. The examination is performed in sequential steps. First, the patient is asked to “slump” the back into thoracic and lumbar flexion. The examiner maintains the patient’s chin in neutral position to prevent neck and head flexion. The examiner then uses one arm to apply overpressure across the shoulders to maintain flexion of the thoracic and lumbar spines. While this position is held, the patient is asked to actively flex the cervical spine and head as far as possible (i.e., chin to chest). The examiner then applies overpressure to maintain flexion of all three parts of the spine (cervical, thoracic, and lumbar) using the hand of the same arm to maintain overpressure in the cervical spine. With the other hand, the examiner then holds the patient’s foot in maximum dorsiflexion. While the examiner holds these positions, the patient is asked to actively straighten the knee as much as possible. The test is repeated with the other leg and then with both legs at the same time. If the patient is unable to fully extend the knee because of pain, the examiner releases the overpressure to the cervical spine and the patient actively extends the neck. If the knee extends further, the symptoms decrease with neck extension, or the positioning of the patient increases the patient’s symptoms, then the test is considered positive.

**Femoral nerve tension test** (also known as the prone knee bending test) – The patient lies prone while the examiner passively flexes the knee as far as possible so that the patient’s heel rests against the buttock. At the same time, the examiner should ensure that the patient’s hip is not rotated. If the examiner is unable to flex the patient’s knee past 90 degrees because of a pathological condition in the hip, the test may be performed by passive extension of the hip while the knee is flexed as much as possible. The flexed knee position should be maintained for 45 to 60 seconds. Unilateral neurological pain in the lumbar area, buttock, and/or posterior thigh may indicate an L2 or L3 nerve root lesion. Pain in the anterior thigh indicates tight quadriceps muscles or stretching of the femoral nerve.

**Hoffmann’s sign** – The examiner holds the patient’s middle finger and briskly flicks the distal phalanx. A positive test is noted if the interphalangeal joint of the thumb of the same hand flexes.
**Babinski’s sign** – The examiner runs a sharp instrument along the plantar surface of the foot from the calcaneus along the lateral border to the forefoot. A positive test occurs with extension of the great toe with flexion and splaying of the other toes. A negative test occurs with no movement of the toes at all or uniform bunching up of the toes.

**Chaddock sign** – The examiner strokes the lateral malleolus. A positive test occurs with extension of the great toe.

**SP-1.2: Red Flag Indications**

*Red Flag Indications are intended to represent the potential for life or limb threatening conditions.* Red Flag Indications are clinical situations in which localized spine pain and associated neurological features are likely to reflect serious underlying spinal and/or non-spinal disease and warrant exception to the requirement for documented failure of six weeks of provider-directed treatment. Advanced diagnostic imaging of the symptomatic level is appropriate and/or work-up for a non-spinal source of spine pain for Red Flag Indications.

- Red Flag Indications include:
  - Motor Weakness
  - Aortic Aneurysm or Dissection
  - Cancer
  - Cauda Equina Syndrome
  - Fracture
  - Infection
  - Severe Radicular Pain

**Motor Weakness** (See: **Grading of Manual Muscle Testing and Reflex Testing** in **SP-1.1: General Considerations**)

<table>
<thead>
<tr>
<th>History, Symptoms or Physical Exam Findings (Initial clinical evaluation required within the last 60 days)</th>
<th>Advanced Diagnostic Imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical presentation including one or more of the following:</td>
<td>MRI of the relevant spinal level without contrast or MRI of the relevant spinal level without and with contrast</td>
</tr>
</tbody>
</table>
  - Motor weakness of grade 3/5 or less of specified muscle(s);                                           |                             |
  - New onset foot drop;                                                                                  |                             |
  - Acute bilateral lower extremity weakness;                                                             |                             |
  - Progressive objective motor /sensory/deep tendon reflex deficits on clinical re-evaluation.         |                             |
### Aortic Aneurysm or Dissection

**History, Symptoms or Physical Exam Findings**  
(Initial clinical evaluation required within the last 60 days)

- New onset of back and/or abdominal pain in an individual with a known AAA; or
- Acute dissection is suspected.

**Advanced Diagnostic Imaging**

See: [PVD-6: Aortic Disorders, Renal Vascular Disorders and Visceral Artery Aneurysms](#) and/or [CH-29: Thoracic Aorta](#)

### Cancer

**History, Symptoms or Physical Exam Findings**  
(Initial clinical evaluation required within the last 60 days)

Clinical presentation including one or more of the following:

- There is clinical suspicion of spinal malignancy AND one or more of the following:
  - Night pain
  - Uncontrolled or unintended weight loss
  - Pain unrelieved by change in position
  - Age greater than 70 years
  - Severe and worsening spinal pain despite a reasonable (generally after 1 week) trial of provider-directed treatment with re-evaluation; or
- Known metastatic malignancies; or acute spinal cord compression from primary or metastatic spinal neoplastic disease is suspected by history and physical examination.

**Advanced Diagnostic Imaging**

MRI of the relevant spinal level without contrast or MRI of the relevant spinal level without and with contrast; CT without contrast of the relevant spinal level if MRI contraindicated.  
See also: [ONC-31.5: Bone (including Vertebral) Metastases](#) and [ONC-31.6: Spinal Cord Compression](#) in the Oncology Imaging Guidelines.

### Cauda Equina Syndrome

**History, Symptoms or Physical Exam Findings**  
(Initial clinical evaluation required within the last 60 days)

Clinical presentation including one or more of the following:

- Acute onset of bilateral sciatica;
- Perineal sensory loss (“saddle anesthesia”);
- Decreased anal sphincter tone;
- Bowel/bladder incontinence;
- Acute urinary retention.

**Advanced Diagnostic Imaging**

MRI Lumbar Spine without contrast (CPT® 72148) or MRI Lumbar Spine without and with contrast (CPT® 72158)
### Fracture

<table>
<thead>
<tr>
<th>History, Symptoms or Physical Exam Findings (Initial clinical evaluation required within the last 60 days)</th>
<th>Advanced Diagnostic Imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is clinical suspicion of spinal fracture related to one or more of the following:</td>
<td>MRI of the relevant spinal level without contrast or CT of the relevant spinal level without contrast</td>
</tr>
<tr>
<td>✦ Long term use of systemic glucocorticoids;</td>
<td></td>
</tr>
<tr>
<td>✦ History of prior low energy fractures;</td>
<td></td>
</tr>
<tr>
<td>✦ History of low bone mineral density;</td>
<td></td>
</tr>
<tr>
<td>✦ Age ≥ 65 years;</td>
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</tr>
<tr>
<td>✦ Recent significant trauma at any age;</td>
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</tr>
<tr>
<td>✦ High speed vehicular accident;</td>
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<tr>
<td>✦ Ejection from a motor vehicle;</td>
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<tr>
<td>✦ Fall from elevation ≥ 3 feet/5 stairs;</td>
<td></td>
</tr>
<tr>
<td>✦ Head trauma and/or maxillofacial trauma</td>
<td></td>
</tr>
<tr>
<td>✦ Patients with ankylosing spondylitis are at high risk of cervical spine fractures even with minor direct/indirect trauma to the cervical spine which can result in quadripareis/quadriplegia.</td>
<td></td>
</tr>
</tbody>
</table>

### Infection

<table>
<thead>
<tr>
<th>History, Symptoms or Physical Exam Findings (Initial clinical evaluation required within the last 60 days)</th>
<th>Advanced Diagnostic Imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a clinical suspicion of spinal infection (e.g., disc space infection, epidural abscess or spinal osteomyelitis) and one or more of the following:</td>
<td>MRI of the relevant spinal level without and with contrast or MRI without contrast</td>
</tr>
<tr>
<td>✦ Fever;</td>
<td></td>
</tr>
<tr>
<td>✦ History of IV drug use;</td>
<td></td>
</tr>
<tr>
<td>✦ Recent bacterial infection (UTIs, pyelonephritis, pneumonia);</td>
<td></td>
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<tr>
<td>✦ Immunocompromised states;</td>
<td></td>
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<tr>
<td>✦ Long term use of systemic glucocorticoids;</td>
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<tr>
<td>✦ Organ transplant recipient taking anti-rejection medication;</td>
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<tr>
<td>✦ Diabetes mellitus;</td>
<td></td>
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<tr>
<td>✦ HIV/AIDS;</td>
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<tr>
<td>✦ Chronic dialysis;</td>
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<tr>
<td>✦ Immunosuppressant therapy.</td>
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</tr>
</tbody>
</table>
Severe Radicular Pain

<table>
<thead>
<tr>
<th>All of the following must be present (Initial clinical evaluation required within the last 60 days)</th>
<th>Advanced Diagnostic Imaging</th>
</tr>
</thead>
</table>
| ✷ Severe radicular pain in a specified spinal nerve root distribution (minimum 9/10 on the VAS); and  
  ✷ Documented significant functional loss at work or at home; and  
  ✷ Severity of pain unresponsive to a minimum of seven (7) days of provider-directed treatment; and  
  ✷ Treatment plan includes one of the following:  
    ■ Transforaminal epidural steroid injection (TFESI) at any level(s); or  
    ■ Interlaminar epidural steroid injection (ILESI) at the cervical or thoracic levels; or  
    ■ A plan for urgent/emergent spinal surgery. | MRI of the relevant spinal level without contrast or MRI without and with contrast |

SP-1.3: Definitions

- **Radiculopathy**, for the purpose of this policy, is defined as the presence of pain resulting in significant functional limitations (i.e., diminished quality of life and impaired, age-appropriate activities of daily living), dysaesthesia(s) or paraesthesia(s) reported by the individual in a specified dermatomal distribution of an involved named spinal root(s) and **ONE or MORE** of the following:
  - Loss of strength of specific named muscle(s) or myotomal distribution(s) or demonstrated on detailed neurologic examination (within the prior 3 months), concordant with nerve root compression of the involved named spinal nerve root(s).
  - Altered sensation to light touch, pressure, pin prick or temperature demonstrated on a detailed neurologic examination (within the prior 3 months) in the sensory distribution concordant with nerve root compression of the involved named spinal nerve root(s).
  - Diminished, absent or asymmetric reflex(es) within the prior 3 months concordant with nerve root compression of the involved named spinal nerve root(s).
  - Either of the following:
    - A concordant radiologist’s interpretation of an advanced diagnostic imaging study (MRI or CT) of the spine demonstrating compression of the involved named spinal nerve root(s) or foraminal stenosis at the concordant level(s) (Performed within the prior 12 months).
    - Electrodiagnostic studies (EMG/NCV’s) diagnostic of nerve root compression of the involved named spinal nerve root(s). (Performed within the prior 12 months).

- **Radicular pain** is pain which radiates to the upper or lower extremity along the course of a spinal nerve root, typically resulting from compression, inflammation and/or injury to the nerve root.
Radiculitis is defined, for the purpose of this policy, as radicular pain without objective neurological findings.

References
<table>
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<td>SP-2.4: CT/Myelography</td>
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<td>SP-2.5: Lumbar Provocative Discography CT</td>
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<td>SP-2.6: Ultrasound of the Spinal Canal</td>
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<td>SP-2.7: Limitations of Spinal Imaging in Degenerative Disorders</td>
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<td>SP-2.9: MRA Spinal Canal</td>
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<td>SP-2.10: Spine PET</td>
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<tr>
<td>SP-2.11: Cone-beam CT</td>
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</tr>
</tbody>
</table>
SP-2.1: Anatomic Guidelines

Anatomic regions of the spine/pelvis that are included in the following MRI and CT advanced diagnostic imaging studies:
- Cervical spine: from the skull base/foramen magnum through T1
- Thoracic spine: from C7 through L1
- Lumbar spine: from T12 through mid-sacrum
- Pelvis: includes hips, sacroiliac joints, sacrum, coccyx

CT or MRI of the cervical and thoracic spine will image the entire spinal cord since the end of the spinal cord or conus medullaris usually ends at L1 in adults. Therefore, lumbar spine imaging is not needed when the goal is to image only the spinal cord unless there is known or suspected low lying conus medullaris (e.g. tethered cord).

Plain x-ray should be the initial evaluation for certain suspected spine conditions, including:
- See SP-11: Pathological Spinal Compression Fractures
- See SP-8: Lumbar Spine Spondylolysis/Spondylolisthesis
- See SP-10.2: Inflammatory Spondylitis
- See SP-3.2: Neck (Cervical Spine) Trauma, SP-4.2: Upper Back (Thoracic Spine) Trauma, and SP-6.2: Low Back (Lumbar Spine) Trauma
- See SP-5.2: Coccydynia without Neurological Features
- See SP-14: Spinal Deformities (e.g. Scoliosis/Kyphosis) and PEDSP-4: Spinal Dysraphism
- See SP-10: Sacro-Iliac (SI) Joint Pain, Inflammatory Spondylitis/Sacroiliitis and Fibromyalgia
- See SP-15: Post-Operative Spinal Disorders

SP-2.2: MRI of the Spine

See Procedure Codes Associated with Spine Imaging

Spine MRI is performed either without contrast, with contrast or without and with contrast. A “with contrast” study alone is appropriate only to complete a study begun without contrast. Contrast is generally not indicated for most disc and nerve root disorders, fractures and degenerative disease.

Spine MRI indications include:
- Evaluation of disc disease, spinal cord and nerve root disorders and most other spinal conditions including evaluation of congenital anomalies of the spine and spinal cord
- Suspicion for or surveillance of known spine/spinal canal/spinal cord neoplastic disease.
- Suspicion, diagnosis of or surveillance of spinal infections, multiple sclerosis or other causes of myelitis, syringomyelia, cauda equina syndrome or other “red flag” indications. See SP-1.2: Red Flag Indications.
Preoperative evaluation to define abnormal or variant spinal anatomy that could influence the outcome of a potential surgical procedure. See SP-16.1: Prior to Spine Surgery.

Spinal imaging for patients having undergone recent spinal surgery e.g., laminectomy, discectomy, spinal decompression, when history and physical examination is suspicious for hematoma, post-surgical infection, or cerebrospinal fluid (CSF) leak.

Positional MRI:

Positional MRI is also referred to as dynamic, weight-bearing or kinetic MRI. Currently, there is inadequate scientific evidence to support the medical necessity of this study. As such, it should be considered experimental or investigational.

SP-2.3: CT of the Spine

See Procedure Codes Associated with Spine Imaging

Spine CT indications include:

- Individuals who cannot have MRI (with implanted ferromagnetic materials or electronically, magnetically or mechanically activated implanted devices that are not determined by the manufacturer as MRI compatible).
- Any spinal trauma/fractures, especially spinal trauma/fractures that could result in spinal instability and spinal cord/spinal nerve compression.
- Spinal neoplastic disease – primary or metastatic.
- In conjunction with myelography or discography (see SP-2.4: CT/Myelography and SP-2.5: Lumbar Provocative Discography CT).
- Preoperative evaluation to define abnormal or variant bony spinal anatomy that could influence the outcome of a potential surgical procedure (see SP-16.1: Prior to Spine Surgery)
- To assess spinal fusions when pseudoarthrosis is suspected (not to be used for routine post-operative assessment where x-rays are sufficient and/or there are no concordant clinical signs or symptoms).
- Congenital, developmental or acquired spinal deformity (see SP-14: Spinal Deformities [e.g. Scoliosis/Kyphosis]). Spondylolysis when routine x-rays are negative and/or MRI is equivocal, indeterminate or non-diagnostic (see SP-8: Lumbar Spine Spondylolysis/Spondylolisthesis).

SP-2.4: CT/Myelography

See Procedure Codes Associated with Spine Imaging

CT/Myelography is generally unnecessary as an initial study when a diagnostic quality MRI has been obtained.

CT/Myelography indications include:

- To clarify equivocal, indeterminate or non-diagnostic MRI findings or to further evaluate the significance of multiple spinal abnormalities.
- When an MRI is contraindicated (see SP-2.2: MRI of the Spine).
Preoperative planning for spine surgery, (e.g., multilevel spinal stenosis or when a previous MRI is insufficient, equivocal, indeterminate or non-diagnostic). See **SP-16.1: Prior to Spine Surgery**

- Evaluation after previous spinal surgery when an MRI without and with contrast is contraindicated or MRI results are equivocal, indeterminate or non-diagnostic.
- To evaluate calcified lesions, (e.g., osteophytes, ossification of the posterior longitudinal ligament [OPLL]).
- eviCore authorizes only the post-myelogram CT (i.e., CPT® 72126, CPT® 72129, and CPT® 72132) and not any other myelogram-related procedure codes (i.e., CPT® 72265 or CPT® 62284).
  - Providers may be required to obtain prior authorization for myelogram-related procedure codes and requirements may vary by health plan payer.
  - Providers are urged to obtain written instructions and prior authorization requirements directly from each health plan payer for myelogram-related procedure codes.

**SP-2.5: Lumbar Provocative Discography CT**

- eviCore authorizes only the post-lumbar discography CT procedure codes and not any other discography-related procedure codes. A post-lumbar discography CT is considered medically necessary following an approved discography and ALL of the following apply:
  - A post-discography CT is coded as without contrast.
  - A CT lumbar spine without contrast (CPT® 72131) is appropriate if verified to be performed as a post-discography CT.
  - When a post-discography CT is requested and the discography has already been approved eviCore will issue authorization for the post-discography CT procedure codes.

**Practice Notes**

- Provocative Discography/CT is a controversial procedure purported to diagnose (or rule-out) a discogenic “pain generator.” i.e., the source of non-specific axial spinal pain. This diagnostic study, when reported as positive, is often used as an indication for spinal fusion in patients with non-specific axial back pain.

- The following uses of discography are considered controversial:
  - To identify a symptomatic pseudoarthrosis in a failed spinal fusion.
  - To identify which of two herniated discs seen on MRI is symptomatic when not determined clinically or otherwise.
  - To confirm the discogenic nature of pain in a patient with an abnormal disc seen on MRI and to rule out pain from an adjacent disc level.
  - To confirm the presumptive diagnosis of “internal disc disruption”.
  - Discography of the cervical and/or thoracic spine.
SP-2.6: Ultrasound of the Spinal Canal

- Spinal canal ultrasound (CPT® 76800) describes the evaluation of the spinal cord (canal and contents) most often performed in newborns, infants, young children and intraoperatively.
- CPT® 76800 describes evaluation of the entire spine and should not be reported multiple times for imaging of different areas of the spinal canal.
- CPT® 76998, rather than CPT® 76800, should be used to report intraoperative spinal canal ultrasound (ultrasonic guidance). Intraoperative use of spinal ultrasound (CPT® 76998) would not require prior authorization by eviCore.

Indications for spinal canal ultrasound (CPT® 76800):

- This study is generally limited to infants, newborns and young children because of incomplete ossification of the vertebral segments surrounding the spinal cord, including the assessment of CSF in the spinal canal and for image-guided lumbar puncture.
- When ossification of the vertebral segments is incomplete for evaluation of suspected or known tethered cord (see PEDSP-5: Tethered Cord).
- Evaluation of suspected occult and non-occult spinal dysraphism (see PEDSP-4: Spinal Dysraphism).
- Evaluation of spinal cord tumors, vascular malformations and cases of birth-related trauma.
- Contraindicated for use in the adult spine for the assessment of spinal pain, radiculopathy, facet inflammation, nerve root inflammation, disc herniation, and soft tissue conditions surrounding the adult spine other than for superficial masses.

SP-2.7: Limitations of Spinal Imaging in Degenerative Disorders

- Non-specific axial spinal pain is ubiquitous. Advanced diagnostic imaging infrequently identifies the source of the spinal pain (pain generator).
- Incidental findings on MRI and CT, including bulging, protruding, extruding or herniated discs, are often non-concordant, asymptomatic and increase in incidence as the spine ages.
- In individuals with poorly defined clinical presentations, “abnormal” spinal advanced diagnostic imaging results are infrequently clinically concordant, significant, material or substantive and may even lead to inappropriate treatment.
- Performing advanced spinal imaging based only on the presence of spinal degenerative findings identified on x-rays is not generally indicated in patients who are either asymptomatic or present with non-specific axial spinal pain.
SP-2.8: Miscellaneous Spinal Lesions

**Vertebral body hemangiomas:**
- Vertebral body hemangiomas are common and are generally benign and incidental findings on plain x-rays and advanced diagnostic imaging studies.
- If the appearance of a vertebral body hemangioma is typical on plain x-ray, further spinal advanced diagnostic imaging is not usually required, unless there are associated neurologic symptoms or signs on physical examination.
- If the appearance of a vertebral body hemangioma is atypical on plain x-ray, (with or without neurological signs or symptoms on physical exam, MRI without contrast or MRI without and with contrast is indicated.
- Occasionally, MRI may be equivocal, indeterminate or non-diagnostic and CT without contrast of the spinal area is indicated to help clarify the diagnosis.
- No follow-up imaging is necessary once the diagnosis of a vertebral body hemangioma is established without neurological features.

**Tarlov cysts:**
- Tarlov cysts are most often cystic dilatations of nerve root sleeves in the lumbar spine and sacrum.
- Controversy exists as to whether Tarlov cysts can result in neurologic signs and symptoms but they can result in erosion of the adjacent bone.
- Usually Tarlov cysts are benign, incidental findings on advanced diagnostic imaging studies. Further evaluation of a known or suspected Tarlov cyst can be performed with a MRI without and with contrast study (CPT® 72158) or with Lumbar CT/Myelography (CPT® 72132).

**Other spinal lesions:**
- MRI without and with contrast or a CT without contrast is appropriate if:
  - Other spinal lesions are seen on routine x-rays or a non-contrast MRI; and
  - These additional advanced imaging studies are recommended by a spine specialist or radiologist to further characterize or diagnose the lesion; or
  - Required for surgical planning.

SP-2.9: MRA Spinal Canal
- All requests for spinal MRA will be forwarded for Medical Director Review.
- Spine MRA imaging is utilized infrequently.
- Cerebrospinal Fluid (CSF) flow studies using MRI are included in CPT® codes 70551, 70552, and 70553 and should not be coded or reported separately.
Indications may include:

- Suspected spinal cord arteriovenous malformation (AVM) or arteriovenous fistula (AVF):
  - Spine MRI of the relevant spine region without and with contrast should be the initial imaging study.
  - If suspicion for a spinal AVM or AVF is high based upon the results of the spine MRI, catheter angiography is recommended (CPT®72159 or CPT®70496).

- Subarachnoid hemorrhage where no brain aneurysm has been previously identified
  - Catheter angiography (CPT®70496) should be performed and is the most definitive study to define possible spinal pathology resulting in a spinal canal subarachnoid hemorrhage.
  - See HD-1.5: CT and MR Angiography (CTA and MRA)
  - See HD 12.1: Intracranial Aneurysms

- Preoperative planning
  - Spinal canal MRA may be useful in identifying major intercostal feeder vessels to the spinal cord prior to surgical procedures that might interfere with this blood supply to the spinal cord. However, catheter angiography (CPT® 72159) is generally a more definitive study for this purpose.

SP-2.10: Spine PET

- At the present time there is controversy regarding spine PET due to inadequate scientific evidence to support the medical necessity of PET for the routine assessment of spinal disorders, other than for neoplastic disease.

  - See ONC-31.5: Bone (including Vertebral) Metastases
  - Spine PET should be considered experimental or investigational and will be forwarded to Medical Director Review.

SP-2.11: Cone-beam CT

- Cone-beam CT for imaging of the cervical spine should be considered experimental or investigational and will be forwarded to Medical Director Review.

References

<table>
<thead>
<tr>
<th>SP-3: Neck (Cervical Spine) Pain Without/With Neurological Features (Including Stenosis) and Trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SP-3.1:</strong> Neck (Cervical Spine) Pain without and with Neurological Features (Including Stenosis)</td>
</tr>
<tr>
<td><strong>SP-3.2:</strong> Neck (Cervical Spine) Trauma</td>
</tr>
</tbody>
</table>
### SP-3.1: Neck (Cervical Spine) Pain without and with Neurological Features (Including Stenosis)

**All** of the following are required prior to advanced imaging:

- Initial clinical evaluation performed.
- A face-to-face evaluation within the last 60 days.
- The initial evaluation is not required within the last 60 days if another face-to-face evaluation was performed in that time frame. This may be satisfied by the initial evaluation, re-evaluation or another visit.

Failure of recent (within 3 months) 6-week trial of provider-directed treatment.

Clinical re-evaluation after treatment period (may consist of a face-to-face evaluation or other meaningful contact, see **SP-1.1: General Considerations**)

<table>
<thead>
<tr>
<th>Advanced Diagnostic Imaging</th>
<th>MRI Cervical Spine, without contrast (CPT®72141).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comments:</strong></td>
<td>CT Cervical Spine without contrast (CPT® 72125) or CT Myelography (CPT® 72126) is appropriate when MRI is contraindicated.</td>
</tr>
<tr>
<td></td>
<td>For surgery criteria, see the following:</td>
</tr>
<tr>
<td></td>
<td>- <strong>CMM-601: Anterior Cervical Discectomy and Fusion</strong></td>
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<tr>
<td></td>
<td>- <strong>CMM-602: Cervical Total Disc Arthroplasty</strong></td>
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<tr>
<td></td>
<td>- <strong>CMM-604: Initial Posterior Cervical Decompression with or without Fusion</strong></td>
</tr>
<tr>
<td></td>
<td>- <strong>CMM-605: Cervical Microdiscectomy</strong></td>
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SP-3.2: Neck (Cervical Spine) Trauma

All of the following are required prior to advanced imaging:
- Initial clinical evaluation performed.
- A face-to-face evaluation within the last 60 days.
- The initial evaluation is not required within the last 60 days if another face-to-face evaluation was performed in that time frame. This may be satisfied by the initial evaluation, re-evaluation or another visit.

Failure of recent (within 3 months) 6-week trial of provider-directed treatment.

Clinical re-evaluation after treatment period (may consist of a face-to-face evaluation or other meaningful contact, see SP-1.1: General Considerations)

Plain x-rays of cervical spine negative for fracture

Advanced Diagnostic Imaging:
- MRI Cervical Spine without contrast (CPT® 72141) or CT Cervical Spine without contrast (CPT® 72125).
  For patients with ankylosing spondylitis, both MRI Cervical Spine without contrast (CPT® 72141) and CT Cervical Spine without contrast (CPT® 72125) can be approved.

Comments:
- Plain x-rays and a 6 week trial of provider-directed treatment and clinical re-evaluation are not required for patients with a high risk mechanism of cervical spine injury within the last 3 months (See below**).

**High risk mechanisms of cervical spine injury may include:
- Head trauma and/or maxillofacial trauma
- Pedestrian in a motor vehicle accident
- Fall from elevation ≥ 3 feet/5 stairs
- Diving accident
- Head-on motor vehicle collision without/with airbag deployment
- Rollover motor vehicle collision
- Ejection from the vehicle in a motor vehicle collision
- High speed of the vehicle at the time of collision
- Not wearing a seatbelt/shoulder harness in a motor vehicle collision
- Patients with ankylosing spondylitis are at high risk of cervical spine fractures even with minor direct/indirect trauma to the cervical spine which can result in quadriplegia

Red Flag Indications: See SP-1.2: Red Flag Indications
Practice Notes

- Pain radiation patterns from the cervical spine area into the thoracic spine area do not necessarily justify the addition of thoracic spine advanced diagnostic imaging.

- Cervical radiculopathy is often confused with shoulder disorders, brachial plexopathy, peripheral nerve entrapment and/or motor/sensory neuropathies. Electrodagnostic testing (EMGs/NCVs) is generally used to confirm, not establish, a diagnosis of peripheral nerve entrapment and/or a motor/sensory neuropathy based upon history and physical examination findings. Electrodagnostic testing is often considered when advanced imaging of the spine does not reveal neurocompressive pathology and/or after 6 weeks of unimproved symptoms of extremity pain, weakness, numbness and/or tingling.

References

SP-4: Upper Back (Thoracic Spine) Pain Without/With Neurological Features (Including Stenosis) and Trauma

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| SP 4.2: Upper Back (Thoracic Spine) Trauma | 26 |
SP 4.1: Upper Back (Thoracic Spine) Pain without and with Neurological Features (Including Stenosis)

All of the following are required prior to advanced imaging:

- Initial clinical evaluation performed.
- A face-to-face evaluation within the last 60 days.
- The initial evaluation is not required within the last 60 days if another face-to-face evaluation was performed in that time frame. This may be satisfied by the initial evaluation, re-evaluation or another visit.

Failure of recent (within 3 months) 6-week trial of provider-directed treatment.

Clinical re-evaluation after treatment period (may consist of a face-to-face evaluation or other meaningful contact, see SP-1.1: General Considerations).

Advanced Diagnostic Imaging: MRI Thoracic Spine without contrast (CPT® 72146).

Comments: A CT Thoracic spine without contrast (CPT® 72128) or CT Myelography (CPT® 72129) is appropriate when MRI is contraindicated.

SP 4.2: Upper Back (Thoracic Spine) Trauma

All of the following are required prior to advanced imaging:

- Initial clinical evaluation performed.
- A face-to-face evaluation within the last 60 days.
- The initial evaluation is not required within the last 60 days if another face-to-face evaluation was performed in that time frame. This may be satisfied by the initial evaluation, re-evaluation or another visit.

Failure of recent (within 3 months) 6-week trial of provider-directed treatment.

Clinical re-evaluation after treatment period (may consist of a face-to-face evaluation or other meaningful contact, see SP-1.1: General Considerations).

Plain x-rays of thoracic spine negative for fracture.

Advanced Diagnostic Imaging: MRI Thoracic Spine without contrast (CPT® 72146) or CT Thoracic Spine without contrast (CPT® 72128).

Red Flag Indications: See SP-1.2: Red Flag Indications

Practice Notes:

- Thoracic radiculopathy presents with pain radiation from the thoracic spine around the trunk. At upper thoracic spine levels, the pain radiation is from the thoracic spine around the rib cage following the sensory distribution of an intercostal nerve.
- Advanced diagnostic imaging is generally not appropriate in evaluation of axial low back pain with radiation toward the thoracic region unless there are documented clinical features indicating a thoracic spine disorder.
References
### SP-5: Low Back (Lumbar Spine) Pain/Coccydynia without Neurological Features

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SP 5.1: Low Back (Lumbar Spine) Pain without Neurological Features

All of the following are required prior to advanced imaging:

- Initial clinical evaluation performed.
- A face-to-face evaluation within the last 60 days.
- The initial evaluation is not required within the last 60 days if another face-to-face evaluation was performed in that time frame. This may be satisfied by the initial evaluation, re-evaluation or another visit.

Failure of recent (within 3 months) 6-week trial of provider-directed treatment.

Clinical re-evaluation after treatment period (may consist of a face-to-face evaluation or other meaningful contact, see SP-1.1: General Considerations).

Advanced Diagnostic Imaging:

| MRI Lumbar Spine without contrast (CPT®72148) |

Comments:

A CT lumbar spine without contrast (CPT®72131) or CT Myelography (CPT®72132) is appropriate when MRI is contraindicated.

For surgery criteria, see CMM-610: Lumbar Total Disc Arthroplasty.

SP 5.2: Coccydynia without Neurological Features

All of the following are required prior to advanced imaging:

- Initial clinical evaluation performed.
- A face-to-face evaluation within the last 60 days.
- The initial evaluation is not required within the last 60 days if another face-to-face evaluation was performed in that time frame. This may be satisfied by the initial evaluation, re-evaluation or another visit.

Failure of recent (within 3 months) 6-week trial of provider-directed treatment.

Clinical re-evaluation after treatment period (may consist of a face-to-face evaluation or other meaningful contact, see SP-1.1: General Considerations).

Plain x-rays of the sacrum/coccyx are negative for fracture

Advanced Diagnostic Imaging:

| MRI pelvis without contrast (CPT®72195) |

Comments:

A CT pelvis without contrast (CPT®72192) when MRI is contraindicated.

Red Flag Indications: See SP-1.2: Red Flag Indications

Practice Notes:

Coccydynia is often reported by patients as “tailbone” pain that is usually idiopathic or post-traumatic and generally follows a benign course.
References


## SP-6: Lower Extremity Pain with Neurological Features (Radiculopathy, Radiculitis, or Plexopathy and Neuropathy) With or Without Low Back (Lumbar Spine) Pain

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SP 6.1: Lower Extremity Pain with Neurological Features (Radiculopathy, Radiculitis, or Plexopathy and Neuropathy) with or without Low Back (Lumbar Spine) Pain

All of the following are required prior to advanced imaging:

- Initial clinical evaluation performed.
- A face-to-face evaluation within the last 60 days.
- The initial evaluation is not required within the last 60 days if another face-to-face evaluation was performed in that time frame. This may be satisfied by the initial evaluation, re-evaluation or another visit.

Failure of recent (within 3 months) 6-week trial of provider-directed treatment.

Clinical re-evaluation after treatment period (may consist of a face-to-face evaluation or other meaningful contact, see SP-1.1: General Considerations.

See SP-9.1: Lumbar Spinal Stenosis

Advanced Diagnostic Imaging: MRI Lumbar Spine without contrast (CPT®72148)

Comments: A CT lumbar spine without contrast (CPT®72131) or CT Myelography (CPT®72132) is appropriate when MRI is contraindicated.

For surgery criteria, see the following:
- CMM-606: Lumbar Microdiscectomy
- CMM-608: Lumbar Decompression
- CMM-609: Lumbar Fusion (Arthrodesis)

SP 6.2: Low Back (Lumbar Spine) Trauma

All of the following are required prior to advanced imaging:

- Initial clinical evaluation performed.
- A face-to-face evaluation within the last 60 days.
- The initial evaluation is not required within the last 60 days if another face-to-face evaluation was performed in that time frame. This may be satisfied by the initial evaluation, re-evaluation or another visit.

Failure of recent (within 3 months) 6-week trial of provider-directed treatment.

Clinical re-evaluation after treatment period (may consist of a face-to-face evaluation or other meaningful contact, see SP-1.1: General Considerations.

Plain x-rays of lumbar spine negative for fracture.

Advanced Diagnostic Imaging: MRI Lumbar Spine without contrast (CPT®72148) or CT Lumbar Spine without contrast (CPT®72131).

- Red Flag Indications: See SP-1.2: Red Flag Indications
- Definitions of radiculopathy, radiculitis and radicular pain: See SP-1.3: Definitions
- Sciatic Neuropathy, Femoral Neuropathy, Peroneal Neuropathy and Meralgia Paresthetica: See PN-2: Focal Neuropathy
Lumbar and/or Lumbosacral Plexopathy: See PN-5: Lumbar and Lumbosacral Plexus

Advanced imaging of the hip or pelvis is not generally required in the evaluation of apparent lumbar radiculopathy unless a separate recognized indication for such studies is documented. See MS-24: Hip in the Musculoskeletal Imaging Guidelines.

References


SP-7: Myelopathy

SP-7.1: Myelopathy
SP-7.1: Myelopathy

Myelopathy is the development of abnormal spinal cord function with long tract signs usually secondary to spinal cord compression, but also inflammation (transverse myelitis, MS, etc.), neoplastic disease or spinal cord infarction.

Examination findings may include loss of manual dexterity, spastic legs and ataxia with hyperreflexia and upgoing toes (positive Babinski), Hoffmann’s sign, sustained clonus, Lhermitte’s sign, crossed radial reflex, inverted radial reflex and finger escape sign. Sensory level and urinary incontinence/retention may be seen. Advanced imaging is generally appropriate in the initial evaluation of documented or reasonably suspected myelopathy.

Cervical, thoracic, and lumbar spine MRI without contrast, or without and with contrast, are appropriate for:
- Initial evaluation of reasonably suspected myelopathy.
- Suspected tethered cord.
- Post-traumatic syrinx with increased spinal pain or a worsening neurological symptoms.
- Sustained, prominent, and unexplained Lhermitte’s sign.
- Unexplained Babinski’s sign.
- Hoffmann’s sign.

Conservative treatment is not a requirement for advanced imaging in patients with potential myelopathy.

CT/Myelography scan can also be considered, especially for surgical planning.

For surgery criteria, see the following:
- CMM-601: Anterior Cervical Discectomy and Fusion
- CMM-602: Cervical Total Disc Arthroplasty
- CMM-604: Posterior Cervical Decompression with or without Fusion
- CMM-605: Cervical Microdiscectomy

Practice Notes

Lhermitte’s sign – With the patient in the long leg sitting position on the examination table, the examiner passively flexes the patient’s head and one hip simultaneously with the leg kept straight. A positive test occurs if there is sharp pain down the spine and into the upper or lower extremities.

Babinski’s sign – The examiner runs a sharp instrument along the plantar surface of the foot from the calcaneus along the lateral border to the forefoot. A positive test occurs with extension of the great toe with flexion and splaying of the other toes. A negative test occurs with no movement of the toes at all or uniform bunching up of the toes.
**Hoffman’s sign** – The examiner holds the patient’s middle finger and briskly flicks the distal phalanx. A positive test is noted if the interphalangeal joint of the thumb of the same hand flexes.

**References**

### SP-8: Lumbar Spine

**Spondylolysis/Spondylolisthesis**

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SP-8.1: Spondylolysis

- Spondylolysis is most often an incidental finding on plain x-rays, and advanced imaging is generally not indicated.
- If plain x-rays are negative, equivocal or indeterminate and clinical suspicion is high:
  - 99mTc-MDP SPECT bone scan (CPT® 78320) is indicated to identify stress reaction in early spondylolysis cases which are radiographically occult.
  - Lumbar spine MRI without contrast (CPT® 72148) is appropriate if SPECT bone scan is negative, to evaluate for stress reaction in bone, to visualize nerve roots, if there is a documented need for preoperative planning, or if there is treatment failure following 6 weeks immobilization with a spinal orthosis and provider-directed treatment with clinical re-evaluation.
    - Note that MRI is not appropriate in the early diagnosis of spondylolysis due to the potential for false negative results.
- Lumbar spine CT without contrast (CPT® 72131) if MRI is contraindicated, if SPECT bone scan is negative, to evaluate bony anatomy, to state a lesion seen on SPECT bone scan, if there is a documented need for preoperative planning, or if there is treatment failure following 6 weeks immobilization with a spinal orthosis and provider-directed treatment with clinical re-evaluation. See SP-1.2: Red Flag Indications.
- For pediatric spondylolysis, See PEDSP-2.4: Spondylolysis
- Bony healing cannot be achieved non-surgically in an established well defined isthmic pars interarticularis defect whether it is developmental or the result of a pars interarticularis fracture non-union. Repeat advanced diagnostic imaging is not medically necessary in this setting.
  - Repeat lumbar spine CT without contrast (CPT® 72131) of the symptomatic spinal level is indicated to monitor healing of a pars interarticularis fracture that was determined to have healing potential on a prior CT (i.e., non-sclerotic lesion).
- For surgery criteria, see the following:
  - CMM-603: Electrical and Low Frequency Ultrasound Bone Growth Stimulation (Spine)
  - CMM-609: Lumbar Fusion (Arthrodesis)

SP-8.2: Spondylolisthesis

- CT lumbar spine without contrast (CPT® 72131) or MRI lumbar spine without contrast (CPT® 72148) can be considered after plain x-ray for the following:
  - Failure of 6 week trial of provider-directed treatment and clinical re-evaluation (see SP-1.1: General Considerations); or
  - Preoperative evaluation; or
  - See SP-1.2: Red Flag Indications
- For surgery criteria, see the following:
  - CMM-608: Lumbar Decompression
CMM-609: Lumbar Fusion (Arthrodesis)

Practice Notes

- Stress reactions and stress fractures of the pars interarticularis are most common in athletes and others whose activities involve repetitive flexion/extension loading of the lumbar spine and may be acute or chronic and unilateral or bilateral. Pars interarticularis defects can be an incidental finding on plain x-rays and is frequently asymptomatic.

- Spondylolisthesis is the forward (anterolisthesis) or backward (retrolisthesis, usually not clinically significant) displacement of one vertebra in relation to an adjacent vertebra, most commonly at L4-5 and L5-S1, although other levels of the spine may be involved. Spondylolisthesis is often an incidental finding on plain x-ray and is frequently asymptomatic.

References

SP-9.1: Lumbar Spinal Stenosis

MRI lumbar spine without contrast (CPT® 72148) or CT Lumbar Spine without contrast (CPT® 72131) is appropriate for those patients with clinical suspicion of lumbar spinal stenosis if:

- Failure of 6 week trial of provider-directed treatment and clinical re-evaluation (see SP-1.1: General Considerations; or
- Red Flag Indications (see: SP-1.2: Red Flag Indications; or
- Severe symptoms of neurogenic claudication restricting normal activity or requiring the frequent use of narcotic analgesics.

A CT/Myelogram lumbar spine (CPT®72132) may also be considered for patients who have failed 6-weeks of provider-directed treatment if requested by the operating surgeon for surgical planning, especially for multi-level lumbar spinal stenosis.

For surgery criteria, see the following:

- CMM-608: Lumbar Decompression
- CMM-609: Lumbar Fusion (Arthrodesis)

Practice Notes
Lumbar spinal stenosis refers to a decrease in the space available for the neural elements within the spinal canal that include spinal nerve roots and the cauda equina. It is usually a degenerative condition of the aging spine which can be asymptomatic or a common cause of buttock/low back and/or leg pain (neurogenic claudication) in this population. Neurogenic claudication is a common symptom of lumbar spinal stenosis that is aggravated by walking, especially down hills or stairs, with prolonged standing and is often relieved by sitting and bending forward. Neurogenic claudication should be differentiated from vascular claudication (leg/calf pain) that is often aggravated by walking and relieved fairly rapidly by stopping and rest. The differential diagnosis for lumbar spinal stenosis should include peripheral vascular disease, hip disorders and peripheral neuropathy.

References
SP-10: Sacro-Iliac (SI) Joint Pain, Inflammatory Spondylitis/Sacroiliitis and Fibromyalgia

SP-10.1: Sacro-Iliac (SI) Joint Pain/Sacroiliitis 45
SP-10.2: Inflammatory Spondylitis 45
SP-10.3: Fibromyalgia 45
**SP-10.1: Sacro-Iliac (SI) Joint Pain/Sacroiliitis**

- Pelvis CT without contrast (CPT® 72192) or MRI pelvis without contrast (CPT® 72195) is appropriate if:
  - Initial plain x-rays are equivocal or not diagnostic; and
  - Failure of 6 weeks of provider-directed treatment and clinical re-evaluation (See: SP-1.1: General Considerations); or
  - Any one of the following:
    - Fractures of the sacrum or sacroiliac joint(s); or
    - See: SP-1.2: Red Flag Indications; or
    - Preoperative planning
  - MRI pelvis without and with contrast as indicated for pediatric patients with juvenile idiopathic arthritis.
  - Suspicion of neoplastic, inflammatory, or infectious disease:
    - MRI pelvis without and with contrast (CPT® 72197) or MRI pelvis without contrast (CPT® 72195)
    - Pelvis CT without contrast (CPT® 72192) if MRI is contraindicated

- See also: MS-15.1: Rheumatoid Arthritis and Inflammatory Arthritis

**SP-10.2: Inflammatory Spondylitis**

- Initial plain x-rays are equivocal or not diagnostic.
  - MRI without and with contrast or MRI without contrast of the affected spinal region.
    - CT without contrast of the affected spinal region if MRI is contraindicated
  - MRI Cervical Spine without contrast (CPT® 72141) and CT Cervical Spine without contrast (CPT® 72125) if a patient with documented ankylosing spondylitis reports neck pain following any head/maxillofacial/neck injury.

**SP-10.3: Fibromyalgia**

- Advanced diagnostic imaging is not supported by the scientific evidence for the evaluation and treatment of fibromyalgia.

**Practice Notes**

- Sacroiliitis can present with pain localized to the SI joint or referred pain to the buttock and/or posterior thigh without neurologic signs or symptoms. Affected individuals can often point to the SI joint as the pain source. Provocative and/or therapeutic SI joint anesthetic/corticosteroid injections can have diagnostic value.

- There is no evidence demonstrating that advanced diagnostic imaging substantiates changes to patient management decisions in patients with proven SI joint disorders when visible on routine plain x-rays.
MRI has shown inflammatory changes in the SI joints prior to visible x-ray changes in several studies. However, the ability of MRI to characterize inflammation in early ankylosing spondylitis, the ability of MRI to predict erosive changes, and the value of monitoring treatment effects using serial MRI studies remains controversial and investigational in adults.

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SP-11.1: Pathological Spinal Compression Fractures

MRI without contrast or CT without contrast of the affected spinal region can be considered after plain x-ray evaluation and the location of the patient’s spinal pain is concordant with the spinal x-rays for any one of the following:

- X-rays reveal a new spinal compression fracture; or
- X-rays are non-diagnostic and severe spinal pain persists for more than one week in a patient already predisposed to low energy/insufficiency fractures; or
- The acuity of the spinal compression fracture deformity on plain x-ray is indeterminate, or
- Surgical planning following known insufficiency spinal compression fractures in individuals who are candidates for kyphoplasty, vertebroplasty or other spine surgical procedures; or
- See SP-1.2: Red Flag Indications

For surgery criteria, see CMM-607: Primary Vertebral Augmentation

Practice Notes
Insufficiency/low energy spinal compression fractures of the spine occur due to the lack of structural integrity to withstand physiologic loads and minor spinal trauma. Low bone mineral density is the primary etiology for most of these fractures but could also occur in the setting of other bone disease and medical conditions, in addition to neoplastic disease and infection. Sudden localized back pain, with or without trauma, is a typical presentation of insufficiency/low energy spinal compression fractures and can often be an incidental finding on plain x-rays and can be asymptomatic.

References
SP-12: Spinal Pain in Cancer Patients

- For guidelines regarding advanced diagnostic imaging in this clinical setting, See **ONC-31.6: Spinal Cord Compression**.

- For metastatic disease of the spine without neurological signs or symptoms:
  - See: **ONC-31.5: Bone including Vertebral Metastases** for advanced diagnostic imaging guidelines in patients with spinal pain with a history of primary or metastatic neoplastic disease, especially cancer of the breast, lung, thyroid, kidney and prostate.
SP-13: Spinal Canal/Cord Disorders (e.g. Syringomyelia)

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SP-13.1: Initial Imaging Pathway

MRI cervical spine without and with contrast (CPT® 72156) is appropriate when syringomyelia is suspected.

Once a syrinx is identified by the initial MRI cervical spine without and with contrast:
- MRI of the brain, usually without contrast (CPT® 70551) to evaluate for syringobulbia; and
- MRI of the thoracic spine without and with contrast (CPT® 72157) to define the lower most extent of the syrinx or to identify a skip lesion.
- Advanced diagnostic imaging of the lumbar spine is generally not indicated unless tethered cord is suspected.

SP-13.2: Follow-up imaging

MRI cervical spine without contrast (CPT® 72141) and MRI brain without contrast (CPT® 70551) and/or MRI thoracic spine without contrast (CPT® 72146) when involved.
- If there is a concern for malignancy, imaging can be performed without and with contrast.
- Annual imaging until non-progression of the syringomyelia is established.
- Following surgical treatment (including posterior fossa decompression).
- Advanced diagnostic imaging every three years for life can be performed once non-progression of the syringomyelia is established.
- Repeat advanced diagnostic imaging is appropriate when there is evidence of neurologic deterioration.
- Repeat advanced diagnostic imaging in spinal cord injury patients with post-traumatic syrinx is not appropriate without evidence of neurological deterioration.

Practice Notes
Syringomyelia may begin to form in childhood but rarely becomes symptomatic before the adult years.

Reference
### SP-14: Spinal Deformities (e.g. Scoliosis/Kyphosis)

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SP-14.1: Spinal Deformities (e.g., Scoliosis/Kyphosis)

MRI without contrast or MRI without and with contrast of the affected spinal regions is appropriate after plain x-rays (e.g., Cobb radiographs) of the affected spinal regions:

- For preoperative evaluation; or
- For cases of congenital scoliosis and other atypical curves that may be associated with spinal canal/cord pathology such as tethered cord, syringomyelia, diastematomyelia, or tumors; or
- For cases of scoliosis when there are associated neurologic signs and symptoms on physical examination; or
- Scoliosis with a convex left thoracic curve due to a high association of a convex left thoracic curve with underlying spinal canal/cord pathology.

CT of the affected spinal regions (contrast as requested) is appropriate in cases with a complex osseous deformity for preoperative evaluation.

CTA or MRA is not medically necessary for preoperative planning for initial anterior spinal surgery for surgical correction of spinal deformities.

SP 14.2: Revision Spinal Deformity Surgery

If requested by the operating surgeon, the following studies can be performed for preoperative planning for revision anterior spinal surgery:

- CTA pelvis (CPT® 72191) and/or CTA abdomen (CPT® 74175); or
- MRA pelvis (CPT® 72198) and/or MRA abdomen (CPT® 74185)

Practice Notes

Scoliosis is defined as a curvature of the spine in the coronal plane. Scoliosis can involve any or all levels of the spine but generally involves the thoracic and/or lumbar spine. Scoliosis initially occurs in the pediatric and adolescent population and persists throughout life. If scoliosis begins in adulthood, it is usually secondary to neurologic disorders (e.g., posttraumatic paralysis) or degenerative spondylosis. Sagittal plane spinal deformity (e.g., kyphosis, hyperlordosis) may be associated with scoliosis.

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Following plain x-rays of the affected spinal regions post-surgical, See SP-2.1: Anatomic Guidelines.

**SP-15.1: Greater than Six Months Post-Operative**

- MRI without and with contrast, MRI without contrast, or CT without contrast post-fusion of the affected spinal region(s) is appropriate when:
  - Patient is more than six months post-operative; **and**
  - No significant improvement after a recent (within 3 months) six week trial of provider-directed treatment with clinical re-evaluation; **or**
  - See SP-1.2: Red Flag Indications

**SP-15.2: Routine Post-Fusion Imaging**

- Requests will be forwarded to Medical Director Review. Following a clinically successful spinal fusion, advanced diagnostic imaging is generally not indicated.

- PET is not currently indicated for the routine assessment of spinal fusions or unsuccessful spine surgery (see: SP-2.10: Spine PET). Requests for PET will be forwarded to Medical Director Review.

**SP-15.3: Prolonged Intractable Pain Following Spinal Surgery Within Six Months**

**Open discectomy and laminectomy:**

- MRI without and with contrast of the affected spinal region(s) if there are residual, new, recurrent, or worsening symptoms related to the surgical site.
  - CT/Myelography of the affected spinal region(s) if MRI is contraindicated.

**Spinal fusions with or without Open Discectomy and/or Laminectomy:**

- These can be challenging problems that may require more than one advanced imaging study. Requests will be forwarded to Medical Director Review.

- For surgery criteria, see the following:
  - CMM-601: Anterior Cervical Discectomy and Fusion
  - CMM-604: Posterior Cervical Decompression with or without Fusion
  - CMM-605: Cervical Microdiscectomy
  - CMM-606: Lumbar Microdiscectomy
  - CMM-608: Lumbar Decompression
  - CMM-609: Lumbar Fusion (Arthrodesis)
SP-15.4: Revision Fusion Surgery

- If requested by the operating surgeon, the following studies can be performed for preoperative planning prior to surgical revision of a lumbar anterior spinal arthrodesis.
  - CTA pelvis (CPT®72191) and/or CTA abdomen (CPT®74175); or
  - MRA pelvis (CPT®72198) and/or MRA abdomen (CPT®74185)

- For surgery criteria, see the following:
  - CMM-601: Anterior Cervical Discectomy and Fusion
  - CMM-604: Posterior Cervical Decompression with or without Fusion
  - CMM-609: Lumbar Fusion (Arthrodesis)

References

SP-16: Other Imaging Studies and Procedures Related to the Spine Imaging Guidelines

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SP-16.1: Prior to Spine Surgery

- MRI/CT should be performed within the past six (6) months for preoperative planning prior to spine surgery when the criteria for advanced imaging studies of the spine are met as otherwise stated in the Spine Imaging Guidelines. (See: SP-2.2: MRI of the Spine, SP-2.3: CT of the Spine, SP-2.4: CT/Myelography)

- MRA and CTA are generally not indicated for preoperative planning of initial anterior spinal surgery unless abnormal vasculature is known or reasonably anticipated. Requests will be forwarded to Medical Director Review.

- For surgery criteria, see the following:
  - CMM-601: Anterior Cervical Discectomy and Fusion
  - CMM-604: Posterior Cervical Decompression with or without Fusion
  - CMM-605: Cervical Microdiscectomy
  - CMM-606: Lumbar Microdiscectomy
  - CMM-608: Lumbar Decompression
  - CMM-609: Lumbar Fusion (Arthrodesis)

SP-16.2: Prior to Interventional Spinal Injections

- Advanced diagnostic imaging studies of the spine are not required prior to facet joint injections, medial branch blocks or radiofrequency ablations unless the criteria for advanced imaging studies of the spine are met as otherwise stated in the Spine Imaging Guidelines.

- Advanced diagnostic imaging studies of the cervical spine and/or thoracic spine are indicated within 12 months prior to interlaminar or transforaminal epidural steroid injections of the cervical and/or thoracic spine when the criteria for advanced imaging studies of the spine are met as otherwise stated in the Spine Imaging Guidelines.

- Advanced diagnostic imaging studies of the lumbar spine are indicated prior to transforaminal epidural steroid injections of the lumbar spine when the criteria for advanced imaging studies of the spine are met as otherwise stated in the Spine Imaging Guidelines.

- Advanced diagnostic imaging studies of the lumbar spine are not required prior to lumbar spine interlaminar or caudal epidural steroid injections unless the criteria for advanced imaging studies of the spine are met as otherwise stated in the Spine Imaging Guidelines.

- For an individual with evidence of symptomatic spinal stenosis, MRI or CT with or without myelography demonstrating severe spinal stenosis at the level to be treated within the past twelve (12) months is required for an initial trial of a transforaminal, interlaminar or caudal epidural steroid injection when ALL of the following criteria are met:
  - Diagnostic evaluation has ruled out other potential causes of pain
- Significant functional limitations resulting in diminished quality of life and impaired age-appropriate activities of daily living (ADLs)
- Failure of at least four (4) weeks of conservative treatment (e.g., exercise, physical methods including physical therapy and/or chiropractic care, NSAIDS and/or muscle relaxants).

See [SP-1.2: Red Flag Indications](#) for severe radicular pain

For interventional pain criteria, see the following:
- [CMM-200: Epidural Steroid Injection](#)
- [CMM-201: Facet Joint Injections](#)
- [CMM-208: Radiofrequency Joint Ablation/Denervation](#)

**SP-16.3: Prior to Spinal Cord Stimulator (SCS) Placement**

- MRI thoracic spine without contrast (CPT® 72146) is generally the study of choice prior to SCS placement. CT thoracic spine without contrast (CPT® 72128) or CT/Myelography thoracic spine (CPT® 72129) are acceptable alternatives.

- Imaging of the lumbar spine is not indicated for insertion of spinal cord stimulators.

- Requests for advanced diagnostic imaging of the cervical spine prior to SCS placement will be forwarded to Medical Director Review.

- For interventional pain criteria, see the following:
  - [CMM-211: Spinal Cord Stimulators](#)

**SP-16.4: Following Vertebral Augmentation Procedures**

- CT without contrast of the affected spinal region(s) within 24 hours post-procedure to evaluate neurologic sequelae resulting from cement extravasation.

- For surgery criteria, see the following
  - [CMM-607: Primary Vertebral Augmentation](#)

**Practice Note**

MRI has not been shown to change the outcome of interventional pain procedures in recent scientific evidence-based studies and without substantial change in the clinical picture or intervening surgery. Repeat advanced diagnostic imaging studies are not necessary with each spinal injection or series of spinal injections.

**References**


Nuclear Medicine

Nuclear medicine studies are rarely used in the evaluation of the spine, but are indicated in the following circumstances:

- Bone scan (CPT® 78315 or CPT® 78320) is indicated for evaluation of suspected loosening of orthopedic implants when recent plain x-ray is nondiagnostic.
- Bone scan SPECT (CPT® 78320) or SPECT/CT (CPT® 78320) can be used if there is back pain with suspected failed fusion surgery with suspected painful pseudoarthrosis and MRI/CT are nondiagnostic.

Any of the following studies are indicated for initial evaluation of suspected osteomyelitis:

- Bone scan (one of CPT® codes: 78300, 78305, 78306, or 78315)
- Nuclear Bone Marrow imaging (one of CPT® codes: 78102, 78103, or 78104)
- Radiopharmaceutical inflammatory imaging (one of CPT® codes: 78805, 78806, or 78807)

For follow-up imaging, any of the following studies are indicated for evaluation of response to treatment in established osteomyelitis. The appropriate follow-up advanced imaging time frame will depend on the nature of the underlying disease and prior imaging. Follow-up advanced imaging requests will be forwarded for medical director review:

- Bone scan (one of CPT® codes: 78300, 78305, 78306, or 78315)
- Nuclear Bone Marrow imaging (one of CPT® codes: 78102, 78103, or 78104)

Radiopharmaceutical inflammatory imaging (one of CPT® codes: 78805, 78806, or 78807) SPECT bone scan (CPT® 78320) is indicated for evaluation of facet arthropathy in patients with ankylosing spondylitis, osteoarthritis, or rheumatoid arthritis.

SPECT bone scan (CPT® 78320) or SPECT/CT (CPT® 78320) (if requested) is indicated for the evaluation of back pain and suspected spondylolysis.

SPECT has been described to identify spinal pain generators, pseudoarthrosis of spinal fusion or hardware failure when conventional advanced diagnostic imaging studies are inconclusive, non-diagnostic or equivocal. Requests for SPECT for these indications will be reviewed on a case-by-case basis by the Medical Director.

Reference

## Pediatric Abdomen Imaging Guidelines

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<tr>
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<tr>
<td>PET with concurrently acquired CT; limited area (this code rarely used in pediatrics)</td>
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<tr>
<td>PET with concurrently acquired CT; skull base to mid-thigh</td>
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**Ultrasound**

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<td>Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; limited study</td>
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### PEDAB-1: General Guidelines

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PEDAB-1.1: Pediatric Abdominal Imaging Age Considerations

Many conditions affecting the abdomen in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients age < 18 years old should be imaged according to the Pediatric Abdomen Imaging Guidelines, and patients age ≥ 18 years should be imaged according to the Abdomen Imaging Guidelines, except where directed otherwise by a specific guideline section.

PEDAB-1.2: Pediatric Abdomen Imaging Appropriate Clinical Evaluation and Conservative Treatment

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, appropriate laboratory studies, and basic imaging such as plain radiography or ultrasound should be performed prior to considering advanced imaging (CT, MR, Nuclear Medicine), unless the patient is undergoing guideline-supported follow-up imaging evaluation.

- These guidelines are based upon using advanced imaging to answer specific clinical questions that will affect patient management. Imaging is not indicated if the results will not affect patient management decisions. Standard medical practice would dictate continuing conservative therapy prior to advanced imaging in patients who are improving on current treatment programs.

- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the abdomen is not supported. Advanced imaging should only be approved in patients who have documented active clinical signs or symptoms of disease.

- Unless otherwise stated in a specific guideline section, repeat imaging studies of the same body area are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.

PEDAB-1.3: Pediatric Abdomen Imaging Modality General Considerations

- Ultrasound
  - Ultrasound should be the initial imaging study of choice in most children with abdominal conditions and should be done prior to advanced imaging.
  - For those patients who do require advanced imaging after ultrasound, ultrasound can be very beneficial in selecting the proper modality, body area, image sequences, and contrast level that will provide the most definitive information for the patient.
  - CPT® codes vary by body area and presence or absence of Doppler imaging and are included in the table at the beginning of this guideline.
MRI
- MRI of the abdomen is generally performed without and with contrast (CPT® 74183) unless the patient has a documented contraindication to gadolinium or otherwise stated in a specific guideline section.
- Due to the length of time for image acquisition and the need for the patient to lie still, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
  - MRI should be performed without and with contrast unless there is a specific contraindication to gadolinium use and strict criteria for contrast agent use should be applied in all cases when the patient already has intravenous access for anesthesia.
  - Recent evidence-based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast.
  - The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.
  - If requesting clinicians indicate that a non-contrast study is being requested with specific concern for gadolinium retention, the exam can be approved.
  - If multiple body areas are supported by eviCore’s guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same session.
- The presence of surgical hardware or implanted devices may preclude MRI.
- The selection of best examination may require coordination between the provider and the imaging service. CT may be the procedure of choice in these cases.

CT
- CT of the abdomen typically extends from the dome of the diaphragm to the upper margin of the sacroiliac joints, and CT of the abdomen and pelvis extends from the dome of the diaphragm through the ischial tuberosities.
  - In general, CT of the abdomen is appropriate when evaluating solid abdominal organs.
  - In general, CT of the Abdomen and pelvis is appropriate when evaluating inflammatory or infectious processes, hematuria, or conditions which appear to involve both the abdomen and the pelvis.
  - In some cases, especially in follow-up of a known finding, it may be appropriate to limit the exam to the region of concern to reduce radiation exposure.
- The contrast level in pediatric CT imaging is specific to the clinical indication, as listed in the specific guideline sections.
CT of the abdomen or abdomen and pelvis may be indicated for further evaluation of abnormalities suggested on prior US or MRI studies.
CT may be indicated without prior MR or US, as indicated in specific sections of these guidelines.
CT should not be used to replace MRI in an attempt to avoid sedation unless listed as a recommended study in a specific guideline section.
The selection of the best examination may require coordination between the provider and the imaging service.

Nuclear Medicine
Nuclear medicine studies are commonly used in evaluation of the pediatric kidney and gallbladder. Other less common indications exist as well:
- Esophageal motility study (CPT® 78258) and/or Gastroesophageal reflux study (CPT® 78262) is indicated in the evaluation of gastroesophageal reflux.
- Nuclear intestinal imaging (Preferred code for Meckel’s Scan, CPT® 78290) or Gastric mucosa imaging (Alternate code Meckel’s scan, CPT® 78261) is indicated for the following:
  - Suspected Meckel’s diverticulum.
  - Gastric mucosa imaging (CPT® 78261) is also indicated for:
    - Barrett’s esophagus.
    - Thoracic masses suspected of containing gastric mucosa.
- Gastric emptying study (CPT® 78264) is indicated for evaluation of either suspected delayed or rapid gastric emptying.
- Gastric emptying study with small bowel transit (CPT® 78265) is indicated for evaluation of suspected abnormalities in both total and regional times for gastrointestinal transit in the small bowel.
- Gastric emptying study with small bowel and colon transit (CPT® 78266) is indicated for evaluation of suspected abnormalities in both total and regional times for gastrointestinal transit to the colon.
- Gastrointestinal bleeding scintigraphy (CPT® 78278) is indicated for evaluation of brisk active GI bleeding with indeterminate endoscopy.
- Gastrointestinal protein loss study (CPT® 78282) is indicated for decreased serum albumin or globulins and no evidence of GI bleeding.
- Peritoneal-venous shunt patency study (CPT® 78291) is indicated for evaluation of shunt patency and function in a patient with ascites.
- Nuclear renal imaging (CPT® 78701, CPT® 78707, CPT® 78708, or CPT® 78709) is indicated for evaluation of the following:
  - Renal transplant follow-up.
  - Kidney salvage vs. nephrectomy surgical decisions.
  - Acute renal failure with no evidence of obstruction on recent ultrasound.
  - Chronic renal failure to estimate prognosis for recovery.

3D Rendering
3D Rendering indications in pediatric abdomen imaging are identical to those for adult patients. See Preface-4.1: 3D Rendering for imaging guidelines.
The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.
References


**PEDAB-2: Generalized Abdominal Pain**

- Children with generalized abdominal pain and physical examination and laboratory studies, including stool for blood (and stool culture if diarrhea), should initially be evaluated by ultrasound (CPT® 76700 or CPT® 76705) and treated conservatively.
  - Gastroenterology (GI) specialist evaluation is helpful in determining the need for advanced imaging.

- Children with abdominal pain that can be localized to a particular area of the abdomen should be imaged according to the relevant guideline section:
  - **PEDAB-3: Right Lower Quadrant Pain.**
  - **PEDAB-4: Flank Pain, Renal Stone.**
  - **PEDAB-8: Right Upper Quadrant Pain.**
  - **PEDAB-25: Left Upper Quadrant Pain.**
  - **PEDAB-29: Left Lower Quadrant Pain.**

- Children with generalized abdominal pain AND any of the following red flag signs or symptoms require additional investigation (which may include advanced imaging). CT Abdomen (CPT® 74160) or Abdomen/Pelvis (CPT® 74177) with contrast is indicated unless otherwise specified in a specific guideline section:
  - Pain that wakes the child from sleep.
  - Unexplained fever (T > 100.4°F).
  - Dysphagia.
  - GI bleeding.
  - Significant vomiting.
  - Severe chronic diarrhea or nocturnal diarrhea in a toilet-trained child.
  - Failure to thrive, involuntary weight loss, or delay in linear growth or pubertal development.
  - Family history of inflammatory bowel disease, familial polyposis syndrome, celiac disease, or peptic ulcer disease.
  - Abdominal mass, hepatomegaly, and/or splenomegaly on exam.
  - Jaundice.
  - Arthritis.
  - Costovertebral angle tenderness.
  - Perianal disease.
  - Spinal tenderness.

**References**

PEDAB-3: Right Lower Quadrant Pain

For patients age ≤ 14 years:

- Ultrasound (CPT® 76700 or CPT® 76705) is indicated as the initial examination. If positive or negative, no further diagnostic imaging is necessary.
  - If the appendix is not visualized on ultrasound and the white blood cell count is not elevated, no further imaging is necessary in nearly all cases, although the referring physician should make the final determination of the need for advanced imaging.
- If insufficient local ultrasound expertise exists or the ultrasound findings are inconclusive, any of the following studies are indicated for evaluation of right lower quadrant pain:
  - CT Abdomen/Pelvis with contrast (CPT® 74177).
  - CT Abdomen/Pelvis without contrast (CPT® 74176).
  - MRI Pelvis without contrast (CPT® 72195).
  - MRI Pelvis without and with contrast (CPT® 72197).

For patients age ≥ 15 years:

- Any of the following studies are indicated:
  - CT Abdomen/Pelvis with contrast (CPT® 74177).
  - CT Abdomen/Pelvis without contrast (CPT® 74176).
  - MRI Pelvis without contrast (CPT® 72195).
  - MRI Pelvis without and with contrast (CPT® 72197).

If the appendix is absent, follow guidelines in: PEDAB-2: Generalized Abdominal Pain

References


**PEDAB-4: Flank Pain, Renal Stone**

Flank Pain imaging indications in pediatric patients are very similar to those for adult patients. See **AB-4: Flank Pain, Rule Out or Known Renal/Ureteral Stone** for imaging guidelines.

Pediatric-specific imaging considerations include the following:
- In children, ultrasound (CPT® 76770 or CPT® 76775) is the preferred initial study.
- If ultrasound is inconclusive, CT Abdomen/Pelvis without contrast (CPT® 74176) is indicated.
- If CT is inconclusive or there is significant concern for radiation exposure from frequent CT use for a particular patient, MRI without and with contrast of the abdomen (CPT® 74183) and pelvis (CPT® 72197) is indicated.
- If hematuria is present, See **PEDAB-7: Hematuria** for imaging guidelines.

Nuclear kidney imaging (CPT® 78707, CPT® 78708, CPT® 78709, or CPT® 78710) is indicated for evaluation of recurrent flank pain when CT and ultrasound are non-diagnostic, or for suspected obstructive uropathy.

**References**

**PEDAB-5: Urinary Tract Infection (UTI)**

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<tr>
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<tr>
<td>PEDAB-5.2: Lower Urinary Tract</td>
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</tr>
</tbody>
</table>
PEDAB-5.1: Upper Urinary Tract

- All children with first time UTI should undergo ultrasound evaluation (CPT® 76770 or CPT® 76775), as the initial imaging modality to diagnose hydronephrosis, pyelonephritis, or congenital renal anomaly.
  - If hydronephrosis is present, this should be further evaluated with voiding cystourethrogram (VCUG), to evaluate for vesicoureteral reflux. In boys, this is generally accomplished using fluoroscopic imaging and iiodinated contrast to exclude urethral anomalies. In girls, Ureteral Reflux Study (Radiopharmaceutical Voiding Cystogram) (CPT® 78740) is commonly used as urethral abnormalities are rare and this technique results in lower radiation exposure.

- Diuretic renography using Tc-99m MAG 3 (CPT® 78707, CPT® 78708, or CPT® 78909) is the study of choice for the following indications:
  - Differentiating a dilated non-obstructed urinary system from a true stenosis (e.g., UPJ obstruction; ureteral-vesical junction [UVJ] obstruction),
  - Quantifying renal parenchymal function.
  - Ultrasound findings that are compatible with a multicystic dysplastic kidney to evaluate function of the affected kidney or a ureteral-pelvic junction (UPJ) obstruction of the contralateral kidney.
  - Diagnostic evaluation of upper tract dilatation when VCUG is negative.
  - Renal function evaluation in patients with hydronephrosis.

- Post-contrast CT abdomen (CPT® 71260) is sensitive in diagnosing pyelonephritis has a role in evaluation of renal abscess or unusual complications such as xanthogranulomatous pyelonephritis but has no role in the routine evaluation of UTI.

- Magnetic resonance urography (MRU) (CPT® 74183 and CPT® 72197), is not a first line test for the routine evaluation of a UTI, but may be appropriate (where available) for investigation of a dilated upper urinary tract.
  - NOTE: MRU requires sedation in young children.
  - MRU can also quantitate renal function.

- Technetium-99m-dimercaptosuccinic acid (Tc-99m DMSA) scintigraphy (CPT® 78700, CPT® 78701, or CPT® 78710), is sensitive for the diagnosis of UTI but there is little benefit in using this after the first episode of a UTI:
  - DSMA is recommended for Detection of post-pyelonephritic renal scarring at least 6 months after the documented upper tract UTI in high risk patients with recurrent UTIs.
  - Note: According to the U.S. FDA, DMSA is currently not available due to manufacturing delays since 2014. Estimated return to market is 1st Quarter 2020.

- Radiopharmaceutical nuclear medicine imaging (CPT® 78805, CPT® 78806, or CPT® 78807) is indicated for evaluation of suspected pyelonephritis or diffuse interstitial nephritis.

- Nuclear non-imaging renal function study (CPT® 78725) is a quantitative study that can be used to evaluate renal function.
PEDAB-5.2: Lower Urinary Tract

- All children with first time UTI should undergo ultrasound evaluation (CPT® 76770 or CPT® 76775), as the initial imaging modality to diagnose hydronephrosis, pyelonephritis, or congenital renal anomaly.
  - Fluoroscopic Voiding cystourethrography (VCUG) is indicated for detection of possible vesico-ureteral reflux (VUR) in neonates or young children when hydronephrosis is seen on ultrasound.
- The American Academy of Pediatrics clinical practice guidelines no longer recommend routine VCUG for infants and young children from 2 to 24 months of age after the first febrile UTI.
  - The current recommendation is to postpone the VCUG until the second febrile UTI UNLESS there are:
    - Atypical or complex clinical circumstances.
    - Renal/bladder ultrasound reveals hydronephrosis, scarring, or obstructive uropathy.

- Vesicoureteral Reflux (VUR)
  - Fluoroscopic VCUG is typically performed for diagnosis and grading of VUR, and should be the first modality used for diagnosis.
  - Ureteral Reflux Study (Radiopharmaceutical Voiding Cystogram) (CPT® 78740), because of its lower radiation exposure and higher sensitivity for reflux > Grade I, is recommended for follow-up imaging of VUR, and investigation of VUR in siblings of affected patients.
- Male patients with first UTI should be evaluated with fluoroscopic VCUG studies rather than radionuclide cystography, to visualize the male urethra for possible abnormalities such as posterior urethral valves, strictures, or diverticula.
- For female patients, radionuclide cystography (CPT® 78740) may replace fluoroscopic VCUG as the initial study, since urethral anatomy is rarely abnormal except in complex malformations.
- MR urography is indicated for evaluation of ectopic distal ureteral insertion, or other complex lower urinary tract anatomy.
- Siblings of patients with known vesicoureteral reflux can undergo Ureteral Reflux Study (Radiopharmaceutical Voiding Cystogram) (CPT® 78740) if they have renal scarring on ultrasound or history of UTI and no prior evaluation for VUR.
References


PEDAB-6: Pediatric Acute Gastroenteritis

- Imaging is not indicated in pediatric acute gastroenteritis unless there is a concern for diagnosis other than acute gastroenteritis.

- When necessary, imaging in children with suspected gastroenteritis should begin with plain x-rays of the abdomen, including supine and left lateral decubitus views. The left lateral decubitus view is useful for the detection of air-fluid levels and for detection of gas in the rectum and to exclude obstruction or bowel perforation.

- Ultrasound (CPT® 76700 or CPT® 76705) should be performed if there is organomegaly, palpable mass, or suspicion for complications in the form of intussusception. See PEDAB-27: Intussusception
  - While ultrasound (CPT® 76700 or CPT® 76705) may detect findings of gastroenteritis, imaging is not necessary to make the diagnosis of uncomplicated gastroenteritis.

- CT Abdomen/Pelvis with contrast (CPT® 74177) is indicated if abdominal red flag symptoms are present as listed in PEDAB-2: Generalized Abdominal Pain.

References


PEDAB-7: Hematuria

Hematuria is a relatively common complaint in pediatric patients, and the imaging considerations are different than those occurring in adult patients.

- For patients with asymptomatic gross hematuria or microscopic hematuria with proteinuria present, ultrasound of the kidneys (CPT® 76770 or CPT® 76775) and bladder (CPT® 76856 or CPT® 76857) are indicated.
- No imaging is appropriate for asymptomatic microscopic hematuria without proteinuria.
- For patients with painful hematuria and no recent trauma, any of the following studies can be approved:
  - CT Abdomen/Pelvis without contrast (CPT® 74176)
  - Ultrasound of kidneys (CPT® 76770 or CPT® 76775)
  - Ultrasound of bladder (CPT® 76856 or CPT® 76857)
- For patients with hematuria and recent trauma, the following studies are indicated:
  - CT Abdomen/Pelvis with contrast (CPT® 74177)
  - CT Cystography (CT Pelvis with bladder contrast – CPT® 72193), if gross hematuria is present and pelvic fracture or traumatic bladder injury is suspected.

References
PEDAB-8: Right Upper Quadrant Pain

- Right upper quadrant pain imaging indications in pediatric patients are very similar to those for adult patients. See AB-2: Abdominal Pain for imaging guidelines.

- Pediatric-specific imaging considerations include the following:
  - In patients with complaints of RUQ pain with fever, elevated white blood cell count, positive Murphy sign with suspicion of acute cholecystitis or suspicion of acalculous cholecystitis, the diagnosis should be confirmed or excluded using US abdomen (CPT® 76700) and/or Nuclear medicine imaging of the hepatobiliary system (HIDA scan, CPT® 78226 or CPT® 78227).
    - MRI abdomen with and without contrast (CPT® 74183) when US or NM is equivocal.
    - CT abdomen with IV contrast (CPT® 74160) when US or NM is equivocal.
  - In patients with complaints of RUQ pain with no fever and normal white blood cell count where a diagnosis of stones and bile duct obstruction are suspected, the diagnosis should be confirmed with US abdomen (CPT® 76700) and/or Nuclear medicine imaging of the hepatobiliary system (HIDA scan, CPT® 78226 or CPT® 78227).
    - MRI abdomen with and without contrast (CPT® 74183) when US or NM is equivocal.
    - CT abdomen with IV contrast (CPT® 74160) when US or NM is equivocal.
  - In patients with complaints of RUQ pain with no fever and an ultrasound shows only gallstones, MRI abdomen without IV contrast (CPT® 74181), MRI abdomen without and with IV contrast (CPT® 74183) or Nuclear medicine imaging of the hepatobiliary system (HIDA scan, CPT® 78226) is indicated to exclude other sources of pain.

References

Enterography is the most appropriate advanced imaging study for patients with inflammatory bowel disease (IBD).

- For children with suspected IBD, MR enterography (CPT® 74183 and CPT® 72197) is preferred to avoid radiation exposure.
  - CT enterography (CPT® 74177) is indicated if MR enterography is inconclusive or unavailable.

- For children with established IBD, MR enterography (CPT® 74183 and CPT® 72197) is indicated for the following:
  - Monitoring response to disease-modifying treatment on an annual basis or when treatment change is being considered.
  - Patients with new or worsening symptoms or suspected complications including abscess, perforation, fistula, or obstruction.
  - CT enterography (CPT® 74177) can be approved if MR enterography is inconclusive or unavailable.

References
PEDAB-10: Abdominal Sepsis (Suspected Abdominal Abscess)

- Abdominal sepsis imaging indications in pediatric patients are identical to those for adult patients.
- See AB-3: Abdominal Sepsis (Suspected Abdominal Abscess) for imaging guidelines.
PEDAB-11: Postoperative Pain within 60 Days Following Abdominal Surgery

- CT Abdomen/Pelvis with contrast (CPT® 74177) is indicated in patients with suspected postoperative complications (e.g. bowel obstruction, abscess, anastomotic leak, etc.).
  - Children can also be evaluated with ultrasound (CPT® 76700 or CPT® 76705) initially (especially in small children or in thin older children) or with MRI abdomen and pelvis without and with contrast (CPT® 74183 and CPT® 72197).
  - Because MRI may not be practical for the timely evaluation of post-operative abscesses, MRI should only replace CT when the study can be completed in a similar time frame as CT.

- Radiopharmaceutical nuclear medicine imaging (CPT® 78805, CPT® 78806, or CPT® 78807) is indicated for evaluation of any of the following:
  - Peritonitis.
  - Postoperative fever without localizing signs or symptoms.

- Beyond 60 days postoperatively, See PEDAB-2: Generalized Abdominal Pain.

References


**PEDAB-12: Constipation, Diarrhea, and Irritable Bowel Syndrome**

- Constipation and diarrhea are extremely common complaints in children. The overwhelming majority of patients do not require advanced imaging for evaluation of constipation or diarrhea.

- Irritable bowel is rare in young children, but more common in adolescents. The overwhelming majority of patients do not require advanced imaging for evaluation of irritable bowel syndrome.
  - In most cases, causes of constipation can be excluded on the basis of a careful history and physical examination. Advanced Imaging should be performed if warning signs of other diseases are present.

- Constipation associated with red flag signs or symptoms may require advanced imaging:
  - Red flag symptoms for abdominal pain (See **PEDAB-2: Generalized Abdominal Pain**).
  - Clinical suspicion of tethered cord based on abnormal physical findings over the spine or failure of maximal laxative therapy. (See **PEDSP-5: Tethered Cord** for imaging guidelines).

- Diarrhea that is associated with additional red flag signs or symptoms may require advanced imaging: (See **PEDAB-2: Generalized Abdominal Pain**).

- Irritable bowel syndrome that is associated with additional red flag signs or symptoms may require advanced imaging: (See **PEDAB-2: Generalized Abdominal Pain**).

- A barium enema and rectal biopsy are indicated for diagnosis of Hirschsprung disease in children with features suggestive of this disorder. MR of the pelvis without and with contrast (CPT® 72197) may be indicated in post-operative patients who have signs of complications related to treatment to assess the position of the pulled-through bowel, the sphincter muscles, and the area of the posterior urethra.

**References**

**PEDAB-13: Abdominal Mass**

<table>
<thead>
<tr>
<th>PEDAB-13.1: Abdominal Wall Mass</th>
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<tr>
<td>PEDAB-13.2: Intra-Abdominal Mass</td>
<td>27</td>
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</table>
**PEDAB-13.1: Abdominal Wall Mass**

- For initial imaging of a newly discovered abdominal wall mass, any of the following studies are indicated:
  - Ultrasound (CPT® 76700 or CPT® 76705).
  - MRI Abdomen without contrast (CPT® 74181) or without and with contrast (CPT® 74183).
  - If below the umbilicus, MRI Pelvis without contrast (CPT® 72195) or without and with contrast (CPT® 72197) may be added to MRI Abdomen.
- If ultrasound and/or MRI are inconclusive or insufficient for preoperative planning, any of the following studies are indicated:
  - CT Abdomen with contrast (CPT® 74160) or without contrast (CPT® 74150).
  - If below the umbilicus, CT Abdomen/Pelvis with contrast (CPT® 74177) or without contrast (CPT® 74176).

**PEDAB-13.2: Intra-Abdominal Mass**

- Ultrasound (CPT® 76700) should be the initial imaging study for children with an intra-abdominal mass.
- Additional imaging studies will be determined by the results of the ultrasound, and will depend on the location and organ involvement associated with the mass as well as history, physical exam, and laboratory findings. See the following sections for additional imaging guidelines:
  - PEDONC-1: General Guidelines.
  - PEDONC-5: Pediatric Lymphomas.
  - PEDONC-6: Neuroblastoma.
  - PEDONC-7: Pediatric Renal Tumors.
  - PEDONC-10: Pediatric Germ Cell Tumors.
  - PEDONC-11: Pediatric Liver Tumors.
  - PEDONC-14: Pediatric Adrenocortical Carcinoma.
  - PEDAB-17: Adrenal Lesions.
  - PEDAB-26: Spleen.

**References**

PEDAB-14: Renovascular Hypertension and Other Secondary Causes of Hypertension

Clinical evaluation for suspected hypertension should include repeated blood pressure measurements (generally ≥ 3 measurements). If these measurements are at or above the age-dependent systolic or diastolic blood pressures requiring further evaluation, as listed in the following table, further evaluation is warranted. Blood pressure may be obtained in-clinic, at home, or by using a wearable ambulatory blood pressure measurement (ABPM) device which records blood pressure at frequent intervals during normal activities and is downloaded later for computer analysis.

<table>
<thead>
<tr>
<th>Age</th>
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<th>Boys Diastolic</th>
<th>Girls Systolic</th>
<th>Girls Diastolic</th>
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Any of the following studies are indicated for initial evaluation of a pediatric patient with suspected secondary hypertension.

- Doppler or Duplex Ultrasound (CPT® 93975 or CPT® 93976).
- Complete retroperitoneal ultrasound (CPT® 76770).
- Captopril renography (CPT® 78709) has largely been abandoned in clinical practice, replaced by CTA and MRA abdomen, but may be supported for unusual circumstances. All such requests should be forwarded to Medical Directors for review.

All follow-up requests for pediatric hypertension will go to Medical Directors for review.
Other considerations for imaging evaluation:

- Abdominal MRA (CPT® 74185) or CTA (CPT® 74175) may be indicated for pediatric patients with hypertension to exclude fibromuscular dysplasia or other blood-flow restricting lesions of the renal arteries.

- Echocardiography (CPT® 93306) is indicated at initial evaluation to screen for cardiac abnormalities, coarctation of the aorta, and end-organ damage such as left ventricular hypertrophy.

- Nuclear renal imaging (CPT® 78707, CPT® 78708, or CPT® 78709 is indicated for evaluation of the following:
  - Severe hypertension with progressive renal insufficiency or failure to respond to 3 drug therapy).
  - Malignant or accelerated hypertension.
  - Acute worsening of previously stable hypertension.
  - Diastolic BP > 100 in patient < 35 years old.
  - New onset severe hypertension.
  - Hypertension in presence of asymmetric kidneys or diffuse atherosclerosis.
  - Hypertension in presence of acute elevation in creatinine either unexplained or after treatment with ACE inhibitor.
  - Abdominal bruit.
  - Recurrent acute pulmonary edema and hypertension.
  - Hypokalemia with normal or elevated plasma renin level in absence of diuretic therapy.
  - Hypertension with known neurofibromatosis.

References


PEDAB-15: Liver Lesion Characterization

Liver lesion characterization imaging indications in pediatric patients are very similar to those for adult patients. See AB-29: Liver Lesion Characterization for imaging guidelines.

Nuclear medicine liver imaging (ONE of CPT® codes: CPT® 78201, CPT® 78202, CPT® 78205, CPT® 78206, CPT® 78215, or CPT® 78216) is rarely performed, but can be approved for the following when ultrasound, CT, and MRI are unavailable or contraindicated:

- Evaluation of liver mass, trauma, or suspected focal nodular hyperplasia (FNH).
- Differentiation of hepatic hemangioma from FNH.
- Diffuse hepatic disease or elevated liver function tests.
- Suspected accessory spleen (CPT® 78215 or CPT® 78216 only).

Pediatric-specific imaging considerations includes:

- US of the abdomen (CPT® 76700 or CPT® 76705) is the initial study of choice in children. MRI is preferred over CT when possible to reduce radiation exposure.

References


PEDAB-16: Pediatric Liver Failure and Cirrhosis

- Elevated liver function testing imaging indications in pediatric patients are very similar to those for adult patients. See [AB-30: Elevated Liver Function (LFT) Levels](#) for imaging guidelines.

- Causes of liver failure or cirrhosis in pediatric patients are different from adults, and are frequently idiopathic, but commonly due to one of the following:
  - Biliary dysfunction (biliary atresia, cystic fibrosis, etc.).
  - Metabolic disease.
  - Post-infectious.

- Liver ultrasound (CPT® 76700) with duplex Doppler (CPT® 93975) is indicated as an initial study for patients prior to approving CT or MRI for pediatric patients.
  - MRI Abdomen without and with contrast (CPT® 74183) is indicated for evaluation of ultrasound findings that are inconclusive or technically limited, and is preferred over CT when possible to reduce radiation exposure.

- Repeat liver ultrasound (CPT® 76705) with duplex Doppler (CPT® 93975) is indicated in pediatric patients in the following circumstances:
  - Known chronic liver dysfunction or cirrhosis of any cause may be reimaged on an annual basis in the absence of new or worsening findings.
  - New or worsening findings on history, physical exam, or laboratory results that suggest progression of liver disease.
  - Doppler ultrasound of the liver (CPT® 93975 or CPT® 93976) is indicated when portal venous congestion or portal hypertension is suspected.

- Nuclear medicine liver imaging (ONE of CPT® codes: CPT® 78201, CPT® 78202, CPT® 78205, CPT® 78206, CPT® 78215, or CPT® 78216) if rarely performed, but can be approved for the following when ultrasound, CT, and MRI are unavailable or contraindicated:
  - Diffuse hepatic disease or elevated liver function tests.

References

Adrenal masses in infants and young children usually present as palpable abdominal masses or are detected on in utero US. In the neonates, the common masses are adrenal hemorrhage and neuroblastoma. Abdominal US is the initial imaging study of choice.

- If an adrenal mass is detected, it can often be adequately evaluated with short interval follow-up retroperitoneal ultrasound (CPT® 76770) in 7 to 10 days.
  - If repeat ultrasound is concerning for neuroblastoma or there is high clinical concern for neuroblastoma, MRI Abdomen without and with contrast (CPT® 74183) or CT Abdomen without and with contrast (CPT® 74170) are indicated to confirm the diagnosis. MRI is preferred over CT when possible to reduce radiation exposure. If these studies, confirm neuroblastoma.
- Metaiodobenzylguanidine (MIBG) scintigraphy is indicated for staging.
- Neuroblastoma is the most common primary adrenal tumor in pediatric patients between day 1 and 5 years of age. See PEDONC-6: Neuroblastoma for imaging guidelines.

Additional adrenal imaging considerations include the following:

- Adrenal Nuclear Imaging of the cortex and/or medulla (CPT® 78075) is indicated for the following:
  - Distinguishing adrenal adenoma from adrenal hyperplasia.
  - Evaluation of suspected pheochromocytoma or paraganglioma.
    - MIBG preferred (ONE of CPT® codes: CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78803, or CPT® 78804).
    - For known pheochromocytoma or parangangioma, See ONC-15: Neuroendocrine Cancers and Adrenal Tumors for imaging guidelines.
  - Evaluation of suspected neuroblastoma, ganglioneuroblastoma, or ganglioneuroma.
    - MIBG preferred (ONE of CPT® codes: CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78803, or CPT® 78804), See PEDONC-6: Neuroblastoma for imaging guidelines.
  - History of multiple endocrine neoplasia syndromes: See PEDONC-2.8: Multiple Endocrine Neoplasias (MEN) for imaging guidelines.
  - History of neurofibromatosis: See PEDONC-2.3: Neurofibromatosis 1 and 2 (NF1 and NF2) for imaging guidelines.
References


### PEDAB-18: Hemochromatosis

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<td>36</td>
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</tbody>
</table>
**PEDAB-18.1: Hereditary (Primary) Hemochromatosis**

- Hereditary hemochromatosis imaging indications in pediatric patients are identical to those for adult patients. See [AB-11.2: Hereditary (Primary) Hemochromatosis (HH) and Other Iron Storage Diseases](#) for imaging guidelines.

**PEDAB-18.2: Transfusion-Associated (Secondary) Hemochromatosis**

- Transfusion-associated hemochromatosis is a common complication of exposure to repeated red blood cell transfusions. This can occur in any patient with exposure to >20 transfusion episodes, but is most common among sickle cell disease, thalassemia, bone marrow failure (aplastic anemia, Fanconi anemia, etc.), oncology patients, and hematopoietic stem cell transplant patients.

- T2* MRI has been well established in the determination of organ iron burden in transfusion-associated hemochromatosis. Contrast use is not necessary for evaluation of iron burden. The following studies are indicated for evaluation of transfusion-associated hemochromatosis:
  - MRI Abdomen without contrast (CPT® 74181) for liver iron evaluation.
  - MRI Cardiac without contrast (CPT® 75557) for cardiac iron evaluation.
  - MRI Chest without contrast (CPT® 71550) can be approved as a single study to evaluate both heart and liver iron burden.
  - CPT® 74181 and CPT® 75557 can be approved alone, or together.
  - If requested, CPT® 71550 will evaluate both heart and liver and should not be approved with any other codes.

- Screening MRI is indicated every 12 months for chronically transfused patients at risk of hemochromatosis.

- Imaging is indicated every 3 months for treatment response in patients receiving active treatment (chelation and/or phlebotomy).

**References**


**PEDAB-19: Indeterminate Renal Lesion**

- Indeterminate renal lesion characterization imaging indications in pediatric patients are very similar to those for adult patients. See **AB-35: Indeterminate Renal Lesion** for imaging guidelines.

- Indeterminate renal lesion imaging indications in pediatric patients are uncommon and are usually cysts or congenital anomalies.

- Pediatric-specific imaging considerations include the following:
  - Pediatric renal cysts have a lower risk of malignant progression than do renal cysts in adults.
  - For patients who have simple cysts but are symptomatic and surgical intervention is being considered, CT Abdomen with contrast (CPT® 74160) is indicated.
  - For pediatric patients with complex renal cyst identified on ultrasound, CT Abdomen without and with contrast (CPT® 74170) is indicated.
  - For patients with congenital anomalies, nuclear medicine studies with diuretic renography (CPT® 78708 or CPT® 78709) can be performed to determine function and cystography to determine presence of associated reflux.
  - Patients with solid renal masses should be imaged according to guidelines in section **PEDONC-7: Pediatric Renal Tumors**.

**References**

PEDAB-20: Hydronephrosis

Hydronephrosis is a relatively common finding in pediatric patients, with the following imaging considerations:

- Patients with prenatal hydronephrosis can be evaluated with retroperitoneal ultrasound (CPT® 76770) within the first week of life, and again after 6 weeks of age.
- Patients with known uncomplicated hydronephrosis can be followed with retroperitoneal ultrasound (CPT® 76770) every 6 to 12 months.
- For patients with hydronephrosis associated with urinary tract infection or vesicoureteral reflux, see PEDAB-5: Urinary Tract Infection (UTI) for imaging guidelines.
- Patients with ureteropelvic junction obstruction (UPJO) be evaluated with retroperitoneal ultrasound (CPT® 76770), and diuretic renography (CPT® 78707, CPT® 78708, or CPT® 78909) for preoperative planning and postoperatively at 6 to 12 months.
  - If hydronephrosis has resolved on postoperative imaging then no further routine imaging is indicated.
- Magnetic resonance urography (MRU) (CPT® 74183 and CPT® 72197) is rarely indicated, but can be approved in patients with inconclusive ultrasound and diuretic renography.
- CT Abdomen with contrast (CPT® 74160) is rarely indicated, but can be approved in patients with inconclusive ultrasound and a suspected vascular cause of UPJO.

References

PEDAB-21: Polycystic Kidney Disease

- An abdominal ultrasound (CPT® 76700) or a retroperitoneal ultrasound (CPT® 76770) is indicated if there is clinical concern for polycystic kidney disease, or for screening individuals who are at risk for autosomal dominant polycystic kidney disease (ADPCKD).

References
Blunt abdominal trauma imaging indications in pediatric patients are identical to those for adult patients. See **AB-10.1: Blunt Abdominal Trauma** for imaging guidelines.
PEDAB-23: Hernias

- Hernia imaging indications in pediatric patients are identical to those for adult patients. See AB-12: Hernias for imaging guidelines.
PEDAB-24: Abdominal Lymphadenopathy

- Abdominal lymphadenopathy imaging indications in pediatric patients are identical to those for adult patients. See **AB-8: Abdominal Lymphadenopathy** for imaging guidelines.
PEDAB-25: Left Upper Quadrant Pain

- Left upper quadrant pain imaging indications in pediatric patients are identical to those for adult patients. See AB-2: Abdominal Pain for imaging guidelines.
- Nuclear medicine spleen imaging (CPT® 78185) is rarely performed, but can be approved for left upper quadrant pain when neither ultrasound nor CT is available.

References
Spleen imaging indications in pediatric patients are very similar to those for adult patients. See AB-34: Spleen for imaging guidelines.

Nuclear medicine spleen imaging (CPT® 78185) is rarely performed, but can be approved for the following indications when CT is unavailable:
- Splenic trauma.
- Evaluation of splenic function.
- Suspected splenic mass, cyst, abscess, infarct, or metastasis.
- Radiation treatment planning.
- Asplenia.
- Suspected functional accessory spleen:
  - Can approve CPT® 78215 or CPT® 78216 instead of CPT® 78185, if requested.

Pediatric-specific imaging considerations include the following:
- MRI is preferred over CT when possible to reduce radiation exposure.

References
Intussusception, telescoping of one bowel loop into another, is a frequent cause of abdominal pain in young children. It may be associated with bloody stool. Plain x-rays (supine and left lateral decubitus views) should be performed initially to exclude mass or bowel obstruction from other causes and to detect possible bowel perforation which may be an indication for emergent surgical intervention.

- Ultrasound (CPT® 76700 or CPT® 76705) is indicated as an initial study if there is a strong suspicion for intussusception, but if negative, plain x-rays of the abdomen should follow.
- In some institutions, Ultrasound guidance (CPT® 76942) may be used for reduction of colonic or ileocolic intussusception. Generally, this is an urgent or emergent procedure and may not require prior authorization. See Health Plan specific guidance for prior authorization requirements.

References
   https://link.springer.com/article/10.1007%2Fs00247-017-3878-x.
PEDAB-28: Bowel Obstruction

- Bowel obstruction imaging indications in pediatric patients are identical to those for adult patients. See AB-20: Bowel Obstruction and Gastroparesis for imaging guidelines.
PEDAB-29: Left Lower Quadrant Pain

Diverticulitis is the most common cause of left lower quadrant pain in adults but is extremely rare in children.

Gastroenterologist evaluation is helpful in determining the appropriate diagnostic pathway in patients with left lower quadrant pain with or without heme-positive stools or rectal bleeding, since advanced imaging is rarely helpful in the initial evaluation of these patients.

- Pelvic ultrasound (CPT® 76856) is the initial imaging study of choice for children for detecting gynecologic abnormalities that may cause left lower quadrant pain.
- For male patients or if ultrasound is inconclusive, advanced imaging may be appropriate for management as directed by gastroenterologic evaluation.

References

PEDAB-30: Celiac Disease (Sprue)

Celiac disease imaging indications in pediatric patients are identical to those for adult patients. See AB-24: Celiac Disease (Sprue) for imaging guidelines.
PEDAB-31: Transplant

- Liver and kidney transplant imaging indications in pediatric patients are identical to those for adult patients. See AB-42: Transplant for imaging guidelines.

- For post-transplant lymphoproliferative disorder in pediatric patients, See PEDONC-5.3: Pediatric Aggressive Mature B-Cell Non-Hodgkin Lymphomas (NHL) for imaging guidelines.
PEDAB-32: Gaucher Disease

See PEDPN-4: Gaucher Disease for imaging guidelines.
**PEDAB-33: Vomiting Infant, Malrotation, and Hypertrophic Pyloric Stenosis**

- Vomiting in infants is generally classified as either bilious (implying obstruction distal to the Sphincter of Oddi) or non-bilious.
- Bilious vomiting may be a true emergency, as some of the conditions causing this could result in compromise of blood supply to the intestines, a potentially life-threatening situation.
- Suspected malrotation is an indication for emergent imaging. If malrotation with mid-gut volvulus is suspected, acute abdominal series (CXR and abdominal views, including supine and upright or supine and left lateral decubitus views), followed by US abdomen, limited (CPT® 76705) and/or UGI series should be performed. If the abdominal X-rays suggest distal bowel obstruction, water soluble contrast enema should be considered.
- Hypertrophic Pyloric Stenosis is an idiopathic condition wherein the circular muscle controlling emptying of the stomach thickens, causing a relative obstruction of the gastric outlet. The condition can occur at any age (including occasionally in adults), but the typical child is male, aged 2 to 6 weeks. Projectile non-bilious vomiting is the most common presenting complaint, but the description of projectile vomiting is subjective. The differential diagnosis for non-bilious vomiting includes common conditions such as viral gastroenteritis and gastro-esophageal reflux.
  - Infants with projectile non-bilious vomiting should be evaluated with US abdomen, limited (CPT® 76705). If initial studies are not diagnostic, repeat studies should be performed, as frequently as daily, until the vomiting resolves or the diagnosis is made. UGI series may be useful as a confirmatory test, may be preferred if US expertise is not available for this condition, or if the clinical presentation is atypical for Hypertrophic Pyloric Stenosis. US is preferred when available, as it involves no contrast or ionizing radiation use.

**References**

# Pediatric Cardiac Imaging Guidelines

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<tr>
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<td>Cardiac Shunt Detection</td>
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### Ultrasound

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**PEDCD-1.1: Pediatric Cardiac Imaging Age Considerations**

- Heart disease in the pediatric population involves predominantly congenital lesions. Pediatric patients can have acquired heart disease unique to children. For those diseases which occur in both pediatric and adult populations, differences exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.
- Individuals who are < 18 years old should be imaged according to the Pediatric Cardiac Imaging Guidelines, and individuals who are age ≥ 18 years should be imaged according to the Cardiac Imaging Guidelines, except where directed otherwise by a specific guideline section.

**PEDCD-1.2: Pediatric Cardiac Imaging Appropriate Clinical Evaluation**

- A recent (within 60 days) face-to-face evaluation should be performed prior to considering advanced imaging unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation. This evaluation should include:
  - A detailed history
  - Physical examination
  - Appropriate laboratory studies
- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the heart is not supported.
- Advanced imaging of the heart should only be approved in patients who have documented active clinical signs or symptoms of disease involving the heart.
- Unless otherwise stated in a specific guideline section, repeat imaging studies of the heart are not necessary unless:
  - there is evidence for progression of disease
  - new onset of disease and/or documentation of how repeat imaging will affect patient management or treatment decisions.
PEDCD-1.3: Pediatric Cardiac Imaging Modality General Considerations

- **MRI**
  - MRI and MRA studies are frequently indicated for evaluation of complex congenital heart defects not well visualized on echocardiography, thoracic arteries and veins not visualized on echocardiography, cardiomyopathies, and right ventricular disease.
  - Due to the length of time for image acquisition and the need for stillness, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of avoiding a short-interval repeat anesthesia exposure due to insufficient information using the following considerations:
    - MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium to avoid repeat anesthesia.
    - If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session.

- **CT**
  - CT is primarily used to evaluate the coronary and great vessels in congenital heart disease.
  - Coding considerations are listed in **PEDCD-10: CT Heart and Coronary Computed Tomography Angiography (CCTA- Other Indications)**

- **Ultrasound**
  - Echocardiography is the primary modality used to evaluate the anatomy and function of the pediatric heart, and is generally indicated before considering other imaging modalities.
  - Coding considerations are listed in **PEDCD-8: Echocardiography- Other Indications**.

- **Nuclear Medicine**
  - Multi Gated Acquisition (MUGA) studies (CPT® 78472, CPT® 78473, CPT® 78481, CPT® 78483, CPT® 78493, or CPT® 78496) are rarely performed in pediatrics, but can be approved for the following:
    - Certain pediatric oncology patients when echocardiography is insufficient: See: **PEDONC-1.2: Appropriate Clinical Evaluations** for imaging guidelines.
    - Quantitation of left ventricular function when recent echocardiogram shows ejection fraction of < 50% and MUGA results will impact acute patient care decisions.
SPECT/CT fusion imaging involves SPECT (MPI) imaging and CT for optimizing location, accuracy, and attenuation correction combines functional and anatomic information.

- There is currently no evidence-based data to formulate appropriateness criteria for SPECT/CT fusion imaging.
- Combined use of nuclear imaging, including SPECT, along with diagnostic CT (fused SPECT/CT) is considered investigational.

Central C-V Hemodynamics (CPT® 78414) is not an imaging study and is an outdated examination

Cardiac Shunt Detection (CPT® 78428) is rarely performed in pediatrics but can be approved for the following:
- Calculation of left and right ventricular ejection fractions
- Assessment of wall motion
- Quantitation of right to left shunts

Myocardial Tc-99m Pyrophosphate Imaging
- Infarct Avid Myocardial Imaging studies (CPT® 78466, CPT® 78468, and CPT® 78469), historically this method of imaging the myocardium, Myocardial Tc-99m Pyrophosphate Imaging, was used to identify recent infarction, hence, the term "infarct-avid scan." Although still available, the sensitivity and specificity for identifying infarcted myocardial tissue is variable and the current use for this indication is limited

- CPT® 78466, CPT® 78468, and CPT® 78469, CPT® 78800 or CPT® 78803 may be used, for identification of myocardial ATTR (transthyretin) amyloidosis. Refer to **CD-3.7: Myocardial Tc-99m Pyrophosphate Imaging** and **CD 3.8: Cardiac Amyloidosis**

<table>
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<tr>
<td>Myocardial Imaging, infarct avid, planar, qualitative or quantitative with ejection fraction by first pass technique</td>
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The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.
References


PEDCD-2: Congenital Heart Disease

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PEDCD-2.2: Congenital Heart Disease Echocardiography Coding 13
PEDCD-2.3: Congenital Heart Disease Modality Considerations 13
PEDCD-2.4: Congenital Heart Disease Timing Considerations 14
PEDCD-2.1: Congenital Heart Disease General Considerations

- Congenital heart disease accounts for the majority of cardiac problems occurring in the pediatric population. Patients may be diagnosed any time spanning prenatal evaluation to adolescence.
- There are a number of variables that influence the modality and timing of imaging patients with congenital heart disease, which results in a high degree of individuality in determining the schedule for imaging these patients, including:
  - Gestational age
  - Patient age
  - Physiologic effects of the defect
  - Status of interventions (cath and surgical)
  - Rate of patient growth
  - Stability of the defect on serial imaging
  - Comorbid conditions
  - Activity level

PEDCD-2.2: Congenital Heart Disease Echocardiography Coding

- Any of the following echocardiography code combinations are appropriate for re-evaluation of patients with known congenital heart disease:
  - CPT® 93303, CPT® 93320, and CPT® 93325
  - CPT® 93304, CPT® 93321, and CPT® 93325
  - CPT® 93303
  - CPT® 93304
- CPT® 93306 is not indicated in the evaluation of known congenital heart disease.
- All requested CPT® combinations other than those listed in this section should be forwarded for Medical Director Review.

PEDCD-2.3: Congenital Heart Disease Modality Considerations

- Echocardiography is the primary imaging modality used for diagnosing and monitoring congenital heart disease and is generally required before other imaging modalities are indicated unless otherwise indicated in a specific guideline section.
- Cardiac MRI either without contrast (CPT® 75557) or without and with contrast (CPT® 75561) is indicated for the following, when a recent echocardiogram is inconclusive:
  - CPT® 75565 is also indicated for patients with valvular disease or a need to evaluate blood flow through the chambers. These patients will usually have CPT® 93320 and CPT® 93325 performed with their echocardiography studies.
MRA Chest (CPT® 71555) may be added if the aorta or pulmonary artery needs to be visualized beyond the root, or if aortopulmonary collaterals, pulmonary veins, or systemic veins need to be visualized. MRA Chest alone (CPT® 71555) should be performed if the patient cannot cooperate with full cardiac MRI exam.

MRA Chest (CPT® 71555) is indicated for the following:
- Coarctation of the aorta, tetralogy of Fallot, anomalous pulmonary veins, and other lesions of the great arteries, with inconclusive recent echocardiography findings

CT imaging is indicated for the following:
- Report CPT® 75574 for evaluating coronary artery anomalies
- Report CPT® 75573 for congenital heart disease
- Determination of extra-cardiac anatomy in patients with complex congenital heart disease
- Pulmonary artery (PA) and Pulmonary vein (PV) assessment
- Coarctation of the aorta or interruption of the aortic arch suspected on echocardiography.

**PEDCD-2.4: Congenital Heart Disease Timing Considerations**

Echocardiography is repeated frequently throughout a child’s life, and the following intervals are within the standard of care and should be approved:
- Patient’s age 0 to 2 years: every 3 months
- Patient’s age 3 to 12 years: every 6 months
- Patient’s age 13 years and older: every 12 months
- Some congenital conditions may require more frequent testing, especially with more complex heart disease, changes in clinical status, repeat interventions, and/or in neonates
- Echocardiography is performed during the physician office visit, and these studies should not be denied because of lack of contact within 60 days
References


8. Identifying newborns with critical congenital heart disease Author:Carolyn A Altman, MDSection Editors:David R Fulton, MDLeonard E Weisman, MDDeputy Editor:Carrie Armsby, MD, MPH All topics are updated as new evidence becomes available and our peer review process is complete. Literature review current through: Jun 2018. | This topic last updated: Jun 14, 2018
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<tr>
<th>PEDCD-3: Heart Murmur</th>
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</thead>
<tbody>
<tr>
<td>PEDCD-3.1: Heart Murmur General</td>
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</tbody>
</table>
PEDCD-3.1: Heart Murmur General

- Heart murmurs are extremely common in pediatric patients. The thinner chest wall in children allows clearer auscultation of blood flowing through the chambers of the heart, which may result in a murmur on physical exam.
- The majority of murmurs are innocent and do not require further evaluation. More than 30% of children may have an innocent murmur detected during physical examination. Innocent murmurs are typically systolic ejection murmurs with a vibratory or musical quality, and generally change in quality when the patient changes position.
- Other types of murmurs can be pathologic and require additional evaluation, usually by a pediatric cardiologist. Echocardiography is indicated, and is performed as part of the office visit. When evaluating a patient with a murmur for the first time, it will not be known whether the patient has congenital heart disease or not. The cardiologist only submits charges for the procedure actually performed.
- The following echocardiography code combinations should be approved for evaluation of any pathologic murmur or any innocent murmur with associated cardiac signs or symptoms:
  - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325
  - CPT® 93303, CPT® 93306
  - CPT® 93306, CPT® 93320 and CPT® 93325 are included with CPT® 93306 and should not be approved separately.
- Repeat echocardiography is not indicated if the initial echocardiogram was normal and the murmur has not changed in quality.
References
5. Allen, Hugh D.; Shaddy, Robert E.; Penny, Daniel J.; Feltes, Timothy F.; Cetta, Frank. Title: Moss and Adams' Heart Disease in Infants, Children, and Adolescents: Including the Fetus and Young Adult, 9th Edition Copyright ©2016 Lippincott Williams & Wilkin.
6. Advances in Cardiovascular Imaging Multimodality Noninvasive Imaging for Assessment of Congenital Heart Disease Ashwin Prakash, MD; Andrew J. Powell, MD; Tal Geva.
7. UpToDate Approach to the infant or child with a cardiac murmur Author: Robert L Geggel, MDS. Section Editors: David R Fulton, MD; Martin I Lorin, MDD; Deputy Editor: Carrie Armsby, MD, MPH. Literature review current through: Jun 2018. This topic last updated: Jun 01, 2017.
PEDCD-4.1: Chest Pain General

Chest pain in pediatric patients is caused by a cardiac etiology in < 5% of cases, yet causes great anxiety for parents resulting in requests for testing.

- A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination, EKG, and appropriate laboratory studies should be performed prior to considering advanced imaging.

- Echocardiography is indicated for pediatric patients with chest pain and one or more of the following:
  - Exertional chest pain
  - Non-exertional chest pain with abnormal EKG
  - First-degree relative with sudden unexplained death or cardiomyopathy
  - Recent onset of fever
  - Recent illicit drug use
  - Other signs or symptoms of cardiovascular disease

- Echocardiography is performed as part of the office visit. When evaluating a patient for the first time, it will not be known whether the patient has congenital heart disease or not. The cardiologist only submits charges for the procedure actually performed.

- The following echocardiography code combinations should be approved for evaluation of chest pain:
  - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325
  - CPT® 93303, CPT® 93306
  - CPT® 93306
    - CPT® 93320 and CPT® 93325 are included with CPT® 93306 and should not be approved separately.

- Repeat echocardiography is not indicated if the initial echocardiogram is normal unless one of the following conditions is present:
  - Increased severity or change in quality of the chest pain
  - New signs or symptoms of cardiovascular disease other than pain
  - New abnormality on EKG
References


4. Allen, Hugh D.; Shaddy, Robert E.; Penny, Daniel J.; Feltes, Timothy F.; Cetta, Frank Title: Moss and Adams' Heart Disease in Infants, Children, and Adolescents: Including the Fetus and Young Adult, 9th Edition Copyright ©2016 Lippincott Williams & Wilkins.

5. Uptodate Nontraumatic chest pain in children and adolescents: Approach and initial management Authors:Robert L Geggel, MDErin E Endom, MDSection Editors:David R Fulton, MDGregory Redding, MDJan E Drutz, MDGary R Fleisher, MDDeputy Editor:James F Wiley, II, MD, MP
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<th>PEDCD-5: Syncope</th>
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**PEDCD-5.1: Syncope**

Syncope in pediatric patients is common, with up to 15% of patients experiencing at least one episode by age 21. Syncope is caused by neurocardiogenic syndrome (vasovagal syncope) in 75 to 80% of cases, which is a benign and self-limiting condition. Despite this, syncope causes great anxiety for parents resulting in requests for testing.

- A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination, EKG, and appropriate laboratory studies should be performed prior to considering advanced imaging.
- Echocardiography is not indicated for most patients with isolated syncope.
- Echocardiography is indicated for pediatric patients with syncope and one or more of the following:
  - Exertional syncope
  - Unexplained post-exertional syncope
  - Abnormal EKG
  - First-degree relative with any of the following before age 50:
    - Sudden cardiac arrest or death
    - Pacemaker or implantable defibrillator placement
  - First-degree relative with cardiomyopathy
  - Known congenital heart disease
  - History of Kawasaki disease
  - Pathologic murmur, irregular rhythm, gallop, or click on physical examination
- Echocardiography is performed as part of the office visit. When evaluating a patient for the first time, it will not be known whether the patient has congenital heart disease or not. The cardiologist only submits charges for the procedure actually performed.
- The following echocardiography code combinations should be approved for evaluation of syncope:
  - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325
  - CPT® 93303, CPT® 93306
  - CPT® 93306
    - CPT® 93320 and CPT® 93325 are included with CPT® 93306 and should not be approved separately.
- Repeat echocardiography is not indicated if the initial echocardiogram is normal unless one of the following conditions is present:
  - Increased severity or change in quality of the syncope
  - New signs or symptoms of cardiovascular disease other than syncope
  - New abnormality on EKG
References
5. Uptodate. Causes of syncope in children and adolescents Author:Jack C Salerno, MDSection Editors:George A Woodward, MDJohn K Triedman, MDDeputy Editor:James F Wiley, II, MD, MPH
6. Allen, Hugh D.; Shaddy, Robert E.; Penny, Daniel J.; Feltes, Timothy F.; Cetta, Frank Title: Moss and Adams’ Heart Disease in Infants, Children, and Adolescents: Including the Fetus and Young Adult, 9th Edition Copyright ©2016 Lippincott Williams & Wilkins
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<tr>
<th>PEDCD-6: Kawasaki Disease</th>
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<td>PEDCD-6.1: Kawasaki Disease 26</td>
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</table>
PEDCD-6.1: Kawasaki Disease

- Kawasaki disease (KD) is the leading cause of acquired pediatric cardiac disease in the developed world. It is an acute febrile illness characterized by a medium vessel vasculitis, which predominantly affects the coronary arteries.
- A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination, and appropriate laboratory studies should be performed prior to considering advanced imaging.
- Patients who do not fulfill the diagnostic criteria for classic KD may be considered to have incomplete (atypical) KD.
- If Kawasaki disease is strongly suspected, treatment will often begin even before cardiac evaluation, since early treatment is associated with a lower risk for coronary aneurysm development.
- Echocardiography (CPT® 93306) is indicated for all patients with suspected or known Kawasaki disease
  - Echocardiography is recommended at the time of diagnosis, 1 to 2 weeks later, and 4-6 weeks from diagnosis.
  - Patients with recurrent or persistent fever or worsening cardiac symptoms should have echocardiogram repeated.
  - Patients with no coronary abnormalities on the 4-6 week study should have a repeat echocardiogram 1 year from diagnosis.
  - Patients with coronary abnormalities will require more frequent echocardiograms based on severity of disease and need for medical management. Patients with history of coronary artery aneurysms may require stress imaging—see below Long-Term Assessment and Counseling Algorithm
- Coronary CTA (CPT® 75574), Cardiac MRI without contrast (CPT® 75557), Cardiac MRI without and with contrast (CPT® 75561), or MRA Chest (CPT® 71555) are indicated for evaluation of inconclusive echocardiogram findings, or significant coronary artery abnormalities.
- Screening of other body areas for aneurysms is not routinely indicated in Kawasaki disease, but MRA or CTA (contrast as requested) of the affected body area can be approved for evaluation of signs or symptoms suggesting aneurysm development.
<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Frequency of Cardiology Assessment</th>
<th>Assessment for Inducible Myocardial Ischemia</th>
<th>Type and Frequency of Additional Cardiology Assessment</th>
<th>Cardiovascular Risk Factor Assessment and Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: No involvement</td>
<td>May discharge between 4 wk and 12 mo</td>
<td>None</td>
<td>None</td>
<td>Assess at 1 y</td>
</tr>
<tr>
<td>2: Dilation only</td>
<td>May discharge after 1 y if normal; assess every 2–5 y if persists</td>
<td>None</td>
<td>None</td>
<td>Assess at 1 y</td>
</tr>
<tr>
<td>3.1: Small aneurysm, current or persistent</td>
<td>Assess at 6 mo, then yearly</td>
<td>Every 2–3 y</td>
<td>May consider every 3–5 y</td>
<td>Assess at 1 y</td>
</tr>
<tr>
<td>3.2: Small aneurysm, regressed to normal or dilation only</td>
<td>Assess every 1–3 y (may omit echocardiography)</td>
<td>Every 3–5 y</td>
<td>May consider if there is inducible ischemia</td>
<td>Assess at 1 y, then every 2 y</td>
</tr>
<tr>
<td>4.1: Medium aneurysm, current or persistent</td>
<td>Assess at 3, 6, and 12 mo, then yearly</td>
<td>Every 1–3 y</td>
<td>May consider every 2–5 y</td>
<td>Assess at 1 y</td>
</tr>
<tr>
<td>4.2: Medium aneurysm, regressed to small aneurysm</td>
<td>Yearly</td>
<td>Every 2–3 y</td>
<td>May consider every 3–5 y</td>
<td>Yearly</td>
</tr>
<tr>
<td>4.3: Medium aneurysm, regressed to normal or dilation only</td>
<td>Every 1–2 y (may omit echocardiography)</td>
<td>Every 2–4 y</td>
<td>May consider if there is inducible ischemia</td>
<td>Every 2 years</td>
</tr>
<tr>
<td>5.1: Large or giant aneurysm, current or persistent</td>
<td>Assess at 3, 6, 9, and 12 mo, then every 3–6 mo</td>
<td>Every 6–12 mo</td>
<td>Baseline within 2–6 mo; may consider every 1–5 y</td>
<td>Every 6–12 mo</td>
</tr>
<tr>
<td>5.2: Large or giant aneurysms, regressed to medium aneurysm</td>
<td>Every 6–12 mo</td>
<td>Yearly</td>
<td>May consider every 2–5 y</td>
<td>Yearly</td>
</tr>
<tr>
<td>5.3: Large or giant aneurysm, regressed to small aneurysm</td>
<td>Every 6–12 mo</td>
<td>Every 1–2 y</td>
<td>May consider every 2–5 y</td>
<td>Yearly</td>
</tr>
<tr>
<td>5.4: Large or giant aneurysm, regressed to normal or dilation only</td>
<td>Every 1–2 y (may omit echocardiography)</td>
<td>Every 2–3 y</td>
<td>May consider every 2–5 y</td>
<td>Every 2 years</td>
</tr>
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</table>

References
### PEDCD-7: Pediatric Pulmonary Hypertension

**PEDCD-7: Pediatric Pulmonary Hypertension General**

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PEDCD-7: Pediatric Pulmonary Hypertension General

- Pulmonary hypertension in children can be caused by cardiac, pulmonary, or systemic diseases, and idiopathic disease occurs as well.
- A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination, and appropriate laboratory studies should be performed prior to considering advanced imaging.
- If pulmonary hypertension is suspected, initial evaluation should consist of chest x-ray, EKG, and echocardiography (CPT® 93306, or CPT® 93303, with CPT® 93320, and CPT® 93325, see: PEDCD-8.1: Transthoracic Echocardiography (TTE) Coding for echocardiography coding considerations).
- Repeat echocardiography intervals are variable depending on age of patient, etiology, and severity.
  - After a comprehensive initial evaluation, echocardiograms using PH-specific protocols may be performed every 4 to 6 months.
  - Echocardiography is indicated at any time for new or worsening symptoms or to evaluate a recent change in therapy.
  - Right heart and/or left heart catheterization may be utilized for PAH patients, including before and after initiation of PAH-targeted therapy, and for patients with concomitant congenital heart disease.
- Chest CT (CPT® 71250) may be indicated in addition to Chest CTA (CPT® 71275) or Chest MRA (CPT® 71555) for initial evaluation of all pediatric patients with pulmonary hypertension to evaluate for pulmonary vascular or interstitial disease, or other intrathoracic causes.
- Cardiac MRI without and with contrast (CPT® 75561) is indicated for evaluation of inconclusive echocardiogram findings, or for monitoring right ventricular function during follow-up.
- Stress echocardiograms may be indicated (as in adult guidelines) see CD-2.7: Stress Echocardiography – Indications, other than ruling out CAD.
References
3. UPtodate. Pulmonary hypertension in children: Classification, evaluation, and diagnosis Authors:Mary P Mullen, MD, PhDThomas Kulik, MD Authors: Section Editors:David R Fulton, MDGeorge B Mallory, MADeputy Editor:Carrie Armsby, MD, MPH Literature review current through: Jun 2018 | This topic last updated: Mar 14, 2018
4. Allen, Hugh D.; Shaddy, Robert E.; Penny, Daniel J.; Feltes, Timothy F.; Cetta, Frank Title: Moss and Adams' Heart Disease in Infants, Children, and Adolescents: Including the Fetus and Young Adult, 9th Edition Copyright ©2016 Lippincott Williams & Wilkin
# PEDCD-8: Echocardiography-Other Indications

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<td>PEDCD-8:3</td>
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<tr>
<td>PEDCD-8:4</td>
<td>Transesophageal Echocardiography (TEE)</td>
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</table>
PEDCD-8.1: Transthoracic Echocardiography (TTE) Coding

- CPT® codes for echocardiography are listed in PEDCD-1: General Guidelines

<table>
<thead>
<tr>
<th>Echocardiogram coding Notes</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>The most commonly performed study is a complete transthoracic echocardiogram with spectral and color flow Doppler (CPT® 93306).</td>
<td>93306</td>
</tr>
<tr>
<td>- CPT® 93306 includes CPT® 93320 and CPT® 93325, so those codes should not be approved along with CPT® 93306.</td>
<td></td>
</tr>
<tr>
<td>Doppler codes (CPT® 93320, CPT® 93321, and CPT® 93325) are add-on codes and are assigned in addition to code for the primary procedure, and should not be approved alone.</td>
<td>+93320</td>
</tr>
<tr>
<td>For a 2D transthoracic echocardiogram without Doppler, report CPT® 93307.</td>
<td>93307</td>
</tr>
<tr>
<td>A limited transthoracic echocardiogram is reported with CPT® 93308.</td>
<td>93308</td>
</tr>
<tr>
<td>- Limited transthoracic echocardiogram should be billed if the report does not “evaluate or document the attempt to evaluate” all of the required structures.</td>
<td></td>
</tr>
<tr>
<td>- Unlike CPT® 93306, the Doppler CPT® 93321 and CPT® 93325 are not included with CPT® 93308.</td>
<td></td>
</tr>
<tr>
<td>- CPT® 93321 (not CPT® 93320) should be reported with CPT® 93308 if Doppler is included in the study.</td>
<td></td>
</tr>
<tr>
<td>- CPT® 93325 should also be reported with CPT® 93308 if color flow Doppler is included in the study.</td>
<td></td>
</tr>
<tr>
<td>For patients with known congenital heart disease, a limited transthoracic echocardiogram is reported with CPT® 93304, +/- CPT® 93321 and CPT® 93325.</td>
<td>93304</td>
</tr>
</tbody>
</table>

- Providers performing an initial echo on a pediatric patient will not know what procedure codes they will be reporting until the initial study is completed.
  - If congenital heart disease is found on the initial echo, a complete echo is reported with codes CPT® 93303, CPT® 93320, and CPT® 93325 because CPT® 93303 does NOT include Doppler and color flow mapping.
  - If no congenital issue is discovered, then CPT® 93306 is reported alone and includes 2-D, Doppler and color flow mapping.
- Since providers may not know the appropriate code/s that will be reported at the time of the pre-authorization request, they may request multiple codes.
  - The following echocardiography code combinations should be approved for any initial echocardiogram:
    - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325
    - CPT® 93303, CPT® 93306
    - CPT® 93306
      - CPT® 93320 and CPT® 93325 are included with CPT® 93306 and should not be approved separately.
  - Depending upon individual health plan payer contracts, post-service audits may be completed to ensure proper claims submission.
PEDCD-8.2: Initial Transthoracic Echocardiography (TTE) Indications

In addition to indications listed in previous guideline sections, initial TTE evaluation is indicated for any of the following:

- Any signs/symptoms that are possibly cardiac in nature, including (but not limited to) central cyanosis, dyspnea, edema, poor peripheral pulses, feeding difficulty, decreased urine output, hepatomegaly, or desaturation on pulse oximetry.
- Abnormal EKG or cardiac biomarkers
- Abnormal chest x-ray suggesting cardiovascular disease
- Palpitations and one of the following:
  - Abnormal EKG
  - First-degree relative with any of the following before age 50:
    - Sudden cardiac arrest or death
    - Pacemaker or implantable defibrillator placement
  - First-degree relative with cardiomyopathy
- Supraventricular Tachycardia (SVT), Ventricular Tachycardia, or Premature Ventricular Contractions (PVCs)
- Known or suspected valvular dysfunction
- Persistent systemic hypertension
- Obesity (BMI > 30) with additional cardiovascular risk factors
- Stroke
- Renal failure
- Preoperative evaluation of patients with chest wall deformities or scoliosis
- Known or suspected vascular ring
- Planned administration of cardiotoxic chemotherapy
  - Generally anthracyclines (doxorubicin, daunorubicin, mitoxantrone, idarubicin, epirubicin)
- Planned radiation therapy involving heart muscle or hematopoietic stem cell transplant
- Sickle cell disease or other hemoglobinopathy causing chronic anemia
- Known or suspected vasculitis, acute rheumatic fever, or other systemic autoimmune disease
- Muscular dystrophy
- Metabolic, mitochondrial, and storage disorders
- Abnormalities of cardiac or other viscera situs
- Signs, symptoms, or blood culture suggestive of endocarditis
- Known or suspected mass lesion involving the heart or great vessels
- Known or suspected clot in atrium or ventricle
- Known or suspected pulmonary hypertension
Known or suspected pericardial effusion

Complications during prenatal development:
- Known or suspected cardiovascular abnormality on fetal echocardiogram
- Maternal phenylketonuria (PKU)
- Maternal diabetes with no fetal echo
- Maternal teratogen exposure
- Maternal infection during pregnancy with potential cardiac sequelae

Genetic abnormality known to be associated with cardiovascular disease

First-degree relative family history of:
- Unexplained sudden death before age 50
- Hypertrophic cardiomyopathy
- Non-ischemic dilated cardiomyopathy
- Genetic abnormality known to be associated with cardiovascular disease
- Congenital left-sided heart lesion
- Heritable pulmonary arterial hypertension

PEDCD-8.3: Repeat Transthoracic Echocardiography Indications

- Repeat echocardiograms are not necessary for most patients with clinically stable syndromes.
- In addition to indications listed in previous guideline sections, repeat TTE evaluation is indicated for any of the following:
  - New or worsening symptoms in a patient with known cardiac disease, previously normal echocardiogram with one of the following:
    - New or worsening cardiac symptoms
    - New EKG abnormality
    - Newly recognized family history suggestive of heritable heart disease
  - Every 12 months for patients age 12 to 18 years with first-degree family history of hypertrophic cardiomyopathy.
  - Every 12 months for patients receiving active therapy for ventricular hypertrophy, valvular dysfunction, cardiomyopathy.
    - One time repeat TTE can be approved at 6 months to assess response to a change in therapy.
  - Every 12 months for patients with chronic pericardial effusions
  - Every 12 months for sickle cell disease or other hemoglobinopathy causing chronic anemia and one of the following:
    - High risk genotype (Hgb SS or Sβ0, severe thalassemia, etc.)
    - History of acute chest syndrome or intrinsic lung disease
    - History of stroke
    - Receiving chronic transfusion therapy
  - As needed for monitoring cardiotoxicity during chemotherapy administration
After completion of chemotherapy and/or radiation therapy. See PEDONC-19.2: Cardiotoxicity and Echocardiography for imaging guidelines.

**PEDCD-8.4: Transesophageal Echocardiography (TEE)**

Transesophageal echocardiography imaging indications in pediatric patients are identical to those for adult patients. See CD-2.5: Transesophageal Echocardiography (TEE) in the Cardiac Imaging Guidelines.

**References**


5. Allen, Hugh D.; Shaddy, Robert E.; Penny, Daniel J.; Feltes, Timothy F.; Cetta, Frank Title: Moss and Adams' Heart Disease in Infants, Children, and Adolescents: Including the Fetus and Young Adult, 9th Edition Copyright ©2016 Lippincott Williams & Wilkins.
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<td>PEDCD-9.2: Cardiac MRI - Coding</td>
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<td>PEDCD-9.3: Indications for Cardiac MRI</td>
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<td>PEDCD-9.4: Aortic Root and Proximal Ascending Aorta</td>
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<tr>
<td>PEDCD-9.5: Evaluation of Pericardial Effusion or Diagnosis of Pericardial Tamponade</td>
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</table>
**PEDCD-9.1: General Guidelines**

- Requests for cardiac MRI that contain only one CPT® code can be completed by the Nurse Reviewer. If the request contains more than one cardiac/chest MRI CPT® code, it should be forwarded for Medical Director Review.
- MRA of the coronary arteries is comparatively less accurate than CCTA or invasive coronary angiography in evaluating coronary disease and is considered investigational at this time.

**PEDCD-9.2: Cardiac MRI - Coding**

<table>
<thead>
<tr>
<th>Cardiac Imaging Procedure Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiac MRI</strong></td>
</tr>
<tr>
<td>Cardiac magnetic resonance imaging for morphology and function without contrast.</td>
</tr>
<tr>
<td>Cardiac magnetic resonance imaging for morphology and function without and with contrast and further sequences.</td>
</tr>
<tr>
<td>Cardiac magnetic resonance imaging for morphology and function without contrast; with stress imaging (rarely used in pediatrics).</td>
</tr>
<tr>
<td>Cardiac magnetic resonance imaging for morphology and function without and with contrast and further sequences; with stress imaging (rarely used in pediatrics).</td>
</tr>
<tr>
<td>Cardiac magnetic resonance imaging for velocity flow mapping (List separately in addition to code for primary procedure).</td>
</tr>
</tbody>
</table>

- Only one procedure code from the set: CPT®75557, CPT®75559, CPT®75561, and CPT®75563 should be reported per session.
- Only one flow velocity measurement (CPT® +75565) should be reported per session.

**PEDCD-9.3: Indications for Cardiac MRI**

- In addition to indications listed in previous guideline sections, Cardiac MRI evaluation is indicated for any of the following, when a recent TTE is inconclusive:
  - Assessment of global ventricular function and mass if a specific clinical question is left unanswered by recent TTE and the MRI results will affect the management of the patient’s condition
  - Clinical suspicion of arrhythmogenic right ventricular dysplasia (ARVD) or arrhythmogenic cardiomyopathy (ARVC).
    - MRI without contrast (CPT®75557) is considered the optimal test for this disorder
  - For pericardial disease (including constrictive pericarditis, restrictive pericarditis, and perimyocarditis), MRI should not be utilized to diagnose pericarditis but only to answer the question regarding possible constriction or restriction suggested clinically or by other techniques (TTE, etc.)
    - MRI without and with contrast (CPT®75561) is considered the optimal test for this disorder.
Evaluate cardiac tumor or mass
- MRI without and with contrast (CPT® 75561) is considered the optimal test for this disorder.

Evaluate anomalous coronary artery
- After echocardiogram, MRI without and with contrast (CPT® 75561) or CCTA (CPT® 75574) is considered the optimal test for this disorder.

For Fabry's disease, late enhancement MRI may predict the effect of enzyme replacement therapy on myocardial changes that occur with this disease.
- MRI without and with contrast (CPT® 75561) is considered the preferred test for this disorder.

For Cardiomyopathy, Cardiac MRI can be performed to evaluate patients with congenital cardiomyopathy (muscular dystrophy, glycogen storage disease, fatty acid oxidation disorders, mitochondrial disorders, etc.) or unexplained cases of cardiomyopathy in order to characterize the myocardium.

Cardiac stress perfusion study (CPT® 75559 or CPT® 75563) can be considered on a case by case basis for patients with anomalous coronary artery, Kawasaki disease, or other disorder with the potential for coronary ischemia who cannot undergo other forms of stress testing (ETT, MPI, etc.).

Assessment of cardiac iron overload in hemochromatosis (either CPT® 75557 or CPT® 71550, T2* MRI, contrast not necessary).
- Screening imaging may be approved every 12 months
- Imaging may be approved every 3 months for treatment response in patients receiving active treatment (chelation +/- phlebotomy)
- Frequently performed along with MRI Abdomen (CPT® 74181) to assess liver iron deposition. See PEDAB-18.2: Transfusion-Associated (Secondary) Hemochromatosis for additional imaging guidelines.

PEDCD-9.4: Aortic Root and Proximal Ascending Aorta
- For screening due to family history of aortic aneurysm or dissection, see: CH-29: Thoracic Aorta in the adult Chest Imaging Guidelines.
- For patients who have both cardiac and ascending aorta abnormalities, the following studies may be indicated following TTE:
  - Cardiac MRI (CPT® 75557 or CPT® 75561) for patients with abnormalities involving the aortic root and/or proximal ascending aorta.
  - If the distal ascending aorta is involved, MRI Chest (CPT® 71552) or MRA Chest (CPT® 71555) is also indicated.
- For patients with aortic abnormalities without cardiac abnormalities, any of the following studies is indicated:
  - MRI Chest (CPT® 71552)
  - MRA Chest (CPT® 71555)
PEDCD-9.5: Evaluation of Pericardial Effusion or Diagnosis of Pericardial Tamponade

- Echocardiogram is the initial imaging study of choice to evaluate pericardial effusions or diagnose pericardial tamponade.
- If a specific clinical question is left unanswered by another recent imaging study and the answer to the clinical question will affect the management of the patient’s clinical condition, contrast-enhanced cardiac MRI is useful for evaluating:
  - Pericarditis
  - Neoplastic effusion
  - Tamponade
  - Myocardial infiltration.
- Cancers that can metastasize to the pericardium or myocardium and can cause a malignant effusion include lung, breast, renal cell, lymphoma and melanoma.

References
4. Allen, Hugh D.; Shaddy, Robert E.; Penny, Daniel J.; Feltes, Timothy F.; Cetta, Frank Title: Moss and Adams’ Heart Disease in Infants, Children, and Adolescents: Including the Fetus and Young Adult, 9th Edition Copyright ©2016 Lippincott Williams & Wilkin
PEDCD-10: CT Heart and Coronary Computed Tomography Angiography (CCTA)-Other Indications

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**PEDCD-10.1: General Considerations**

- Metal artifact reduces the accuracy of CCTA. Devices that can cause this issue include, but are not limited to, surgical clips, pacemaker devices, defibrillator devices, and tissue expanders.
- Cardiac testing that does not involve exposure to ionizing radiation should be strongly considered.

**Practice Note**

<table>
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<tr>
<th>Relative Contraindications to CCTA Include:</th>
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<tr>
<td>Very obese patients (body mass index &gt; 40 kg/m(^2))</td>
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<tr>
<td>Elevated calcium score: CCTA should not be performed if there is extensive coronary calcification (calcium score &gt;1000).</td>
</tr>
<tr>
<td>Renal insufficiency</td>
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<tr>
<td>Inability to follow breath-holding instructions</td>
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**PEDCD-10.2: Anomalous Coronary Artery**

- Evaluating coronary artery anomalies and other complex congenital heart disease of cardiac chambers or great vessels is an appropriate indication for CCTA.
  - Report CPT\(^{®}\) 75574 for evaluating coronary artery anomalies
  - Report CPT\(^{®}\) 75573 for congenital heart disease
  - Can add CPT\(^{®}\) 71275 (chest CTA) to evaluate great vessels
  - In cases of anomalous pulmonary venous return, can add CT abdomen and pelvis with contrast (CPT\(^{®}\) 74177).
  - Partial anomalous pulmonary venous return (PAPVR), or total anomalous pulmonary venous return (TAPVR) could require cardiac CT, chest CTA, and abdomen/pelvis CTA, or Cardiac MRI, chest MRA, abdominal MRA, and pelvis MRA.
- Congenital anomalies of the coronary arteries are an important cause of sudden death in pediatric patients. Coronary arteries may arise from the wrong coronary artery cusp leading to ischemic changes during exercise. These lesions may be found incidentally during a murmur evaluation. Anomalous coronary arteries may be seen on echocardiogram during an evaluation for chest pain or syncope or palpitations. In addition patients with no echocardiographic findings, but symptoms concerning for angina chest pain may require stress testing. Patients who have positive echocardiographic findings, regardless of symptoms, and patients who have angina chest pain regardless of echocardiographic findings, may require treadmill stress testing, stress imaging, of advanced imaging such as Cardiac MRI, Cardiac CT, and/or cardiac catheterization.
- Patients with congenital heart disease such as TOF, Truncus Arteriosus, and TGA have increased incidence of coronary artery anomalous and may require the above imaging as well
- Patients with confirmed coronary artery anomalies may require repeat imaging based on the clinical scenario
The use of CCTA to rule out anomalous coronary artery should be limited to one of the following:

- Patients who need to have an anomalous coronary artery mapped prior to an invasive procedure.
- Patients who have not had a previous imaging study that clearly demonstrates an anomalous coronary artery
- Patients with a history that includes one or more of the indications in **PEDCD-10.3: Indications for CCTA**

**PEDCD-10.3: Indications for CCTA (CPT® 75574)**

In addition to indications listed in previous guideline sections, CCTA is indicated for any of the following, when a recent TTE and/or MRI is inconclusive:

- Persistent exertional chest pain and normal stress test
- Full sibling(s) with history of sudden death syndrome before age 30 or with documented anomalous coronary artery
- Resuscitated sudden death and contraindication to conventional coronary angiography
- Unexplained new onset of heart failure if CCTA will replace conventional invasive coronary angiography
- Documented ventricular tachycardia (6 beat runs or greater) if CCTA will replace conventional invasive coronary angiography
- Equivocal coronary artery anatomy on conventional cardiac catheterization
- In infants: otherwise unexplained dyspnea, tachypnea, wheezing, episodic pallor, irritability, sweating, poor feeding, and/or failure to thrive
  - The presence of other congenital heart disease is not a separate indication for CCTA to rule out anomalous coronary artery (except when coronary artery surgery is pending, i.e. Transposition of the great arteries, Tetralogy of Fallot, Truncus arteriosus, aortic root surgery)
- Evaluation of the arterial supply and venous drainage in children with bronchopulmonary sequestration

**PEDCD-10.4: Indications for Cardiac CT (CPT® 75572)**

In addition to indications listed in previous guideline sections, CCTA is indicated for any of the following, when a recent TTE and/or MRI is inconclusive:

- Cardiac or pericardial mass
- Pericarditis
- Complications of cardiac surgery or evaluation of post-operative anatomy
- Cardiac thrombus in patients with technically limited TTE, TEE, or MRI
Clinical suspicion of arrhythmogenic right ventricular dysplasia (ARVD) or arrhythmogenic cardiomyopathy (ARVC)

Native aortic abnormalities if echocardiogram is indeterminate

**PEDCD-10.5: Radiation Dose**

- Radiation dosage for CCTA varies by facility and the particular protocol used. The American College of Radiology Clinical Statement on Noninvasive Cardiac Imaging states that “as a general rule a multi-detector CT encompassing the heart should not result in an effective dose of greater than 12 mSv.”
- CT scanners can deliver a radiation dose from as low as 2-5 mSv.
- Prospective gating and other techniques can reduce the radiation dose of cardiac CT studies to less than 5 mSv.
- See table: Practice Estimate of Effective Radiation Dose chart for Selected Imaging Studies in **CD-1: General Guidelines**

**References**

5. ESC Guidelines for the management of grown-up congenital heart disease (new version 2010) The Task Force on the Management of Grown-up Congenital Heart Disease of the European Society of Cardiology (ESC) Endorsed by the Association for European Paediatric Cardiology (AEPC)
6. ACC/AHA 2008 Guidelines for the Management of Adults With Congenital Heart Disease A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Develop Guidelines on the Management of Adults With Congenital Heart Disease)
7. AHA SCIENTIFIC STATEMENT Congenital Heart Disease in the Older Adult A Scientific Statement From the American Heart Association Ami B. Bhatt, Elyse Foster, Karen Kuehl, Joseph Alpert, Stephen Brabeck, Stephen Crumb, William R. Davidson, Michael G. Earing, Brian B. Ghoshhajra, Tara Karamlou, Seema Mital, Jennifer Ting, Zian H. Tseng and on behalf of the American Heart Association Council on Clinical Cardiology
8. Uptodate :Congenital and pediatric coronary artery abnormalitiesAuthors:Peter R Koenig, MD, FACC, FASEZiyad M Hijazi, MD, MPH, FAAP, FACC, MSCAI, FAHASSection Editor:John K Triedman, MDDeputy Editor:Gordon M Saperia, MD, FAC
9. Circulation. 2011 Jun 7;123(22):2607-52. doi: 10.1161/CIR.0b013e31821b1f10. Epub 2011 May 2. Indications for Cardiac Catheterization and Intervention in Pediatric Cardiac Disease A Scientific Statement From the American Heart Association Endorsed by the American Academy of Pediatrics and Society for Cardiovascular Angiography and Intervention Timothy F. Feltes, MD, FAHA, Chair; Emile Bacha, MD; Robert H. Beekman III, MD, FAHA; John P. Cheatham, MD; Jeffrey A. Feinstein, MD, MPH; Antoinette S. Gomes, MD, FAHA; Ziyad M. Hijazi, MD, MPH, FAHA; Frank F. Ing, MD; Michael de Moor, MBBCh; W. Robert Morrow, MD; Charles E. Mullins, MD, FAHA; Kathryn A. Taubert, PhD, FAHA; Evan M. Zahn, MD; on behalf of the American Heart Association Congenital Cardiac Defects Committee of the Council on Cardiovascular Disease in the Young, Council on Clinical Cardiology, and Council on Cardiovascular Radiology and Intervention

# Pediatric Chest Imaging Guidelines

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<td><strong>MRI</strong></td>
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<tr>
<td>Chest MRI without contrast</td>
<td>71550</td>
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<tr>
<td>Chest MRI with contrast (rarely used)</td>
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<tr>
<td>Chest MRI without and with contrast</td>
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<tr>
<td>Unlisted MRI procedure (for radiation planning or surgical software)</td>
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<tr>
<td><strong>MRA</strong></td>
<td></td>
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<tr>
<td>Chest MRA (non-cardiac)</td>
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<tr>
<td><strong>CT</strong></td>
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<tr>
<td>Chest CT without contrast</td>
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</tr>
<tr>
<td>Chest CT with contrast</td>
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<tr>
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<tr>
<td>CT Guidance for Placement of Radiation Therapy Fields</td>
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<tr>
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<tr>
<td>PET Imaging: whole body (this code not used in pediatrics)</td>
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</tr>
<tr>
<td>PET with concurrently acquired CT; limited area (this code rarely used in pediatrics)</td>
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<tr>
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<tr>
<td>Quantitative Differential Pulmonary Perfusion, Including Imaging When Performed</td>
<td>78597</td>
</tr>
<tr>
<td>Quantitative Differential Pulmonary Perfusion and Ventilation (e.g., Aerosol or Gas), Including Imaging When Performed</td>
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<tr>
<td><strong>Ultrasound</strong></td>
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<tr>
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<tr>
<td>Ultrasound, axilla</td>
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</tr>
<tr>
<td>Ultrasound, breast; <em>unilateral</em>, including axilla when performed; complete</td>
<td>76641</td>
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<tr>
<td>Ultrasound, breast; <em>unilateral</em>, including axilla when performed; limited</td>
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### PEDCH-1: General Guidelines

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**PEDCH-1.1: Pediatric Chest Imaging Age Considerations**

Many conditions affecting the chest in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients who are < 18 years old should be imaged according to the Pediatric Chest Imaging Guidelines, and patients who are ≥ 18 years old should be imaged according to the Adult Chest Imaging Guidelines, except where directed otherwise by a specific guideline section.

**PEDCH-1.2: Pediatric Chest Imaging Appropriate Clinical Evaluation**

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, and appropriate laboratory studies should be performed prior to considering advanced imaging (CT, MR, Nuclear Medicine), unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation.
- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the chest is not supported. Advanced imaging of the chest should only be approved in patients who have documented active clinical signs or symptoms of disease involving the chest.
- Unless otherwise stated in a specific guideline section, repeat imaging studies of the chest are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.

**PEDCH-1.3: Pediatric Chest Imaging Modality General Considerations**

- **MRI**
  - MRI Chest is generally performed without and with contrast (CPT® 71552) unless the patient has a documented contraindication to gadolinium or otherwise stated in a specific guideline section.
  - Due to the length of time for image acquisition and the need for the patient to lie still, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
    - MRI should be performed without and with contrast unless there is a specific contraindication to gadolinium use and strict criteria for contrast agent use should be applied in all cases.
    - Recent evidence-based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast. The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not
warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.

- If requesting clinicians indicate that a non-contrast study is being requested due to concerns regarding the use of gadolinium, the exam can be approved.
- If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently.
- The presence of surgical hardware or implanted devices may preclude MRI.
- The selection of best examination may require coordination between the provider and the imaging service.

CT
- CT Chest is generally performed either with contrast (CPT® 71260) or without contrast (CPT® 71250).
  - There are no generally accepted pediatric indications for CT Chest without and with contrast (CPT® 71270).
- CT should not be used to replace MRI in an attempt to avoid sedation unless listed as a recommended study in a specific guideline section.
- The selection of best examination may require coordination between the provider and the imaging service.

Ultrasound
- Ultrasound of the chest (CPT® 76604) or axilla (CPT® 76882) is indicated as an initial study for evaluating adenopathy, palpable chest wall lesions, pleural effusion or thickening, and patency of thoracic vasculature.
- For those patients who do require advanced imaging, ultrasound can be very beneficial in selecting the proper modality, body area, image sequences, and contrast level that will provide the most definitive information for the patient.

Nuclear Medicine
- Nuclear medicine studies other than PET/CT are very rarely used in evaluation of the pediatric chest.
- Pulmonary Ventilation-Perfusion Imaging (CPT® 78582) has been replaced by CTA (CPT® 71275) or CT (CPT® 71260) Chest with contrast, but can be approved for evaluation of suspected pulmonary embolism if CT is unavailable.
  - See CH-25: Pulmonary Embolism (PE) for additional imaging guidelines.
- Pulmonary Perfusion Imaging (CPT® 78580) should generally not be approved in lieu of CPT® 78582 for initial evaluation of suspected pulmonary embolism, but can be approved for follow up of an equivocal or positive recent ventilation-perfusion lung scan (CPT® 78582) to evaluate for interval change.
- Pulmonary Ventilation Imaging (CPT® 78579) should not be approved in lieu of CPT® 78582 for evaluation of suspected pulmonary embolism, but can be approved for additional evaluation of an abnormal perfusion-only scan (CPT® 78580).
Pulmonary split crystal function study (CPT® 78597 or CPT® 78598), also known as Quantitative Differential Pulmonary Perfusion, is indicated for preoperative planning of segmental, lobar, or lung resection.

Radiopharmaceutical nuclear medicine imaging of an inflammatory process (CPT® 78805, CPT® 78806, or CPT® 78807) is rarely performed, but is indicated for evaluation of sarcoidosis or toxicity from drug toxicity (cyclophosphamide, busulfan, bleomycin, amiodarone, or nitrofurantoin).

The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

References


PEDCH-2: Lymphadenopathy

▷ Axillary lymphadenopathy imaging indications in pediatric patients are identical to those for adult patients. See **CH-2.2: Axillary Lymphadenopathy** for imaging guidelines.

▷ Supraclavicular adenopathy in pediatric patients is almost always pathologic, and advanced imaging is indicated prior to excisional biopsy. Fine needle aspiration, while common in adults prior to advanced imaging, is inappropriate for evaluating lymphadenopathy in pediatric patients. Any of the following studies may be approved for evaluation of supraclavicular adenopathy in children:
  - CT Chest with contrast (CPT® 71260).
  - MRI Chest without and with contrast (CPT® 71552).
  - Ultrasound of the chest (CPT® 76604).

▷ If malignancy is suspected, see the appropriate imaging guidelines as below:
  - Lymphoma: **PEDONC-5: Pediatric Lymphomas**.
  - Soft tissue sarcoma: **PEDONC-8: Pediatric Soft Tissue Sarcomas**.
  - Neuroblastoma: **PEDONC-6: Neuroblastoma**.

Reference
PEDCH-3: Mediastinal Mass

The causes of mediastinal masses in children are generally different than those in adults, and the imaging considerations are different.

- Chest x-ray is indicated as an initial study for all patients with suspected mediastinal mass.
- CT Chest with contrast (CPT® 71260) is indicated for any pediatric patient with a mediastinal mass identified on chest x-ray.
  - Masses can be very large and anterior masses frequently cause compression of the trachea and/or mediastinal blood vessels.
- MRI Chest without and with contrast (CPT® 71552) is indicated for any pediatric patient with:
  - A posterior (paravertebral) mediastinal mass.
  - CT findings are inconclusive regarding specific anatomy.
  - MRI should not be used for patients with large anterior mediastinal masses if anesthesia is necessary to complete the study.
- If lymphoma is known or strongly suspected or there is evidence of tracheal compression on CT imaging, PET/CT (CPT® 78815) is indicated prior to biopsy in pediatric patients. See PEDONC-5: Pediatric Lymphoma for imaging guidelines.
- If neuroblastoma is known or strongly suspected, MIBG (CPT® 78804) is indicated and can be approved prior to biopsy in pediatric patients. See PEDONC-6: Neuroblastoma for imaging guidelines.
- Ultrasound (CPT® 76604) can be approved in children younger than 5 years old to distinguish prominent but otherwise normal thymus from true mediastinal mass.
- A single repeat CT Chest with contrast (CPT® 71260) can be approved to confirm stability and avoid biopsy for patients with NONE of the following features:
  - Anterior mediastinal mass.
  - Enlarged lymph nodes anywhere in the imaging field.
  - Lymphopenia.
  - Pleural effusion.

References
PEDCH-4.1: Imaging

- True hemoptysis is rare in pediatric patients, and a detailed history, physical examination, and appropriate laboratory studies should be performed prior to considering advanced imaging.
  - Aspirated blood from epistaxis or emesis frequently presents as hemoptysis, and history and physical examination will aid in this assessment.
- Chest x-ray is indicated as an initial study for stable patients.
  - Advanced imaging is not indicated for patients with epistaxis and a normal chest radiograph and no personal or family history of underlying lung disease or bleeding disorder.
  - Chest CT with contrast (CPT® 71260) is indicated for all other pediatric patients with hemoptysis.
    - Chest CT without contrast (CPT® 71250) can be approved for patients with a documented allergy to CT contrast or significant renal dysfunction.
- MRI is not indicated in the evaluation of pediatric hemoptysis.

References

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PEDCH-5.1: Cystic Fibrosis

- Chest x-ray is the primary study for initial evaluation of acute clinical symptoms in patients with cystic fibrosis.
- CT Chest without contrast (CPT® 71250) or with contrast (CPT® 71260) is indicated for the following (without initial chest x-ray):
  - Hemoptysis.
  - Pneumonia worsening despite antibiotic therapy.
  - Pleural effusion or empyema.
  - Suspected fungal pneumonia.
  - Monitoring treatment changes on bronchiectasis.
  - Expiratory CT for evaluating small airways disease.
  - Pre- and post-lung transplant evaluation.
- Low dose CT Chest without contrast (CPT® 71250) is indicated every 2 years for monitoring of bronchiectasis and small airways disease.

PEDCH-5.2: Bronchiectasis Not Associated with Cystic Fibrosis

- Bronchiectasis not associated with cystic fibrosis is rare in pediatric patients, and imaging indications are identical to those for adult patients. See CH-7: Bronchiectasis for imaging guidelines.

References

PEDCH-6: Bronchiolitis

Bronchiolitis is a self-limiting viral infection causing lower respiratory tract illness, most common in infants under 12 months of age.

- Advanced imaging is not indicated for routine evaluation or monitoring of bronchiolitis, but CT chest with contrast (CPT® 71260) can be approved for the following:
  - Pleural effusion or empyema on recent chest x-ray.
  - Immunocompromised patient with acute pulmonary symptoms.
  - Abnormality on recent chest x-ray suggesting condition other than bronchiolitis.

Reference
PEDCH-7: Pneumonia

- Pneumonia imaging indications in pediatric patients are very similar to those for adult patients. See CH-13: Pneumonia for imaging guidelines.
- Pediatric-specific imaging considerations include the following:
  - Immunocompromised patients with acute pulmonary symptoms should be imaged using CT Chest with contrast (CPT® 71260).
  - Patients with recurrent lower respiratory tract infections should undergo CT Chest without contrast (CPT® 71250) or with contrast (CPT® 71260).
  - Ultrasound of the chest (CPT® 76604) can be approved for evaluation of childhood pneumonia.

References
PEDCH-8: Solitary Pulmonary Nodule

The Fleischner Society guidelines for solitary pulmonary nodule management do not apply to pediatric patients. An incidental solitary pulmonary nodule in a child representing a primary lung carcinoma has never been reported in the literature. Similarly, an extrathoracic malignancy presenting with an incidental solitary pulmonary nodule in an otherwise healthy child is very rare.

- All children with a pulmonary nodule incidentally discovered on other imaging should have CT Chest with contrast (CPT® 71260) as a one-time evaluation.
- Follow up imaging of incidental solitary pulmonary nodules in asymptomatic healthy children is not necessary.
  - Follow up imaging is indicated for the following:
    - Immunocompromised patients.
    - Malignancy (see below).
    - Invasive infection.
    - New or worsening pulmonary symptoms.
- Children with a malignant solid tumor who have pulmonary nodules of any size should have imaging according to the guideline section for the specific cancer type. See Pediatric Oncology Imaging Guidelines for specific imaging indications.
- This guideline section does not apply to multiple pulmonary nodules, which are imaged according to the underlying disorder in pediatric patients.

Practice Notes

A nodule is any pulmonary or pleural lesion that is a discrete, spherical opacity 2-30 mm in diameter surrounded by normal lung tissue. A larger nodule is called a mass. Entities that are not nodules, and are considered benign, include non-spherical linear, sheet-like, two-dimensional or scarring opacities.

References

**PEDCH-9: Positive PPD or Tuberculosis**

- Positive PPD and tuberculosis imaging indications in pediatric patients are identical to those for adult patients. See **CH-14.1: PPD or TB** for imaging guidelines.
- Radiopharmaceutical nuclear medicine imaging of an inflammatory process (CPT® 78805, CPT® 78806, or CPT® 78807) is rarely performed, but is indicated for evaluation of tuberculosis.

**References**

PEDCH-10: Asthma

Advanced imaging is not indicated for routine evaluation or monitoring of asthma, but CT Chest without (CPT® 71250) or with (CPT® 71260) contrast can be approved for the following:

- Pleural effusion or empyema on recent chest x-ray.
- Immunocompromised patient with acute pulmonary symptoms.
- Abnormality on recent chest x-ray suggesting condition other than asthma, including suspected foreign body.
- Asthma and poor response to bronchodilators or conventional inhaled corticosteroid therapy in whom associated conditions, such as allergic bronchopulmonary aspergillosis and eosinophilic pneumonia can mimic asthma.

Reference
CT Chest without contrast (CPT® 71250) is indicated in patients with a pectus deformity for:

- Preoperative planning.
- Significant cardiac displacement after chest x-ray and echocardiography (CPT® 93306).
- Evidence of pulmonary impingement after chest x-ray and pulmonary function tests (PFTs) if there is increasing shortness of breath. Note: It may not be possible to obtain PFTs in children younger than 9 years old.
- CT Chest with contrast (CPT® 71260) or MRI of the chest without and with contrast (CPT® 71552) is indicated when congenital heart disease or Marfan’s syndrome is suspected in those with pectus deformities.

References

PEDCH-12: Breast Masses

See PEDONC-17: Pediatric Breast Masses for imaging guidelines.
### PEDCH-13: Vascular Malformations

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PEDCH-13.1: Vascular Ring

Vascular rings generally present with either respiratory symptoms (stridor, wheezing, tachypnea, cough) or feeding difficulties (dysphagia, slow feeding, hyperextension of the head while feeding, weight loss, failure to thrive) but can also be discovered incidentally on imaging obtained for other purposes.

- Chest x-ray is the recommended initial study in patients with respiratory symptoms.
- Barium esophagram is the recommended initial study in patients with feeding difficulties.
- Either CT Chest with contrast (CPT® 71260), Chest CTA (CPT® 71275) or Chest MRA (CPT® 71555) can be approved in patients with known or suspected vascular ring after chest x-ray or barium esophagram.
- Echocardiogram can be approved to rule out associated congenital heart disease.
  - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325 can be approved for initial evaluation of patients with vascular ring and no prior echocardiograms.

PEDCH-13.2: Other Vascular Malformations

See PEDPVD-2: Vascular Anomalies for imaging guidelines.

References

PEDCH-14.1: Congenital Cystic Lung Diseases

- This section includes common congenital cystic lung lesions such as:
  - Bronchogenic cyst
  - Congenital pulmonary airway malformation (congenital cystic adenomatoid malformation)

- Cystic Lung disease is often identified on prenatal ultrasound, and occasionally discovered incidentally on chest x-ray.

- Chest x-ray is indicated before considering advanced imaging.

- CT chest with contrast (CPT® 72160) may be approved when chest x-ray suggests a cystic lung lesion.

- MRI chest with and without contrast (CPT® 71552) can be approved if CT is inconclusive or if requested for pre-operative planning

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PEDHD-1.1: Pediatric Head Imaging Age Considerations

Many conditions affecting the head in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients who are < 18 years old should be imaged according to the pediatric head imaging guidelines and patients who are ≥ 18 years old should be imaged according to the adult head imaging guidelines, except where directed otherwise by a specific guideline section.

PEDHD-1.2: Pediatric Head Imaging Appropriate Clinical Evaluation

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination with a thorough neurologic examination, and appropriate laboratory studies should be performed prior to considering the use of an advanced imaging (CT, MR, Nuclear Medicine) procedure. An exception can be made if the patient is undergoing a guideline-supported, scheduled follow-up imaging evaluation.

- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the head is not supported. Advanced imaging of the head is only indicated in patients who have documented active clinical signs or symptoms of disease involving the head.
  - Advanced imaging of the head is not indicated for evaluation of recurrent isolated vomiting in patients without associated headache or focal neurologic findings unless a gastrointestinal workup (labs, imaging, and endoscopy) does not reveal a cause.

- Unless otherwise stated in a specific guideline section, repeat imaging studies of the head are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.

Requests for Studies with Overlapping Fields

- There are many CPT® codes for imaging the head that have significantly overlapping fields. In the majority of cases where multiple head CPT® codes are requested, only one CPT® code should be approved unless there is clear documentation of a need for the additional codes to cover all necessary body areas.

- See HD-1.1: General Guidelines - Anatomic Issues the correct coding of these studies.
PEDHD-1.3: Pediatric Head Imaging Modality General Considerations

MRI
- MRI is the preferred modality for imaging the pediatric head unless otherwise stated in a specific guideline section.
- Due to the length of time for image acquisition and the need for the patient to lie still, anesthesia is required for almost all infants except neonates and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
  - MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use since the patient already has intravenous access for anesthesia.
  - Recent evidence based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast.
  - The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.
  - If requesting clinicians indicate that a non-contrast study is being requested with specific concern for gadolinium retention, the exam can be approved.
  - If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session.

CT
- CT is generally inferior to MRI for imaging the pediatric head, but has specific indications in which it is the preferred modality listed in specific sections of these guidelines.
- CT should not be used to replace MRI in an attempt to avoid sedation unless listed as a recommended study in a specific guideline section.

Ultrasound
- Cranial ultrasound (CPT® 76506) is a non-invasive means of evaluating for intracranial abnormalities in infants with an open anterior fontanelle.
- Transcranial Doppler ultrasonography has some utility in select populations of older children with known or suspected intracranial vascular disease.
Nuclear Medicine

Nuclear medicine studies other than metabolic PET imaging on the pediatric brain or head are rarely performed in an elective outpatient setting, but the following studies can be approved when requested for the following indications:

- Brain Scintigraphy with or without vascular flow (any one of CPT® codes: CPT® 78600, CPT® 78601, CPT® 78605, or CPT® 78606)
- Establish brain death (rarely done in outpatient setting).
- Brain Imaging SPECT (CPT® 78607)
- Immune-compromised patients with mass lesion detected on CT or MRI for differentiation between lymphoma and infection.
- Brain Imaging Vascular Flow (CPT® 78610)
- Cerebral ischemia.
- Establish brain death.
- CSF Leakage Detection (CPT® 78650)
- Evaluation of CSF rhinorrhea or otorrhea, or refractory post-lumbar puncture headache.
- Radiopharmaceutical Dacryocystography (CPT® 78660)
- Suspected obstruction of nasolacrimal duct due to excessive tearing.

The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

References


## PEDHD-2: Specialized Imaging Techniques

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PEDHD-2.1: Magnetic Resonance Spectroscopy (MRS, CPT® 76390)

Magnetic Resonance Spectroscopy involves the analysis of the levels of certain chemicals in pre-selected voxels (small regions) on an MRI scan done at the same time.

**NOTE:** Certain payers consider MRS investigational, and their coverage policies may take precedence over eviCore healthcare guidelines.

Uses in pediatric neuro-oncology: See PEDONC-4: Pediatric CNS Tumors for imaging indications.

**Uses in Metabolic Disorders:**
- These cases should be forwarded for medical director review.
- MRS is associated with disease-specific characteristics findings and is indicated for diagnosis and disease monitoring in the following metabolic disorders:
  - Canavan disease.
  - Creatine deficiency.
  - Nonketotic hyperglycinemia.
  - Maple Syrup Urine disease.
- MRS has nonspecific abnormal patterns that can aid in the diagnosis of the following metabolic disorders, but is not routinely indicated for disease monitoring:
  - Metachromatic leukodystrophy.
  - Pelizaeus-Merzbacher disease.
  - Hypomyelination and Congenital Cataract.
  - Globoid Cell Leukodystrophy (Krabbe disease).
  - X-linked adrenoleukodystrophy.
  - Mitochondrial disorders.
  - Alexander disease.
  - Megalencephalic leukoencephalopathy with subcortical cysts.
  - Vanishing White Matter disease.
- MRS can be approved for disease monitoring of these diagnoses when recent MRI findings are inconclusive and a change in therapy is being considered.
- MRS is considered investigational for all other pediatric indications at this time.

PEDHD-2.2: Functional Magnetic Resonance Imaging (fMRI, CPT® 70554 and CPT® 70555)

- These cases should be forwarded for medical director review.
- fMRI is indicated to define eloquent areas of the brain as part of preoperative planning for epilepsy surgery or removal of a mass lesion.
  - The documentation should be clear that brain surgery is planned.
  - Can be approved concurrently with MRI Brain (CPT® 70551 or CPT® 70553) and/or PET Brain Metabolic (CPT® 78608 or CPT® 78609).
- fMRI is considered investigational for all other pediatric indications at this time.
PEDHD-2.3: PET Brain Imaging (CPT® 78608 and CPT® 78609)

- These cases should be forwarded for medical director review.
- Uses in pediatric neuro-oncology: See PEDONC-4: Pediatric CNS Tumors for imaging indications.
- PET Brain is indicated to define active areas of the brain as part of preoperative planning for epilepsy surgery.
  - The documentation should be clear that brain surgery is planned.
  - Can be approved concurrently with MRI Brain (CPT® 70551 or CPT® 70553) and/or fMRI (CPT® 70554 or CPT® 70555).
- PET Brain is considered investigational for all other pediatric indications at this time.

References

**PEDHD-3: Pediatric Headache**

Headache is a very common complaint in school aged children and adolescents. Many of these children have a family history of one of the primary headache disorders, such as migraine or tension headache.

- A recent (within 60 days) evaluation including a detailed headache history, physical examination with a thorough neurologic examination, and appropriate laboratory studies should be performed prior to considering advanced imaging.
- Advanced imaging is not indicated for pediatric patients with headache in the absence of red flag symptoms. Sensitivity and specificity of MRI are greater than that of CT for intracranial lesions.

**MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553)** is indicated for children with headaches and at least one of the following red flags:

- Age ≤ 5 years.
- Headaches awakening from sleep or always present in the morning.
- Focal findings on neurologic examination including diplopia.
- Clumsiness (common description of gait or coordination problems in young children).
- Headaches associated with morning nausea/vomiting.
- New onset of seizure activity with focal features.
- Papilledema on physical exam.
- Headache precipitated by coughing, sneezing, or Valsalva.
- Progressive worsening in headache frequency and severity without period of temporary improvement.
- Systemic symptoms such as persistent fever, weight loss, rash, or joint pain.
- Immunocompromised patient.
- Patient with hypercoagulable state or bleeding disorder.
- Known history of cancer of any type.
- Known autoimmune or rheumatologic disease.
- Known genetic disorder with predisposition to intracranial mass lesions.
- History of stable chronic headaches with recent significant change in frequency or severity.
- Patients requiring sedation should generally have MRI studies without and with contrast. See **PEDHD-1.3: Pediatric Head Imaging Modality General Considerations**.

- CT Head poorly visualizes the posterior fossa in children and is generally insufficient to evaluate pediatric headaches with red flag symptoms. CT should not be approved in lieu of MRI solely to avoid sedation.

- CT Head without contrast is indicated for pediatric headache with one or more of the following:
  - Recent head trauma.
  - Suspected skull or other bony involvement.
  - Ventriculoperitoneal shunt with suspected shunt malfunction. See **PEDHD-7: Macroccephaly, Microcephaly, and Hydrocephalus** for additional imaging.
  - Sudden onset (thunderclap) headache with suspected intracranial hemorrhage.
MRI is contraindicated due to implantable device or rapid clinical deterioration.

MRA Brain or CTA Head are not generally medically necessary in the evaluation of headache in children unless a vascular lesion has been seen or suspected on a prior brain MRI Brain or CT Head.

Concurrent approval of both MRI and MRA is generally not indicated.

MRV Head (CPT® 70544) is indicated in pediatric patients with papilledema and headache. See PEDHD-22: Pseudotumor Cerebri for additional imaging guidelines.

References
### PEDHD-4: Pediatric Head and Face Trauma

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PEDHD-4.1: Head Trauma

In patients with recent head trauma, a history focused on the incident and careful examination of the head, neck, and neurological function should be performed prior to considering advanced imaging.

- Advanced imaging is not indicated for children with minor head trauma and none of the following red flags:
  - Loss of consciousness.
  - Altered mental status.
  - Known or suspected skull fracture.
  - Glasgow Coma Score ≤ 13.
- CT Head without contrast (CPT® 70450) is the primary advanced imaging study in patients with acute head trauma.
  - CT Maxillofacial without contrast (CPT® 70486), Orbits/Temporal bone without contrast (CPT® 70480), or CT Cervical spine without contrast (CPT® 72125) is indicated if there has been associated injury to those structures.
- Brain MRI without contrast (CPT® 70551) is indicated for the following:
  - Children with an abnormal neurological exam that is not explained by the CT findings.
  - Children suspected of being the victims of physical abuse. See PEDMS-7: Suspected Physical Child Abuse for imaging considerations.
- Following a head injury, a repeat head CT Head without contrast (CPT® 70450) or MRI Brain without contrast (CPT® 70551) is indicated if the child develops fixed or fluctuating diminished mental acuity or alertness, or new abnormalities on neurological examination.
- Follow-up of known or treated subdural or epidural hematoma may require frequent imaging during the initial 8 weeks following injury, and these requests should generally be approved.
  - These cases should be forwarded for medical director review.
- Currently there is no well-validated pediatric version of the Canadian or New Orleans Head CT Rule to aid in deciding which children seen after recent head trauma would benefit from head CT.

PEDHD-4.2: Facial Trauma

- CT without contrast is the preferred imaging study in facial trauma.

Coding of Facial Imaging

Both orbital/facial bone CT (CPT® 70480) and maxillofacial CT (CPT® 70486) cover the structures of the orbits, sinuses, and face. Unless there is a grounded suspicion of simultaneous involvement of more posterior lesions, especially of the region involving the middle or inner ear, one of these studies only should be sufficient.

Maxillofacial CT (CPT® 70486) is the usual study (except in obvious orbital or temporal bone trauma), but either study is appropriate.
References


### PEDHD-5: Sinusitis and Allergic Rhinitis

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PEDHD-5.1: General Considerations

- Acute sinusitis is a clinical diagnosis, and imaging is not indicated to establish a diagnosis. Acute bacterial sinusitis can be presumptively diagnosed in a child with acute upper respiratory infection (URI) symptoms and any of the following:
  - Persistent symptoms lasting > 10 days without improvement.
  - Worsening symptoms after initial period of improvement.
  - Severe symptoms including purulent nasal discharge and fever > 102.2°F for at least 3 consecutive days.
  - Presumed bacterial infections should be treated empirically with appropriate antibiotics.
  - Imaging of any kind cannot distinguish bacterial from viral sinusitis.

PEDHD-5.2: Imaging Indications in Sinusitis

- Mild mucosal thickening in the paranasal sinuses or mastoids is an extremely common incidental finding noted on head imaging studies done for other indications. If there are no other abnormalities of facial structures noted, this finding is not an indication for advanced imaging of the sinuses or temporal bone.

- CT of the sinuses without contrast (CPT® 70486) is indicated if any of the following is present:
  - No improvement after 10 days of appropriate antibiotic treatment.
    - Generally this will be amoxicillin/clavulanate, amoxicillin, cefdinir, cefuroxime, cefpodoxime, or ceftriaxone.
  - Recurrence of a treated infection within 8 weeks of effective treatment.
  - Chronic sinusitis (persistent residual URI symptoms for > 90 days).
  - Known or suspected fungal sinusitis.
  - Preoperative evaluation to assess surgical candidacy.

- CT of the sinuses with contrast (CPT® 70487) can be performed if any of the following is present:
  - Orbital or facial cellulitis.
  - Proptosis.
  - Abnormal visual examination.
  - Ophthalmoplegia.
  - Cystic fibrosis.
  - Immunocompromised patient.
  - Fungal or vascular lesions visualized in nasal cavity.

- CT Head with contrast (CPT® 70460) or MRI Brain without and with contrast (CPT® 70553) is indicated if any of the following are present:
  - Focal neurologic findings.
  - Altered mental status.
  - Seizures.

- Repeat sinus imaging is generally not indicated for patients who have responded satisfactorily to treatment, but can be approved with clear documentation of the need for updated CT results to direct acute patient care decisions.
  - These cases should be forwarded for medical director review.
**PEDHD-5.3: Stereotactic CT Localization (CPT® 77011)**

Stereotactic CT localization is frequently obtained prior to sinus surgery. The dataset is then loaded into the navigational workstation in the operating room for use during the surgical procedure. The information provides exact positioning of surgical instruments with regard to the patient’s 3D CT images. In most cases, the preoperative CT is a technical-only service that does not require interpretation by a radiologist.

- The imaging facility should report CPT® 77011 when performing a scan not requiring interpretation by a radiologist.
- If a diagnostic scan is performed and interpreted by a radiologist, the appropriate diagnostic CT code (e.g. CPT® 70486) should be used.
- It is not appropriate to report both CPT® 70486 and CPT® 77011 for the same CT stereotactic localization imaging session.
- 3D Rendering (codes CPT® 76376 or CPT® 76377) should not be reported in conjunction with CPT® 77011 (or CPT® 70486 if used). The procedure inherently generates a 3D dataset.
- Such operative studies are indicated when ordered by the operating surgeon for this purpose.

**PEDHD-5.4: Requests for both Head and Sinus Imaging**

- Head CT does not visualize all of the sinuses.
- Head MRI provides excellent visualization of the sinuses sufficient to recognize sinusitis, and addition of sinus CT for this purpose is unnecessary.
- In patients being evaluated for potential sinus surgery, separate sinus CT is often appropriate even after a head MRI in order to visualize obstructions to spontaneous mucous flow. See PEDHD-5.3: Stereotactic CT Localization (CPT® 77011).
- Separate head imaging is not generally indicated in patients with a normal neurological examination who have headaches associated with sinus symptoms.
- Sinus CT or MRI is not indicated for the evaluation of headaches or neurological complaints without a more specific indication pointing to a sinus etiology.

**PEDHD-5.5: Allergic Rhinitis**

- Advanced imaging is not indicated for diagnosis or management of patients with uncomplicated allergic rhinitis.

**PEDHD-5.6: Other Indications for Sinus Imaging**

See PEDHD-4.2: Facial Trauma for imaging guidelines in trauma.

- Congenital anomalies of facial structures - CT without contrast (CPT® 70486).
- 3-D CT reconstructed images (CPT® 76377) in conjunction with routine CT should be an integral part of the examination in evaluating craniofacial abnormalities.
- Tumors or other disorders of facial structures - CT without and with contrast (CPT® 70488) or MRI Orbits/Face/Neck without and with contrast (CPT® 70543).
- Obstructive sleep apnea—See PEDHD-24: Pediatric Sleep Disorders for imaging guidelines.
References


PEDHD-6: Epilepsy and Other Seizure Disorders

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**PEDHD-6: Epilepsy and Other Seizure Disorders**

A recent (within 60 days) face to face evaluation including a detailed history, physical examination with a thorough neurologic examination, and appropriate laboratory studies should be performed prior to considering the use of an advanced imaging (CT, MR, Nuclear Medicine) procedure. An exception can be made if the patient is undergoing guideline-supported, scheduled follow-up imaging evaluation. This clinical evaluation should also include family history and (whenever possible) the accounts of eyewitnesses to the event(s).

**PEDHD-6.1: Initial Imaging of Non-Febrile Seizures**

- MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated for the following:
  - First-time seizure in child ≥ 12 months of age that has no known cause and is not associated with fever.
  - Partial seizures.
  - Focal neurologic deficits.
  - Inconclusive findings on recent cranial ultrasound or CT Head.
  - If patient meets criteria for MRI imaging for initial imaging of non-febrile seizure, MRI is approvable even with a recent negative CT.
  - Patients requiring sedation should generally not have non-contrast MRI studies. See [PEDHD-1.3: Pediatric Head Imaging Modality General Considerations](#).

- CT Head without contrast (CPT® 70450) is indicated for the following:
  - First-time seizure in child associated with recent head trauma.
  - Patient cannot safely undergo MRI (avoidance of sedation is not an indication).

- Cranial ultrasound (CPT® 76506) is indicated for the following:
  - First-time seizure in child < 12 months of age that has no known cause and is not associated with fever if the infant has an open fontanelle.

- The following imaging tests do not generally add valuable information initially and are not indicated for the initial evaluation of seizures in children:
  - CTA Head or Neck.
  - MRA Head or Neck.
  - MRI Cervical, Thoracic, or Lumbar Spine.

**PEDHD-6.2: Repeat imaging indications**

- Repeat MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated for the following:
  - Need to perform MRI using Epilepsy Protocol (typically 3T magnet with thin section angled slices through hippocampus and temporal lobes, either without or without and with contrast).
  - New or worsening focal neurologic deficits.
  - Increase in severity or frequency of seizures despite documented therapeutic antiepileptic drug levels.
  - Change in seizure type.
  - Preoperative evaluation for epilepsy surgery.
  - Patients requiring sedation should generally not have non-contrast MRI studies. See [PEDHD-1.3: Pediatric Head Imaging Modality General Considerations](#).
**PEDHD-6.3: Special Imaging Studies in Evaluation for Epilepsy Surgery**

For patients with a previous brain MRI and documentation of intractable epilepsy for which surgical treatment or another interventional modality is under active consideration, any of the following are indicated for preoperative planning:

- These cases should be forwarded for medical director review
- PET Brain Metabolic (CPT® 78608 or CPT® 78609).
- Functional MRI Brain (CPT® 70554 or CPT® 70555).
- MR Spectroscopy (CPT® 76390).
  - NOTE: Certain payers consider MR Spectroscopy investigational/experimental, and those coverage policies take precedence over eviCore Imaging Guidelines.

**PEDHD-6.4: Febrile Seizures**

A typical febrile seizure is a generalized seizure occurring in the presence of fever (T > 100.4°F) and no central nervous system infection in a child between the age of 6 months and 5 years.

- Neuroimaging should not be performed in the routine evaluation of children with simple febrile seizures.
- MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated for febrile seizures in the presence of one or more of the following:
  - Seizure lasting > 15 minutes.
  - Partial seizures.
  - Focal neurologic deficits.
  - Multiple seizures within 24 hours.
  - Macrocephaly
  - Signs and symptoms of increased intracranial pressure.
References


### PEDHD-7: Macrocephaly, Microcephaly, and Hydrocephalus

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PEDHD-7.1: Macrocephaly

Macrocephaly is defined as head circumference that is greater than the 95th percentile for age and sex, established by use of measurements and CDC growth charts. An online calculator to determine head circumference percentile is available at: http://www.infantchart.com/cdc0to3headforage.php.

Birth to age 12 months:

- Ultrasound of the head (CPT® 76506) is indicated initially in patients with an open fontanelle.
- If hydrocephalus or hemorrhage is present on ultrasound, CT Head without contrast (CPT® 70450) is indicated.
- For any abnormality seen on ultrasound, MRI Brain without and with contrast (CPT® 70553) is indicated.

Age 13 months and older:

- MRI Brain without and with contrast (CPT® 70553) is indicated.
- CT is generally not indicated in this age group since uncomplicated hydrocephalus is less likely after early infancy.

PEDHD-7.2: Microcephaly

- Microcephaly is defined as head circumference that is less than the 5th percentile for age and sex, established by use of measurements and CDC growth charts. An online calculator to determine head circumference percentile is available at: http://www.infantchart.com/cdc0to3headforage.php.
- MRI Brain without and with contrast (CPT® 70553) is indicated for all patients.
  - CT is generally not recommended as that modality lacks the sensitivity to detect the relevant anatomical abnormalities.

PEDHD-7.3: Hydrocephalus

- This is the most common identifiable cause of macrocephaly. Almost all hydrocephalus is obstructive, except hydrocephalus due to choroid plexus papillomas. See PEDONC-4.13: Choroid Plexus Tumors for imaging guidelines for those lesions.
- Hydrocephalus is traditionally divided into non-communicating (the obstruction lies within the course of the brain’s ventricular system) and communicating (the obstruction is distal to the ventricular system).
- Patients requiring sedation should generally not have non-contrast MRI studies. See PEDHD-1.3: Pediatric Head Imaging Modality General Considerations.
**Initial Imaging Indications**

**Age 0-6 months:**
- Screening head ultrasound examination (CPT® 76506)
- If ultrasound shows hydrocephalus, MRI Brain without and with contrast (CPT® 70553) is indicated.
- Serial US (CPT® 76506) can be used to monitor ventricular size to determine need and timing of placement of a ventricular catheter.

**Greater than 6 months old:**
- MRI Brain without and with contrast (CPT® 70553) is indicated.

**Spine imaging:**
- MRI Spine without and with contrast (CPT® 72156, CPT® 72157, and CPT® 72158) may be indicated in individuals with Chiari malformation (multiple spine segments), Dandy-Walker malformation (cervical spine only), or malignant infiltration of the meninges.

**Repeat Imaging Indications**
- Rapid MRI Brain without contrast (CPT® 70551) or CT Head without contrast (CPT® 70450) is indicated for any new signs or symptoms suggesting shunt malfunction, including (but not limited to) sepsis, decreased level of consciousness, protracted vomiting, visual or neurologic deterioration, decline of mentation after initial improvement, or new or changing pattern of seizures. Rapid MRI Brain without contrast (CPT® 70551) or CT Head without contrast (CPT® 70450) is indicated following shunt placement and then every 12 months for patients with stable clinical findings.
  - Rapid MRI provides more anatomical detail and does not involve radiation exposure, but many providers use head CT as rapid MRI is not universally available.
  - For routine follow up imaging with CT a low dose protocol should be used.
- Shunting into the peritoneum (VP shunts) can give rise to abdominal complications, but these are generally symptomatic, so surveillance imaging of the abdomen is not indicated.
  - Abdominal ultrasound (CPT® 76700) can be approved for suspicion of CSF pseudocyst formation or distal shunt outlet obstruction.
- Familial screening is not indicated for hydrocephalus except in siblings of individuals with aqueductal stenosis, for whom a one-time CT Head without contrast (CPT® 70450) or Rapid MRI Brain without contrast (CPT® 70551) is indicated.

**Additional Rarely Used Studies**
- Cisternogram (CPT® 78630) is rarely done in children but can be approved for the following:
  - Known hydrocephalus with worsening symptoms.
  - Suspected obstructive hydrocephalus.
  - Suspected normal pressure hydrocephalus with gait disturbance and either dementia or urinary incontinence.
Cerebrospinal Ventriculography (CPT® 78635) is rarely done in children but can be approved for the following:
- Evaluation of internal shunt, porencephalic cyst, or posterior fossa cyst.

Nuclear Medicine Shunt Evaluation (CPT® 78645) and CSF Flow SPECT (CPT® 78647) are rarely done in children but can be approved for the following:
- Suspected malfunction of ventriculoperitoneal, ventriculopleural, or ventriculovenous shunts.

References
**PEDHD-8.1: Imaging**

Craniosynostosis is the premature closure of one or more cranial sutures, usually during infancy. Abnormal head shape is the common clinical feature.

- CT head without contrast (CPT® 70450) is indicated in the diagnosis of craniosynostosis, with reported sensitivity near 100%. CT also detects associated intracranial pathology.
- 3D rendering (CPT® 76377) is indicated with the initial diagnostic CT to evaluate the extent of synostosis and determine surgical candidacy or for preoperative planning.
- CT Maxillofacial (CPT® 70486) and CT Orbits (CPT® 70480) without contrast are generally not necessary to evaluate patients with craniosynostosis but are indicated if the craniosynostosis is part of a larger congenital defect which also involves the bones of the face or orbit.
- Head Ultrasonography (CPT® 76506) is an alternative method of assessing sutural patency in neonates and infants when radiographs are indeterminate.
- A postoperative CT head without contrast (CPT® 70450) may be performed at the discretion of the specialist coordinating the patient’s care.

**References**

   [http://journals.lww.com/plasreconsurg/Abstract/2014/05000/Evidence_Based_Medicine__Craniosynostosis.36.aspx](http://journals.lww.com/plasreconsurg/Abstract/2014/05000/Evidence_Based_Medicine__Craniosynostosis.36.aspx)
## PEDHD-9: Chiari and Skull Base Malformations

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**PEDHD-9.1: Chiari I Malformations**

This is the most common, involving caudal displacement or herniation of the cerebellar tonsils. Chiari I is often associated with syringomyelia, and rarely with hydrocephalus. Most cases are asymptomatic and discovered incidentally on a head scan performed for another indication. When symptoms are present, they are usually nonspecific but can include headache, lower cranial nerve palsies, or sleep apnea.

- For initial evaluation, MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) and MRI of the entire spine without contrast (CPT® 72141, CPT® 72146, CPT® 72148) or without and with contrast (CPT® 72156, CPT® 72157, CPT® 72158) is indicated.
  - Patients requiring sedation should generally not have non-contrast MRI studies.
  - See **PEDHD-1.3: Pediatric Head Imaging Modality General Considerations**.

- Repeat MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated for patients with a known Chiari I malformation when any of the following are present:
  - There are new or worsening signs or symptoms documented on a physical examination within 60 days of the imaging request.
  - A surgical procedure is actively being considered.

- Repeat MRI Spine imaging is not indicated for patients with normal initial spine imaging unless there are new or worsening signs or symptoms that suggest spinal cord pathology documented on a physical examination within 60 days of the imaging request.
  - These cases should be forwarded for medical director review.

**PEDHD-9.2: Chiari II Malformations**

These malformations are less common and more severe than Chiari I malformations. These patients usually present at birth. Myelomeningocele is always present, and syringomyelia and hydrocephalus are extremely common.

- Ultrasound is the initial examination in infants to determine ventricular size and associated anomalies and to provide a baseline for follow up evaluation.

- For initial advance imaging evaluation, MRI Brain without and with contrast (CPT® 70553) and MRI of the entire spine without and with contrast (CPT® 72156, CPT® 72157, CPT® 72158) is indicated.

- Repeat brain and spine imaging in individuals with Chiari II malformations is highly individualized and is indicated at the discretion of the specialist coordinating the patient’s care for this condition.
  - These cases should be forwarded for medical director review.

- Familial screening is not indicated for Chiari II Malformations.
PEDHD-9.3: Chiari III and IV Malformations

Chiari III malformation includes cerebellar herniation into a high cervical myelomeningocele. Chiari IV malformation refers to complete cerebellar agenesis. Both Chiari III and IV malformations are noted at birth, and are rarely compatible with life.

- Repeat brain and spine imaging in individuals with Chiari III and IV malformations is highly individualized and is indicated at the discretion of the specialist coordinating the patient’s care for this condition.
- These cases should be forwarded for medical director review.
- Familial screening is not indicated for Chiari III or IV Malformations.

PEDHD-9.4: Basilar Impression

Basilar impression involves malformation of the occipital bone in relation to C1/2 (cervical vertebrae 1 and 2). The top of the spinal cord is inside the posterior fossa and the foramen magnum is undersized. Over time, this can lead to brain stem and upper spinal cord compression. Basilar impression can also be associated with the Chiari malformation, producing very complex anatomical abnormalities.

- MRI Brain (CPT® 70551) and cervical spine (CPT® 72141) without contrast are indicated.
- If surgery is being considered, CT Head (CPT® 70450) and cervical spine (CPT® 72125) without contrast are also indicated.
- Basilar impression appears to be genetic, and one-time screening of first-degree relatives with MRI Brain without contrast (CPT® 70551) can be approved.

PEDHD-9.5: Platybasia

Platybasia is a flattening malformation of the skull base, in which the clivus has a horizontal orientation.

- Patients are usually asymptomatic, but either MRI Brain without contrast (CPT® 70551) or CT Head without contrast (CPT® 70450) is indicated to establish a positive diagnosis.
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### PEDHD-10: Intracranial Aneurysms and AVM

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PEDHD-10.1: Pediatric Intracranial Aneurysms

Unlike adults, the majority of pediatric aneurysms are caused by genetic or developmental defects rather than environmental or lifestyle factors.

Pediatric aneurysms most commonly present with subarachnoid hemorrhage, headache, increased intracranial pressure, seizure activity, or focal neurologic findings.

- A recent (within 60 days) evaluation including a detailed history, physical examination with a thorough neurologic examination, and appropriate laboratory studies should be performed prior to considering advanced imaging, unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation.
  - For patients presenting with suspected subarachnoid hemorrhage, CT Head without contrast (CPT® 70450) or MRI Brain without contrast (CPT® 70551) is indicated as an initial study.
    - If subarachnoid hemorrhage is present on CT or MRI, or lumbar puncture findings suggest hemorrhage, additional imaging with CTA Head (CPT® 70496) or MRA Head without contrast (CPT® 70544) is indicated.
  - For patients presenting with headache, increased intracranial pressure, seizures, or focal neurologic findings, MRI without and with contrast (CPT® 70553) is indicated as an initial study.
    - If findings suspicious for intracranial aneurysm are present on MRI, additional imaging with CTA Head (CPT® 70496) or MRA Head without contrast (CPT® 70544) is indicated.
  - For patients with known unruptured aneurysm presenting with headache, increased intracranial pressure, seizures, or focal neurologic findings, MRI without contrast (CPT® 70551) or without and with contrast (CPT® 70553) and MRA Head without contrast (CPT® 70544) are indicated.
  - For patients with any of the following conditions and headache, increased intracranial pressure, seizures, or focal neurologic findings, MRI without contrast (CPT® 70551) or without and with contrast (CPT® 70553) and MRA Head without contrast (CPT® 70544) are indicated:
    - Polycystic kidney disease.
    - Fibromuscular dysplasia.
    - Ehlers-Danlos Syndrome.
    - Klippel-Trenaunay-Weber Syndrome.
    - Tuberous Sclerosis.
    - Moyamoya Syndrome.
    - Hereditary Hemorrhagic Telangiectasia (Osler-Weber-Rendu Syndrome).
    - Pseudoxanthoma elasticum.
    - Neurofibromatosis type 1.
    - Patients requiring sedation should generally not have non-contrast MRI studies.
      See PEDHD-1.3: Pediatric Head Imaging Modality General Considerations.
  - The timing of follow-up imaging for intracranial aneurysms in children is similar to that in adults. See HD-12.1: Intracranial Aneurysms for follow-up imaging guidelines.
Screening MRI Brain or MRA Head for aneurysms is not supported in asymptomatic patients under age 20 since only 0.6% of ruptured aneurysms occur in the pediatric age range.

Screening MRI Brain or MRA Head for aneurysms is not supported in patients with coarctation of the aorta repaired before age 3 since there is not an increased risk for intracranial aneurysm in this patient population.

**PEDHD-10.2: Pediatric Intracranial Arteriovenous Malformations (AVM)**

A recent (within 60 days) evaluation including a detailed history, physical examination with a thorough neurologic examination, and appropriate laboratory studies should be performed prior to considering advanced imaging, unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation.

Most intracranial AVMs are congenital, vary widely in their location and type, and are discovered at birth due to associated clinical findings or incidentally later in life. Certain hereditary conditions are associated with an increased risk for AVM development.

Vascular malformations include arteriovenous, venous, cavernous, and capillary malformations. The vein of Galen malformation is the most common arteriovenous malformation, presenting in neonates with signs of high output congestive heart failure or later in infancy of childhood with signs of hydrocephalus. Low flow venous, cavernous, and capillary malformations may be asymptomatic and discovered incidentally or they may present in childhood with seizures or neurologic findings secondary to intracranial hemorrhage.

Head ultrasound (CPT® 76506) is the study of choice for evaluation of a suspected vein of Galen malformation in the neonate. Once confirmed, MRI or conventional angiography are required to precisely identify the feeding arteries and draining vein, especially if embolization is planned.

MRA or CTA are indicated for diagnosis of low flow malformations.

- MRI Brain without and with contrast (CPT® 70553) is the initial study of choice for evaluation of suspected AVM after the neonate period.
  - Patients requiring sedation should generally not have non-contrast MRI studies.
  - See **PEDHD-1.3: Pediatric Head Imaging Modality General Considerations**.
  - MRA, CTA, or CT are generally not indicated prior to completion of initial MRI.

- For patients with known AVM, MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553), and MRA Brain (CPT® 70544) or CTA Head (CPT® 70496) are indicated in the following circumstances:
  - New or worsening headaches, seizures, or focal neurologic symptoms.
  - Preoperative planning (including embolization).

- Head imaging for AVM screening is indicated for the following conditions:
  - Hereditary Hemorrhagic Telangiectasia (Osler-Weber-Rendu Syndrome).
    - MRI Brain without and with contrast (CPT® 70553) is indicated as an initial screening study for infants born to a parent with known HHT.
MRI Brain without and with contrast (CPT® 70553) at the time of diagnosis, and a single repeat study after the age of 20.
- Ongoing surveillance imaging is not indicated for patients without new or worsening symptoms.
- Repeat MRI alone or with MRA or CTA (as above) is indicated for clinical signs or symptoms concerning for progression in a patient with a known AVM.

Capillary Malformation-Arteriovenous Malformation (CM-AVM)
- Caused by RASA1 mutations.
- MRI Brain without and with contrast (CPT® 70553) at the time of diagnosis.
- Ongoing surveillance imaging is not indicated for patients without new or worsening symptoms.
- Repeat MRI alone or with MRA or CTA (as above) is indicated for clinical signs or symptoms concerning for progression in a patient with a known AVM.
- See PEDPVD-2: Vascular Anomalies.

Sturge-Weber Syndrome:
- MRI Brain without and with contrast (CPT® 70553) and MRI Face/Neck (CPT® 70543) at the time of diagnosis.
- Ongoing surveillance imaging is not indicated for patients without new or worsening symptoms.
- Repeat MRI alone or with MRA or CTA (as above) is indicated for clinical signs or symptoms concerning for progression in a patient with a known AVM.

Cerebral Cavernous Malformations:
- Also known as cavernomas, cavernous angiomas, or cryptic vascular malformations.
- MRI Brain without and with contrast (CPT® 70553) and MRI Cervical (CPT® 72156) and Thoracic (CPT® 72157) Spine without and with contrast at the time of diagnosis.
- Ongoing surveillance imaging is not indicated for patients without new or worsening symptoms.
- Repeat MRI alone or with MRA or CTA (as above) is indicated for clinical signs or symptoms concerning for progression in a patient with a known AVM.
References


Syncope in children is almost always neurocardiogenic (vasovagal) in nature. Intracranial mass lesions do not cause isolated syncope. Syncope and seizure activity can often be challenging to distinguish for unwitnessed syncope.

- Advanced imaging of the brain is not indicated for patients with isolated syncope without focal neurologic findings. See PEDCD-5: Syncope and PEDHD-6: Epilepsy and Other Seizure Disorders for additional imaging considerations.

References
## PEDHD-12: Pediatric Stroke

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PEDHD-12.1: General Considerations

Imaging indications are the same for neonates as for older children.

PEDHD-12.2: Pediatric Stroke Initial Imaging

- As pediatric strokes may be hemorrhagic, CT Head without contrast (CPT® 70450) is generally the initial study indicated.
  - MRI Brain without contrast (CPT® 70551) can be performed in lieu of initial CT if emergently available for evaluation of acute stroke symptoms.
- After the initial study, any of the following studies are indicated for further evaluation of pediatric stroke:
  - MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553).
  - MRA Head without contrast (CPT® 70544) and Neck with contrast (CPT® 70548).
  - CTA Head (CPT® 70496) and Neck (CPT® 70498).
  - These cases should be forwarded for medical director review.

PEDHD-12.3: Pediatric Stroke Subsequent Imaging

- MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated for any new or worsening neurological findings or seizure activity.
- Most pediatric patients do not benefit from surveillance imaging after stroke, but specific surveillance imaging indications for specified conditions are listed in the disease-specific section.
  - MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553).
  - These cases should be forwarded for medical director review.

PEDHD-12.4: Moyamoya Disease

Initial imaging

- MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) MRA Head (CPT® 70544) and Neck (CPT® 70548) are indicated for all patients. Head and Neck CTA (CPT® 70496 and CPT® 70498) can be approved if MRI is contraindicated or not readily available.

Repeat imaging

- Head MRA (CPT® 70544) every 12 months. Head CTA (CPT® 70496) can be approved if MRI is contraindicated or not readily available.
- MRI Brain without contrast (CPT® 70551) every 12 months.

PEDHD-12.5: Sickle Cell Disease

Patients with sickle cell disease are at significantly increased risk for stroke and silent infarction, beginning at a very young age. Recent advances allow physicians to identify patients at high risk for stroke and begin a primary stroke prevention program.

- The following imaging is indicated for all sickle cell patients with a severe phenotype (Hgb SS or Hgb Sβ0):
  - Transcranial Doppler Ultrasound (CPT® 93886 or CPT® 93888) annually for all patients age 2 to 16.
A short interval repeat study is indicated for patients with conditional (170-199 cm/sec) flow results.

MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated in patients with persistent abnormal Transcranial Doppler.

- Transcranial Doppler is not indicated for patients with other phenotypes (Hgb SC, Hgb S/D-).
- Screening of asymptomatic sickle cell patients with MRI or MRA is no longer recommended.6

**PEDHD-12.6: CNS Vasculitis and Stroke**

- MRI Brain without and with contrast is the recommended initial study for all patients with vasculitis and suspected CNS involvement, whether primary or secondary.
- A normal MRI Brain almost always completely excludes intracranial vasculitis.
- MRA Head (contrast as requested) is indicated for inconclusive MRI findings suggesting medium or large vessel vasculitis.
- Patients with aggressive disease being treated with systemic therapy can have imaging approved for treatment response every 3 months during active treatment.
- Annual surveillance imaging can be approved to detect progressive vascular damage that may require intervention.

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**PEDHD-13.1: Arachnoid Cysts**
Arachnoid cysts arise in the middle or posterior fossa, and the majority of lesions are discovered incidentally and do not require surgical intervention.

- MRI Brain without and with contrast (CPT® 70553) is indicated for initial evaluation of arachnoid cysts if not already completed.
- Repeat MRI Brain is not indicated for most patients with arachnoid cysts, but can be approved for the following:
  - Annual MRI Brain without and with contrast (CPT® 70553) until age 4 if diagnosed at a younger age.
  - New or worsening headache or focal neurologic deficits suggesting progression of cyst.
  - Preoperative planning.

**PEDHD-13.2: Pineal Cysts**
Pineal cysts are generally discovered incidentally and do not require surgical intervention.

- MRI Brain without and with contrast (CPT® 70553) is indicated for initial evaluation of pineal cysts if not already completed.
- Repeat MRI Brain is not indicated for most patients with pineal cysts, but can be approved for the following:
  - New or worsening headache or focal neurologic deficits suggesting progression of cyst.
  - Preoperative planning.

**PEDHD-13.3: Acoustic Neuromas**
- See PEDPN-2.2: Neurofibromatosis 2 for imaging guidelines in pediatric patients

**References**
**PEDHD-14: Pediatric Demyelinating Diseases**

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**PEDHD-14.1: General Considerations**

- MRI Brain without and with contrast (CPT® 70553) is the preferred imaging study for evaluation of pediatric demyelinating disease.
  - MRI of the spinal cord (CPT® 72156 and CPT® 72157) without and with contrast is also indicated for evaluation of pediatric demyelinating disease.
  - MRI of the lumbar spine (CPT® 72158) is not indicated unless the patient has a tethered cord or other anatomic abnormality causing caudal displacement of the filum terminalis.
- CT imaging is generally not indicated in the evaluation of demyelinating disease.
- PET Brain (CPT® 78608 and CPT® 78609) and MR spectroscopy (CPT® 76390) are considered investigational for evaluation of pediatric demyelinating diseases.

**PEDHD-14.2: Multiple Sclerosis (MS)**

Multiple sclerosis is less common in children. About 4% of MS cases are diagnosed before age 18, and only ~0.7% of all MS cases begin before age 10.

Ataxia, optic neuritis, diplopia, and transverse myelitis are common presentations. MS can present as an acute encephalitis-like illness, especially in childhood.

Among children with suspected demyelinating diseases, the principal differential diagnosis is often between MS and acute disseminated encephalomyelitis.

- MRI (CPT® 70553) Brain and spinal cord (CPT® 72156 and CPT® 72157) without and with contrast is indicated for initial diagnosis in patients with clinical signs and/or symptoms suggestive of MS.
  - MRI (CPT® 70551) Brain and spinal cord (CPT® 72141 and CPT® 72146) without contrast can be approved if there is a contraindication to gadolinium administration.
- MRI (CPT® 70553) Brain and spinal cord (CPT® 72156 and CPT® 72157) without and with contrast is indicated every 6 months for disease monitoring.
  - MRI (CPT® 70551) Brain and spinal cord (CPT® 72141 and CPT® 72146) without contrast can be approved if there is a contraindication to gadolinium.

**PEDHD-14.3: Acute Disseminated Encephalomyelitis (ADEM)**

- ADEM has an acute onset, and is more common among younger children than MS, but the signs and symptoms overlap significantly, and distinguishing between MS and ADEM can be challenging based on clinical examination alone.
- MRI (CPT® 70553) Brain and spinal cord (CPT® 72156 and CPT® 72157) without and with contrast is indicated for initial diagnosis in patients with clinical signs and/or symptoms suggestive of ADEM.
  - MRI (CPT® 70551) Brain and spinal cord (CPT® 72141 and CPT® 72146) without contrast can be approved if there is a contraindication to gadolinium.
- MRI (CPT® 70553) Brain and spinal cord (CPT® 72156 and CPT® 72157) without and with contrast is indicated every 3 months for 1 year following diagnosis.
  - MRI (CPT® 70551) Brain and spinal cord (CPT® 72141 and CPT® 72146) without contrast can be approved if there is a contraindication to gadolinium.
Most patients will have complete clinical recovery by 12 months, while stable MRI abnormalities (gliosis) may persist. These findings do not require additional imaging unless the patient develops new neurologic symptoms.

References
## PEDHD-15: Pituitary Dysfunction

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**PEDHD-15.1: General Considerations**

- The initial step in the evaluation of all potential pituitary masses is a detailed history, recent physical examination, and thorough neurological exam, including evaluation of the visual fields.
- Endocrine laboratory studies should be performed prior to considering advanced imaging.
- When pituitary imaging is indicated, MRI Brain without and with contrast (CPT® 70553) is the correct study.
  - One study (either brain MRI [CPT® 70553] or MRI Orbit, Face, Neck [CPT® 70543]) is adequate to image the pituitary. The ordering physician should specify that the study is specifically to evaluate the pituitary gland. The reporting of two CPT® codes, to image the pituitary, is not indicated.

**PEDHD-15.2: Panhypopituitarism**

Endocrine testing should be performed initially.

- MRI Brain without and with contrast (CPT® 70553) with special attention to the pituitary is indicated for newly diagnosed Panhypopituitarism.
- Patients with a normal pituitary on initial MRI do not need routine follow up imaging.
- Patients with mass lesions should have follow up imaging according to the guidelines for the specific diagnosis.

**PEDHD-15.3: Isolated Growth Hormone Deficiency**

Endocrine testing should be performed initially. For isolated growth hormone deficiency, two measurements of growth hormone with different stimulation agents are performed.

- MRI Brain without and with contrast (CPT® 70553) with special attention to the pituitary is indicated for newly diagnosed isolated growth hormone deficiency.
- Patients with a normal pituitary on initial MRI do not need routine follow up imaging.
- Patients with mass lesions should have follow up imaging according to the guidelines for the specific diagnosis.

**PEDHD-15.4: Diabetes Insipidus (DI) and Other Disorders of Anti-Diuretic Hormone**

The principal evaluation of ADH deficiency is by urine and blood electrolyte and osmolality testing - serum osmolality greater than 300 with urine osmolality less than 300. Deficiencies in ADH can either be central or nephrogenic.
Central Diabetes Insipidus (DI)

- MRI Brain without and with contrast (CPT® 70553) is indicated for newly diagnosed central DI.
- Head CT without contrast (CPT® 70450) with attention to the skull base may be approved with history of recent significant head trauma.
- Patients with a normal pituitary on initial MRI can have repeat MRI without and with contrast (CPT® 70553) every 12 months as germinomas may cause central DI while still too small to detect on imaging.
  - Serial measurement of hCG is also indicated for these patients, and MRI should be repeated if a significant rise in hCG is detected on screening.
- Patients with mass lesions should have follow up imaging according to the guidelines for the specific diagnosis.

Nephrogenic DI

- Once this diagnosis is firmly established, further advanced imaging is usually not indicated.

Syndrome of Inappropriate Antidiuretic Hormone Secretion (SIADH)

Laboratory studies should be obtained prior to considering advanced imaging—urine osmolality should be high and serum osmolality low.

- MRI Brain without and with contrast (CPT® 70553) is indicated for initial evaluation of unexplained central SIADH.
- Patients with a normal pituitary on initial MRI do not need routine follow up imaging.
- Patients with mass lesions should have follow up imaging according to the guidelines for the specific diagnosis.

PEDHD-15.5: Precocous Puberty

Defined as the appearance of secondary sexual characteristics before age 8 in girls and before age 9 in boys.

When precocious puberty is documented on physical examination, endocrine lab studies are not necessary prior to advanced imaging.

- Brain MRI Brain without and with contrast (CPT® 70553) is indicated for initial evaluation of any child with documented precocious puberty, following ultrasound of the abdomen (CPT® 76700) in both genders and ultrasound of the pelvis (CPT® 76856) in girls.
- Patients with a normal pituitary on initial MRI do not need routine follow up imaging.
- Patients with mass lesions should have follow up imaging according to the guidelines for the specific diagnosis.

PEDHD-15.6: Benign Pituitary Tumors

Benign pituitary tumor indications in pediatric patients are identical to those for adult patients. See HD-19: Pituitary for imaging guidelines.
PEDHD-15.7: Pituitary Malignancies

See PEDONC-4.10: Craniopharyngioma and Pituitary Tumors or PEDONC-18: Histiocytic Disorders for imaging guidelines

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### PEDHD-16: Pediatric Ear Disorders

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**PEDHD-16.1: Hearing Loss**

A recent (within 60 days) evaluation including a detailed history, physical examination (including otoscopic examination), and age-appropriate audiology testing should be performed on any child with known or suspected hearing loss prior to considering advanced imaging. The selection of imaging testing will depend on the age of the child and type of hearing loss.

- Temporal bone CT without contrast (CPT® 70480) is indicated for the following:
  - Conductive hearing loss of any cause.
  - Preoperative planning for resection of mass lesion or cochlear implant placement.
  - Sensorineural hearing loss in patients who cannot safely undergo MRI.
  - Mixed conductive and sensorineural hearing loss.
  - Congenital hearing loss.
  - Total deafness.

- MRI Brain without and with contrast (CPT® 70553) with attention to internal auditory canals (included in CPT® 70553 and does not require a separate CPT code) is indicated for the following:
  - Conductive hearing loss secondary to known or suspected mass lesion.
  - Preoperative planning for resection of mass lesion or cochlear implant placement.
  - Sensorineural hearing loss of any cause.
  - Mixed conductive and sensorineural hearing loss.
  - Congenital hearing loss.
  - Total deafness.
  - Hearing loss associated with tinnitus
  - Patients requiring sedation should generally not have non-contrast MRI studies.

See [PEDHD-1.3: Pediatric Head Imaging Modality General Considerations](#).

**PEDHD-16.2: Ear Pain**

A recent (within 60 days) evaluation including a detailed history, physical examination (including otoscopic examination), should be performed on any child with ear pain prior to considering advanced imaging. Common causes of ear pain include external and middle ear infections, dental problems, sinus infection, neck problems, tonsillitis, and pharyngitis.

- Advanced imaging is not indicated in the overwhelming majority of pediatric patients with ear pain.

- CT scan temporal bone without contrast (CPT® 70480) or without and with contrast (CPT® 70482), OR, MRI Brain without and with contrast with attention to internal auditory canals (CPT® 70553), OR MRI Orbits/Face/Neck without and with contrast (CPT® 70543) is indicated for the following:
  - Persistent ear pain without obvious cause.
  - Clinical suspicion for complicated or invasive infection such as mastoiditis.
  - Clinical suspicion of mass lesion causing ear pain.
  - Significant trauma with concern for hematoma formation.
  - Preoperative planning.
Patients requiring sedation should generally not have non-contrast MRI studies. See PEDHD-1.3: Pediatric Head Imaging Modality General Considerations.

**PEDHD-16.3: Cholesteatoma**

Cholesteatomas are expansive cysts of the middle ear filled with cellular debris. They can be congenital or arise from recurrent middle ear infections or trauma to the tympanic membrane. Hearing loss is usually conductive, although if the lesion is large enough combined conductive and sensorineural hearing loss may be present. Otoscopic exam findings and symptoms may include painless drainage from the ear or chronic/recurrent ear infections.

- CT scan temporal bone without contrast (CPT® 70480) or without and with contrast (CPT® 70482), OR MRI Brain without and with contrast with attention to internal auditory canals (CPT® 70553), OR MRI Orbits/Face/Neck without and with contrast (CPT® 70543) is indicated for preoperative evaluation in cholesteatoma patients.

- CT scan temporal bone without contrast (CPT® 70480) or without and with contrast (CPT® 70482), OR MRI Brain without and with contrast with attention to internal auditory canals (CPT® 70553), OR MRI Orbits/Face/Neck without and with contrast (CPT® 70543) is indicated one time post-operatively to exclude residual or regrown cholesteatoma to avoid the need for a second-look surgery.

- Patients requiring sedation should generally not have non-contrast MRI studies. See PEDHD-1.3: Pediatric Head Imaging Modality General Considerations.

**PEDHD-16.4: Vertigo**

Isolated vertigo is an uncommon complaint during childhood. Middle ear/Eustachian tube problems are the most common cause of isolated vertigo in children. A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination (including otoscopic examination), should be performed on any child with vertigo prior to considering advanced imaging.

- If physical examination is otherwise normal and the vertigo responds to treatment, advanced imaging is not indicated.

- MRI Brain without and with contrast with attention to internal auditory canals (CPT® 70553) is indicated for the following:
  - Vertigo with associated headache or ataxia.
  - Vertigo associated with tinnitus.
  - Vertigo that does not respond to vestibular treatment.
  - Patients requiring sedation should generally not have non-contrast MRI studies. See PEDHD-1.3: Pediatric Head Imaging Modality General Considerations.
**PEDHD-16.5: Tinnitus**

Tinnitus without hearing loss is a less common complaint during childhood. Children with hearing loss and tinnitus should be imaged according to **PEDHD-16.1: Hearing Loss**. A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination (including otoscopic examination), and age-appropriate audiology testing should be performed on any child with known or suspected tinnitus prior to considering advanced imaging.

- Advanced imaging is not indicated in the overwhelming majority of pediatric patients with isolated tinnitus and normal hearing.

- CT scan temporal bone without contrast (CPT® 70480) or without and with contrast (CPT® 70482), OR MRI Brain without and with contrast with attention to internal auditory canals (CPT® 70553), OR MRI Orbits/Face/Neck without and with contrast (CPT® 70543) is indicated for the following:
  - Clinical suspicion of mass lesion causing tinnitus.
  - Persistent tinnitus after recent significant trauma.
  - Patients requiring sedation should generally not have non-contrast MRI studies. See **PEDHD-1.3: Pediatric Head Imaging Modality General Considerations**.

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**References**

**PEDHD-17: Autism Spectrum Disorders**

The group of diagnoses, including Asperger syndrome, are classified as pervasive development disorders (PDD). These diagnoses are established on clinical criteria, and no imaging study can confirm the diagnosis.

Comprehensive evaluation for autism might include history, physical exam, audiology evaluation, speech, language, and communication assessment, cognitive and behavioral assessments, and academic assessment.

- MRI Brain without and with contrast (CPT® 70553) is indicated for new or worsening focal neurologic findings documented on a physical examination within 60 days of the imaging request.
  - Patients requiring sedation should generally not have non-contrast MRI studies. See [PEDHD-1.3: Pediatric Head Imaging Modality General Considerations](#).

- PET imaging is considered investigational in the evaluation of patients with autism spectrum disorders.

**References**

PEDHD-18: Behavioral and Psychiatric Disorders

- Behavioral and psychiatric disorders of childhood or adolescence generally require no advanced imaging for diagnosis or management.
  - MRI Brain without and with contrast (CPT® 70553) is indicated for new or worsening focal neurologic findings documented on a physical examination within 60 days of the imaging request.
  - Patients requiring sedation should generally not have non-contrast MRI studies. See PEDHD-1.3: Pediatric Head Imaging Modality General Considerations.

References
## PEDHD-19: Intellectual Disability, Cerebral Palsy, and Developmental Motor Delay

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PEDHD-19.1: Intellectual Disability

Intellectual disability was formerly known as mental retardation, and may be primary or secondary to a variety of heterogeneous disorders.

- Brain MRI without and with contrast (CPT® 70553) is indicated for new or worsening focal neurologic findings documented on a physical examination within 60 days of the imaging request.

- Patients requiring sedation should generally not have non-contrast MRI studies. See PEDHD-1.3: Pediatric Head Imaging Modality General Considerations.

PEDHD-19.2: Cerebral Palsy

Many patients with intellectual disability also have cerebral palsy, but not all patients with cerebral palsy have intellectual disability.

Cerebral palsy is a static motor encephalopathy caused by a variety of entities spanning developmental, metabolic, genetic, infectious, ischemic, and other acquired etiologies.

- Brain MRI without and with contrast (CPT® 70553) is indicated for:
  - Initial evaluation of newly diagnosed cerebral palsy.
  - New or worsening focal neurologic findings documented on a physical examination within 60 days of the imaging request, including the presence of developmental delay.
  - Patients requiring sedation should generally not have non-contrast MRI studies. See PEDHD-1.3: Pediatric Head Imaging Modality General Considerations.

PEDHD-19.3: Developmental Motor Delay

There are many causes for developmental motor delay. Patients with motor delay can have decreased, normal, or increased muscular tone. Patients with low or normal tone do not require imaging unless they have focal neurologic findings.

- Brain MRI without and with contrast (CPT® 70553) is indicated for:
  - Initial evaluation of newly diagnosed developmental motor delay with increased muscle tone.
  - Toe walking, when associated with upper motor neuron signs including hyperreflexia, spasticity, or positive Babinski sign.
  - New or worsening focal neurologic findings documented on a physical examination within 60 days of the imaging request.
  - Patients requiring sedation should generally not have non-contrast MRI studies. See PEDHD-1.3: Pediatric Head Imaging Modality General Considerations.
References
**PEDHD-20: Ataxia**

Ataxia refers to an abnormally ill-coordinated or unsteady gait for age. “Limb ataxia” refers to impaired coordination (for age) of limbs, especially arms. Developmental failure to acquire the ability to walk is a form of developmental delay, not ataxia.

(See **PEDHD-19: Intellectual Disability, Cerebral Palsy, and Developmental Motor Delay**)

- A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination with a thorough neurologic examination, and appropriate laboratory studies should be performed prior to considering advanced imaging, unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation.
- Brain MRI without and with contrast (CPT® 70553) can be performed to evaluate ataxia, hereditary ataxia, and slowly progressive ataxia.
  - Cervical spine MRI without contrast (CPT® 72141) or without and with contrast (CPT® 72156) is indicated if brain MRI is non-diagnostic.
  - Patients requiring sedation should generally not have non-contrast MRI studies. See **PEDHD-1.3: Pediatric Head Imaging Modality General Considerations**.
- CT Head without and with contrast (CPT® 70470) or with contrast (CPT® 70460) is indicated for patients who have a contraindication to MRI.
  - CT should not be used in place of MRI solely to avoid sedation in young children because MRI is superior for imaging the posterior fossa.
- CT Head without contrast (CPT® 70450) or without and with contrast (CPT® 70470) or MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated for patients with acute ataxia following significant head trauma.
- Repeat imaging may be appropriate no more frequently than every 12 months when requested by a specialist.

**References**

PEDHD-21.1: Imaging

Initial evaluation of epistaxis (nosebleed), including recurrent epistaxis that is refractory to medical management is by direct or endoscopic visualization of the relevant portions of the upper airway.

- If a mass lesion is detected on direct visualization, any one of the following imaging studies is indicated:
  - CT Maxillofacial without contrast (CPT® 70486) or without and with contrast (CPT® 70488).
  - MRI Orbits/Face/Neck without and with contrast (CPT® 70543).

Reference
PEDHD-22: Pseudotumor Cerebri

- Pseudotumor cerebri indications in pediatric patients are identical to those for adult patients. See HD-17: Papilledema/Pseudotumor Cerebri for imaging guidelines.
PEDHD-23: Cranial Neuropathies

- MRI Brain without and with contrast (CPT® 70553) is indicated for all patients with new or worsening specific cranial nerve abnormalities.
- MRI Neck without and with contrast (CPT® 70543) is also indicated for patients with abnormalities in cranial nerves IX, X, XI, or XII.

References
PEDHD-24: Pediatric Sleep Disorders

- See Pediatric Sleep Guidelines for sleep study indications.
- Advanced imaging is not indicated for the following:
  - Parasomnias.
  - Bed wetting (if child is otherwise neurologically normal).
  - Insomnia.
  - Narcolepsy.
  - Restless Leg Syndrome (polysomnography is useful).
- For Obstructive Sleep Apnea, endoscopic examination of the upper airway and lateral upper airway x-rays should be performed initially.
  - CT Maxillofacial without contrast (CPT® 70486) may be indicated for evaluation of obstructive anatomy if operative intervention is being considered.
- For Obstructive Sleep Apnea, endoscopic examination of the upper airway and lateral upper airway x-rays should be performed initially.
  - CT Maxillofacial without contrast (CPT® 70486) may be indicated.
- For Central Sleep Apnea, MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated if the clinical picture and/or polysomnography study suggests central sleep apnea.

References
PEDHD-25: Temporomandibular Joint (TMJ) Imaging in Children

There is a paucity of clinical symptoms and poor sensitivity of conventional x-rays in diagnosing TMJ arthritis in pediatric patients with arthritis.

- TMJ MRI (CPT® 70336) is indicated annually for detecting silent TMJ arthritis in children with juvenile idiopathic arthritis (JIA).

References
PEDHD-26: Tourette’s Syndrome

The diagnosis of Tourette’s syndrome is made clinically and advanced neuroimaging is not indicated for either diagnosis or management.

References
PEDHD-27: Tuberous Sclerosis

See PEDONC-2.9: Tuberous Sclerosis Complex (TSC) for imaging guidelines.
PEDHD-28: Von Hippel Lindau Syndrome (VHL)

See PEDONC-2.10: Von Hippel-Lindau Syndrome (VHL) for imaging guidelines.
CNS infection imaging indications in pediatric patients are similar to those for adult patients. See HD-14: CNS Infection for imaging guidelines.

Pediatric-specific imaging considerations include suspected congenital brain infection and neonatal meningitis. The common causes of prenatal infections of the central nervous system are cytomegalovirus, *Toxoplasma gondii*, herpes simplex type 2 virus and most recently zika virus. The findings suggesting prenatal brain infection include microcephaly, microphthalmia, chorioretinitis, cataracts, hypotonia, and seizures. The following are performed for congenital brain infections:

- The following imaging is considered for newborn infants with suspected prenatal brain infection regardless of inciting organism. (For additional information see CDC’s Areas with risk of Zika site: https://wwwnc.cdc.gov/travel/page/zika-information)
  - Head ultrasound (CPT® 76506) can be approved as an initial imaging study.
  - If the ultrasound is abnormal, MRI Brain without and with contrast (CPT® 70553) is indicated.
  - Patients requiring sedation should generally not have only non-contrast MRI studies. See PEDHD-1.3: Pediatric Head Imaging Modality General Consideration.

- Newborn infants with microcephaly should be evaluated as discussed in PEDHD-7: Macrocephaly, Microcephaly, and Hydrocephalus.

Neonatal meningitis is most often caused by bacterial pathogens and usually occurs as a complication of sepsis in the first week of life. In older infants and children, meningeal inoculation occurs secondary to hematogenous spread or penetrating trauma.

- The following imaging is considered for newborns or older infants with an open fontanelle and suspected meningitis.
  - Head ultrasound (CPT® 76506) can be approved as an initial imaging study.
  - If the ultrasound is abnormal, MRI Brain without and with contrast (CPT® 70553) is indicated.

References
PEDHD-30: Scalp and Skull Lesions

- Scalp and skull lesion imaging indications in pediatric patients are identical to those for adult patients with the exception of neonates. See HD-20: Scalp and Skull Lesions for imaging guidelines.
  - In neonates and young infants, scalp masses include:
    - congenital lesions (cephalocele-discussed above, dermoid cysts, epidermoid cyst),
    - vascular lesions (hemangioma, sinus pericranii), and
    - extracranial hemorrhage related to birth trauma (caput succedaneum, cephalohematoma, subgaleal hematoma).
  - After the first year of life, malignant tumors, such as Langerhans cell histiocytosis metastases from neuroblastoma and rhabdomyosarcoma are an additional cause of a scalp mass.

- The following imaging is considered for newborns with palpable scalp and skull lesions.
  - Head ultrasound (CPT® 76506) can be approved as an initial imaging study.
  - If the ultrasound is abnormal and associated anomalies are suspected, MRI Brain without and with contrast (CPT® 70553) (preferred) or CT without and with contrast (CPT® 70470) is indicated.

References
Pediatric Head Imaging

PEDHD-31: Eye Disorders

Eye disorder imaging indications in pediatric patients are identical to those for adult patients. See HD-32: Eye Disorders for imaging guidelines.
# Pediatric Musculoskeletal Imaging Guidelines

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### Ultrasound

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<td>Duplex scan of upper extremity arteries or arterial bypass grafts; unilateral or limited</td>
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<tr>
<td>Duplex scan of extremity veins including responses to compression and other maneuvers; complete bilateral study</td>
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<td>Duplex scan of extremity veins including responses to compression and other maneuvers; unilateral or limited study</td>
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# PEDMS-1: General Guidelines

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**PEDMS-1.1: Age Considerations**

- Many conditions affecting the musculoskeletal system in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients who are < 18 years old should be imaged according to the Pediatric Musculoskeletal Imaging Guidelines, and patients who are ≥ 18 years old should be imaged according to the adult Musculoskeletal Imaging Guidelines, except where directed otherwise by a specific guideline section.

**PEDMS-1.2: Appropriate Clinical Evaluation and Conservative Treatment**

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, appropriate laboratory studies, and basic imaging such as plain radiography or ultrasound should be performed prior to considering advanced imaging (CT, MR, Nuclear Medicine), unless the patient is undergoing guideline-supported scheduled imaging evaluation.

- Plain x-ray should be done prior to advanced imaging for musculoskeletal conditions to rule out those situations that do not require advanced imaging, such as osteoarthritis, acute/healing fracture, osteomyelitis, and tumors of bone amenable to biopsy or radiation therapy (in known metastatic disease), etc.
  - Even in soft tissue masses, plain x-rays are helpful in evaluating for calcium/bony deposits, e.g. myositis ossificans and invasion of bone.

- Provider-directed conservative care may include any or all of the following: R.I.C.E (rest, ice, compression, and elevation), NSAIDs (non-steroidal anti-inflammatory drugs), narcotic and non-narcotic analgesic medications, oral or injectable corticosteroids, viscosupplementation injections, a provider-directed home exercise program, cross-training, physical medicine, or immobilization by splinting/casting/bracing.

- These guidelines are based upon using advanced imaging to answer specific clinical questions that will affect patient management. Imaging is not indicated if the results will not affect patient management decisions. Standard medical practice would dictate continuing conservative therapy prior to advanced imaging in patients who are improving on current treatment programs.

- Unless otherwise stated in a specific guideline section, repeat imaging studies of the same body area are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.
PEDMS-1.3: Modality General Considerations

MRI

- MRI without contrast is the preferred modality for pediatric musculoskeletal imaging unless otherwise stated in a specific guideline section, as it is superior in imaging the soft tissues and can also define physiological processes in some instances, e.g. edema, loss of circulation (AVN), and increased vascularity (tumors).

- MRI without and with contrast is frequently recommended for evaluation of tumors, infection, post-operative evaluation, arthrography, and juvenile idiopathic arthritis, as described in the disease-specific guideline sections.

- Due to the length of time for image acquisition and the need for the patient to lie still, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:

  - MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use, since the patient already has intravenous access for anesthesia.
    - Recent evidence based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast.
    - The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.
    - If requesting clinicians indicate that a non-contrast study is being requested due to concerns regarding the use of gadolinium, the exam can be approved.

  - If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same imaging session.

- The presence of surgical hardware or implanted devices may preclude MRI, as magnetic field distortion may limit detail in adjacent structures. CT may be the procedure of choice in these cases.

- The selection of best examination may require coordination between the provider and the imaging service.
CT
CT without contrast is generally superior to MRI for imaging bone and joint
anatomy; thus it is useful for studying complex fractures (particularly of the joints,
dislocations, and assessing delayed union or non-union of fractures, integration
of bone graft material, if plain x-rays are equivocal.
- CT should not be used to replace MRI in an attempt to avoid sedation unless
  listed as a recommended study in a specific guideline section.
- CT beam attenuation can result in streak artifact which can obscure adjacent
details. This can occur with radiopaque material such as metal objects or dense
bones.
- The selection of best examination may require coordination between the
  requesting provider and the rendering imaging facility.

Ultrasound
- Ultrasound is frequently used to evaluate infants for hip dysplasia, to detect
  and/or aspirate joint effusion, and as an initial evaluation of extremity soft tissue
  masses.
- CPT® codes vary by body area and the use of Doppler imaging. These CPT®
codes are included in the table at the beginning of this guideline.

Nuclear Medicine
- Nuclear medicine studies are commonly used in evaluation of the peripheral
  musculoskeletal system, and other rare indications exist as well:
  - Bone scan (CPT® 78315 or CPT® 78320) is indicated for evaluation of
    suspected loosening of orthopedic prostheses when recent plain x-ray is
    nondiagnostic.
  - Nuclear medicine bone marrow imaging (CPT® codes: CPT® 78102, CPT®
    78103, or CPT® 78104) is indicated for detection of ischemic or infarcted
    regions in sickle cell disease.
  - Triple phase bone scan (CPT®78315) is indicated for evaluation of complex
    regional pain syndrome or reflex sympathetic dystrophy.

3D Rendering
- 3D Rendering indications in pediatric musculoskeletal imaging are identical to
  those for adult patients. See MS-3: 3D Rendering for imaging guidelines.

The guidelines listed in this section for certain specific indications are not intended to be
all-inclusive; clinical judgment remains paramount and variance from these guidelines
may be appropriate and warranted for specific clinical situations.
References


2. ACR-SPR-SSR Practice Parameter for the performance of radiography of the Revised 2015 (Resolution 5) Accessed July 24, 2018


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<td>PEDMS-2.4: Osteochondral or Chondral Fractures, Including Osteochondritis Dissecans</td>
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<td>PEDMS-2.5: Stress/Occult Fracture</td>
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<tr>
<td>PEDMS-2.6: Compartment Syndrome</td>
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<td>PEDMS-2.7: Physical Child Abuse</td>
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</table>
A recent (within 60 days) evaluation including a detailed history, physical examination, and plain radiography should be performed prior to considering advanced imaging.

**PEDMS-2.1: Acute Fracture**

- Plain x-rays should be performed initially in any obvious or suspected acute fracture or dislocation.
  - If plain x-rays are positive, no further imaging is generally indicated except in complex (comminuted or displaced) joint fractures where MRI or CT without contrast can be approved for preoperative planning.
  - 3D Rendering may sometime be indicated for complex fracture repairs. See **MS-3: 3D Rendering** for imaging guidelines.
- If plain x-rays are negative or equivocal for fracture, and fracture or bone marrow edema is still clinically suspected, CT or MRI without contrast is indicated if the results will determine immediate treatment decisions as documented by the treating physician.
- Bone scan may be approved for evaluation of suspected fracture when two x-rays are negative at least 10 days apart, using any of the following CPT® code combinations:
  - CPT® 78300, CPT® 78305, or CPT® 78306 as a single study
  - See **PEDMS-2.5: Stress/Occult Fracture** for bone scan indications

**PEDMS-2.2: Joint Fracture**

- CT can be approved in complex (comminuted or displaced) fractures involving a joint for preoperative planning.
- CT can be approved when there is clinical concern for delayed union or non-union of fracture or joint fusions on follow-up plain x-ray.

**PEDMS-2.3: Growth Plate Injuries (Salter-Harris Fractures)**

- These fractures can generally be diagnosed and managed adequately with plain x-ray.
- In case of severe injury with displacement of bone fractures, CT may be indicated prior to surgical intervention.
- If there is concern for delayed union or non-union of the bone, CT without contrast is indicated.
- MRI without contrast is indicated for the evaluation of a suspected physeal bar in a healing fracture or other complication of a fracture involving the growth plate, which may result in abnormal growth.
Compressive injuries of the growth plate (Salter-Harris I) injuries may be difficult to identify on plain films, and MRI without contrast is indicated for confirmation.

An orthopedic surgeon and a radiologist should make the decision to perform advanced imaging.

**PEDMS-2.4: Osteochondral or Chondral Fractures, Including Osteochondritis Dissecans**

An Osteochondral fracture is a tear of the cartilage which covers the end of a bone, within a joint. It is also known as Osteochondritis Dissecans. In both disorders, loose bone fragments may form in a joint.

- If x-rays are negative and an osteochondral fracture is still suspected, or if x-ray or clinical exam suggests an unstable osteochondral injury, either MRI without contrast, MR arthrogram, or CT arthrogram is indicated.
- If plain x-rays show a non-displaced osteochondral fragment, follow up imaging should be with plain x-rays. Advanced imaging is not necessary.
- MRI without contrast or CT without contrast is indicated when healing cannot be adequately assessed on follow up plain x-rays.

**PEDMS-2.5: Stress/Occult Fracture**

- These fractures can usually be adequately evaluated by history, physical exam, plain x-ray and bone scan.
- Plain x-rays should be performed before advanced imaging. Plain x-rays are often negative initially but become positive at 4 weeks in stress fractures or 14 days in occult fractures.
- Bone scan (CPT®78315 or CPT®78320) may be approved for evaluation of suspected stress or occult fracture when two x-rays are negative at least 10 days apart.
- If a stress or occult fracture involving the pelvis, sacrum, hip, femur, tibia, tarsal navicular, proximal 5th metatarsal, or scaphoid is suspected and the initial plain x-ray or bone scan fails to establish a definitive diagnosis, an MRI or CT without contrast is indicated without conservative care or follow-up plain x-rays.
- For all other suspected stress or occult fractures, MRI or CT without contrast is indicated if follow-up plain x-rays are negative after 2 weeks of conservative care when occult fracture is still suspected, or 4 weeks of conservative care when stress fracture is still suspected.
- Periodic follow-up plain x-rays will usually show progressive healing.
  - CT without contrast is indicated when there is clinical concern for non-union.
**PEDMS-2.6: Compartment Syndrome**

- Acute compartment syndrome is a clinical diagnosis made by direct measurement of compartment pressure and is a surgical emergency. Advanced imaging is not indicated.
- See **MS-11.3: Chronic Exertional Compartment Syndrome** for imaging guidelines.

**PEDMS-2.7: Physical Child Abuse**

- See **PEDMS-7: Suspected Child Abuse** for imaging guidelines

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**References**

### PEDMS-3: Soft Tissue and Bone Masses

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<td>PEDMS-3.4: Mass Involving Bone (Including Lytic and Blastic Metastatic Disease)</td>
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PEDMS-3.1: General Considerations

- A recent (within 60 days) evaluation including a detailed history, physical examination, with detailed information on the mass (including location, size, duration, solid vs. cystic, fixed vs. not fixed to bone) should be performed prior to considering advanced imaging.

- Evaluation by a surgical specialist or oncologist is strongly recommended to help determine the most helpful advanced imaging studies for an individual patient.

- Plain x-rays should be performed as initial imaging. This is true even for soft tissue masses that are clearly not directly associated with osseous structures. Details such as soft tissue calcification, presence or absence of phleboliths, radiographic density, and any effect on adjacent bone are all potentially significant plain film findings that may help better identify the etiology of the mass and determine the optimal modality and contrast level when advanced imaging is indicated.

- If initial plain x-ray is negative, ultrasound (CPT® 76881 or CPT® 76882) can be approved to evaluate:
  - Ill-defined masses or areas of swelling
  - Hematomas
  - Subcutaneous lipomas with inconclusive clinical examination
  - Lipomas in other locations
  - Masses that have been present and stable for ≥ 1 year
  - Vascular malformations (see PEDPVD-2: Vascular and Lymphatic Malformations for imaging guidelines)

- Advanced imaging is not indicated for the following entities:
  - Ganglion cysts
  - Sebaceous cysts
  - Hematomas
  - Subcutaneous lipomas
    - MRI without or without and with contrast can be performed if surgery is planned.

- Lipomas in other locations (not subcutaneous) should be evaluated by MRI without and with contrast or by ultrasound (CPT® 76881 or CPT® 76882).

PEDMS-3.2: Soft Tissue Mass with Negative X-ray and Abnormal Ultrasound

- MRI without and with contrast is indicated.
  - CT without or with contrast is indicated if MRI is contraindicated.
PEDMS-3.3: Soft Tissue Mass with Calcification/Ossification on X-ray

- MRI without and with contrast is indicated.
  - CT without or with contrast is indicated if MRI is contraindicated.

PEDMS-3.4: Mass Involving Bone (Including Lytic and Blastic Metastatic Disease)

- Many benign bone tumors have a characteristic appearance on plain x-ray and advanced imaging is not necessary unless one of the following applies:
  - Imaging requested for preoperative planning (MRI without and with contrast and/or CT without may be indicated).
  - MRI without and with contrast can be approved when the diagnosis is uncertain based on plain x-ray appearance.
    - CT without or with contrast can be approved if MRI is contraindicated.
- Known benign bone tumors, Osteogenic Sarcoma, and Ewing Sarcoma Family of Tumors should be imaged according to PEDONC-9: Bone Tumors.

References

# PEDMS-4: Limping Child

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| PEDMS-4.3: Limping Child with Suspected Infection | 19 |
| PEDMS-4.4: Limping Child with No Evidence of Trauma or Infection | 20 |
**PEDMS-4.1: General Evaluation of the Limping Child**

- This guideline primarily applies to children under the age of 6 years. It may also be applied to older children with pre-existing conditions who may not be able to communicate, such as a child with severe intellectual disability. Many of these cases will be urgent, because of the risk of adverse outcomes in delay of diagnosis.

- A recent (within 60 days) evaluation, including a detailed history and physical examination, should be performed, which will help determine any indication for advanced imaging. Based on this clinical evaluation, the most likely etiology should be determined, usually trauma, infection, or neither trauma nor infection.

**PEDMS-4.2: Limping Child with Suspected Trauma**

- Plain radiographs are indicated for detection of fractures, destructive lesions, and avascular necrosis. For children under age 4 this may require X-rays of the entire leg from hip to foot. If clinical suspicion is high for “toddler fracture” imaging may start with tibia/fibula radiographs, and if a fracture is demonstrated, additional imaging may not be required.

- If initial radiographs are negative, but limping symptoms or avoidance of weight-bearing persist, follow-up radiographs in 7 to 10 days are indicated. MRI without contrast of the affected body area is indicated if plain films are negative and suspicion remains high for stress fractures or soft tissue injury.

- CT use is limited in the evaluation of the limping child with suspected trauma. Requests should be for Medical Director Review.

- Radionuclide bone scan (CPT® 78300, CPT® 78305, or CPT® 78306) may be indicated in setting of a non-focal exam, especially in younger and non-verbal children. Due to relatively high radiation exposure, bone scan is reserved for high suspicion cases with negative radiographs. It is a preferred examination in a child with implanted hardware or devices precluding MRI.

**PEDMS-4.3: Limping Child with Suspected Infection**

- Pain localized to hip:
  - It is essential to exclude septic arthritis. Ultrasound of the hip (CPT® 76881 or CPT® 76882) is used to exclude hip joint effusion.
    - If hip joint effusion is demonstrated, hip joint fluid aspiration should be performed to distinguish infection from non-infectious etiologies.
    - If no hip joint effusion is demonstrated, plain radiographs should be obtained.
    - If plain films are not diagnostic, MRI without or without and with contrast is indicated.
    - For unilateral hip use CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast).
For bilateral hips use a single CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast) and add modifier -50.

- Pain localized distal to hip:
  - Plain radiographs of the leg should be obtained. If these are not diagnostic, MRI without contrast or without and with contrast of the affected body part is indicated.

- Nonlocalized pain:
  - Plain radiographs of the spine, pelvis, and lower extremities may be necessary to localize the abnormality.
  - If plain radiography is not diagnostic and suspicion for infection remains high, whole body bone scan (CPT® 78306) or MRI without contrast or without and with contrast of the affected body area is indicated.

**PEDMS-4.4: Limping Child with No Evidence of Trauma or Infection**

- This differential diagnosis is quite broad.
  - Transient (or toxic) synovitis of the hip:
    - Ultrasound of the hip (CPT® 76881 or CPT® 76882) is the preferred initial exam.
      - If no hip effusion is demonstrated, plain radiographs should be obtained.
      - If a hip joint effusion is demonstrated, hip joint fluid aspiration is indicated. This is usually performed with US guidance, though fluoroscopic guidance or blind aspiration may be required.
  - Avascular Necrosis: See **PEDMS-6: Avascular Necrosis (AVN)/ Legg-Calvé-Perthes Disease**
  - Juvenile Idiopathic Arthritis: See **PEDMS-10: Juvenile Idiopathic Arthritis**
  - Histiocytic Disorders: See **PEDONC-18: Pediatric Histiocytic Disorders**
  - Neoplasm: See **PEDONC-1: General Guidelines, PEDONC-3: Pediatric Leukemias, PEDONC-6: Neuroblastoma, PEDONC-8: Pediatric Soft Tissue Sarcomas, or PEDONC-9: Bone Tumors**
  - Child Abuse: See **PEDMS-7: Suspected Child Abuse**

**References**

**PEDMS-5: Developmental Dysplasia of the Hip**

Developmental dysplasia of the hip (DDH) was formerly known as congenital dislocation of the hip. DDH includes a spectrum of abnormalities including abnormal acetabular shape (dysplasia) and malposition of the femoral head ranging from mild subluxation, dislocatable hip to fixed dislocation. 60 to 80% of abnormalities are identified by physical exam, and more than 90% are identified by ultrasound. Treatment may involve placement in a Pavlik harness, casting, or surgery in extreme or refractory cases.

**Screening studies**

- The routine use of ultrasound in screening neonates and infants without risk factors for DDH is not recommended by the American Academy of Pediatrics and the American Academy of Orthopedic Surgeons. There are two sonographic methods of evaluating the hip: the dynamic stress (Harcke) technique and the static (Graf) technique.

- Screening ultrasound (CPT® 76885 or CPT® 76886) is recommended for infants between 4 weeks of age and 6 months of age with one or more of the following risk factors:
  - Breech presentation
  - Family history of DDH
  - Abnormal hip exam (e.g. positive Ortolani or Barlow maneuvers, asymmetric thigh folds, shortening of the thigh observed on the dislocated side, limitation of hip abduction).

- Indications for follow-up hip ultrasound (CPT® 76885 or CPT® 76886):
  - Type IIA hip was diagnosed on a previous hip ultrasound using the Graf method and follow-up hip ultrasound is requested to confirm normal development.
  - Graf type IIA hip has an alpha angle (bony angle) between 50 to 59 degrees in a child less than 3 months of age.
  - The overwhelming majority of these hips mature spontaneously, but follow-up may be required to ensure that maturation has occurred.
  - Subluxation or dislocation was diagnosed on previous hip ultrasound using the dynamic Harke imaging method.
  - Prior ultrasound demonstrates abnormal hip and treatment has been applied, such as a Pavlik harness or other device. Follow-up ultrasound is indicated to document effectiveness of treatment, to ensure the femoral head remains located in the acetabulum or to identify treatment failure. The usual interval for follow-up sonography is monthly, but earlier imaging is indicated for clinical suspicion of treatment failure, subluxation or dislocation of the hip.
MRI without contrast or CT without contrast is indicated to evaluate alignment following reduction. Children in casts or following surgery may require repeated advanced imaging to ensure the reduction remains satisfactory, or to assess incorporation of bone graft material.

- For unilateral Hip MRI use CPT® 73721
- For bilateral Hips MRI use a single CPT® 73721 and add modifier -50
- For unilateral Hip CT use CPT® 73700
- For bilateral Hips CT use a single CPT® 73700 and add modifier -50

Hip ultrasound is NOT indicated for the following:

- Infants less than 2 weeks of age, since hip laxity is normal after birth and usually resolves spontaneously.
- Infants older than 6 months of age as plain x-ray of the hips become more reliable due to femoral head ossification and should be used in infants over 6 months of age.
- Type I, IIB, IIC, IID, and III hips diagnosed on a previous hip ultrasound using the Graf method. Type I hip is normal, and Type IIb, IIC, IID, and III require referral for treatment rather than follow-up imaging.
- Plain x-ray of the hips should be performed rather than ultrasound if there is a clinical suspicion for teratogenic dysplasia.

References
PEDMS-6: Avascular Necrosis (AVN) / Legg-Calvé-Perthes Disease / Idiopathic Osteonecrosis

PEDMS-6.1: Avascular Necrosis and Legg-Calvé-Perthes Disease 24
PEDMS-6.2: Osteonecrosis 24
Legg-Calvé-Perthes Disease (LCP) is idiopathic osteonecrosis (AVN) of the femoral head. This may occur in children when the femoral head loses its blood supply. It most commonly affects children between the ages of 4 and 8 (occasionally younger or older). Clinically, LCP is quite different than adult AVN since there is good healing potential of the femoral head, especially in younger children. Treatment is observation in mild cases and containment of the head within the acetabulum by abduction bracing or occasionally surgery in more severe cases.

- A recent (within 60 days) evaluation including a detailed history, physical examination, and plain radiography should be performed prior to considering advanced imaging, unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation.

### PEDMS-6.1: Avascular Necrosis and Legg-Calvé-Perthes Disease

- Plain x-ray is the initial imaging study and may be all that is necessary for follow-up.
- If the diagnosis is uncertain on plain x-ray, hip MRI either without contrast or without and with contrast is indicated.
  - For unilateral hip use CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast).
  - For bilateral hips use a single CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast) and add modifier -50
  - If MRI is contraindicated or unavailable, any one of the following studies may be approved in lieu of MRI:
    - CT scan without contrast, with contrast or without and with contrast
    - Nuclear bone scan (CPT® codes: CPT® 78300, CPT® 78305, CPT® 78306, or CPT® 78320)

### PEDMS-6.2: Osteonecrosis

- Osteonecrosis can occur in a number of conditions, including during treatment for developmental dysplasia of the hip.
- Patients with acute lymphoblastic leukemia, lymphoblastic lymphoma, or other conditions with recurrent exposure to high dose corticosteroids and known or suspected osteonecrosis should be imaged according to guidelines in: **PEDONC-3.2: Acute Lymphoblastic Leukemia**.
- Known or suspected osteonecrosis in long term cancer survivors should be imaged according to guidelines in: **PEDONC-19.4: Osteonecrosis in Long Term Cancer Survivors**.
References


PEDMS-7: Suspected Physical Child Abuse

The suspicion of physical abuse of a child often requires imaging, both for clinical management and for forensic purposes. Every effort should be made to support reasonable requests for imaging in these children.

Child abuse injuries may affect any organ or system. Fractures are common, but injuries may also include solid and hollow visceral organs, superficial and deep soft tissue injuries, or burns. Some fracture patterns are highly correlated with non-accidental mechanisms, such as the “classic metaphyseal lesion,” also known as a corner fracture or bucket handle fracture, but fractures may occur in any bone. Unsuspected fractures, multiple fractures at various stages of healing, or fractures of a configuration or distribution inconsistent with the history provided, may raise the suspicion for physical abuse.

Skeletal Injury

- The radiographic skeletal survey is the primary imaging procedure for detecting fractures, especially in children age 24 months or younger. In older children, skeletal survey may be indicated, but more tailored radiographic evaluation based on history and physical examination may be preferable to skeletal survey.

- Bone scan (CPT® codes: CPT® 78300, CPT® 78305, CPT® 78306, or CPT® 78320) is complimentary to plain radiographs, and may be used when the skeletal survey is negative but clinical suspicion remains high.

- Suspected injury to the spine should usually first be evaluated with plain radiographs. CT without contrast and/or MRI without contrast or without and with contrast may be required for complete evaluation of osseous and soft tissue spine injuries. If requested for suspected or known physical abuse, both CT and MRI should be approved.

- A repeat skeletal survey performed approximately 2 weeks after the initial examination can provide additional information on the presence and age of child abuse fractures and should be performed when abnormal or equivocal findings are found on the initial study and when abuse is suspected on clinical grounds.

Head Injury

- CT Head without contrast (CPT® 70450) is indicated when there is clinical evidence of head injury or when skull fracture of any age is detected on survey skull x-ray.
  - CT Head without contrast (CPT® 70450) is also indicated when known or suspected cervical trauma is present in a pediatric patient.
  - Cervical Spine CT without contrast (CPT® 72125) and/or MRI without contrast (CPT® 72141) or without and with contrast (CPT® 72156) may be approved when there is clinical evidence of head injury or when skull fracture of any age is detected on survey skull x-ray.
MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated to further evaluate brain parenchymal injury, or in a child where the clinical signs of brain injury are not sufficiently explained by CT findings.

Infants may require advanced imaging even if no neurologic symptoms are detected due to the great potential morbidity of abusive head trauma.

**Other Body Area Injuries**

- CT should be performed with IV contrast unless an absolute contraindication exists.
- Any of the following imaging studies are indicated for suspected injury to the abdomen or pelvis:
  - Abdominal ultrasound (CPT® 76700)
  - Pelvic ultrasound (CPT® 76856)
  - CT Abdomen with contrast (CPT® 74160)
  - CT Pelvis with contrast (CPT® 72193)
  - CT Abdomen/Pelvis with contrast (CPT® 74177)
- Any of the following imaging studies are indicated for suspected injury to the chest:
  - CT Chest without contrast (CPT® 71250)
  - CT Chest with contrast (CPT® 71260)

**Screening of other children**

- A skeletal survey, or other imaging, may be requested for siblings of abused children, or for other household members under the age of two due to the high incidence of occult fractures in these children. All such requests should be approved.

**References**

PEDMS-8: Infection/Osteomyelitis

- Infection and osteomyelitis imaging indications in pediatric patients are identical to those for adult patients other than the limping child.
  - See MS-9: Infection/Osteomyelitis for imaging guidelines other than in the limping child.
  - See PEDMS-4.3: Limping Child with Suspected Infection for imaging guidelines when limping is present.
  - See PEDMS-10: Inflammatory Musculoskeletal Disease for imaging guidelines for chronic recurrent multifocal osteomyelitis (CRMO, which is an autoimmune disease).

- Bone scan (CPT® 78315 or CPT® 78320) is indicated for evaluation of suspected bone infection if MRI cannot be done and when infection is multifocal, or when the infection is associated with orthopedic hardware or chronic bone alterations from trauma or surgery. Combining bone scintigraphy with a labeled leukocyte scan enhances sensitivity. A labeled leukocyte scan (radiopharmaceutical inflammatory imaging - one of CPT® codes: CPT® 78805, CPT® 78806, or CPT® 78807) in concert with Tc-99m sulfur colloid marrow imaging (one of CPT® codes: CPT® 78102, CPT® 78103, or CPT® 78104) is particularly useful in cases with altered bone marrow distribution, such as joint prosthesis.

References
PEDMS-9: Foreign Body

Foreign body imaging indications in pediatric patients are similar to those for adult patients. See MS-6.1: Foreign Body – General for imaging guidelines.

The common soft tissue foreign bodies in children are wood, glass, and metal slivers. The latter two elements are radiopaque and visible to some degree on plain radiographs, whereas wood is usually radiolucent and nearly always imperceptible on radiographs. When a radiolucent foreign body is suspected, ultrasound (CPT® 76881) can be used to identify the foreign body.

References
### PEDMS-10: Inflammatory Musculoskeletal Disease

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| PEDMS-10.1: Juvenile Idiopathic Arthritis | 31 |
| PEDMS-10.2: Chronic Recurrent Multifocal Osteomyelitis | 31 |
| PEDMS-10.3: Inflammatory Muscle Diseases | 32 |
PEDMS-10: Inflammatory Musculoskeletal Disease

- A recent (within 60 days) evaluation including a detailed history, physical examination, and plain radiography should be performed prior to considering advanced imaging.

- Inflammatory arthritis imaging indications in pediatric patients are very similar to those for adult patients. See MS-15: Rheumatoid Arthritis and Inflammatory Arthritis for imaging guidelines. Specific pediatric considerations are included below.

PEDMS-10.1: Juvenile Idiopathic Arthritis

- Ultrasound (CPT® 76881) is indicated for assessment of: size and characteristics of joint effusions, extent of synovial hypertrophy, which is the hallmark of juvenile idiopathic arthritis, and involvement of tendinous structures.

- SPECT bone scan (CPT® 78320) is indicated for evaluation of facet arthropathy in patients with ankylosing spondylitis, osteoarthritis, or rheumatoid arthritis.

- TMJ MRI (CPT® 70336) is indicated annually for detecting silent TMJ arthritis in children with juvenile idiopathic arthritis (JIA).

PEDMS-10.2: Chronic Recurrent Multifocal Osteomyelitis

Chronic recurrent multifocal osteomyelitis (CRMO) is a rare autoimmune disease affecting multiple bones, arising most commonly during the second decade of life. Treatment consists of anti-inflammatory and immunomodulatory therapies, and is directed predominantly by status of clinical symptoms (most commonly pain).

- Patients with CRMO can have the following imaging approved for evaluation of new or worsening pain, or response to treatment in patients without complete clinical resolution of pain symptoms, when plain x-rays are non-diagnostic:
  - Bone scan (CPT® codes: CPT® 78300, CPT® 78305, CPT® 78306, CPT® 78315, or CPT® 78320)
  - Nuclear Bone Marrow imaging (CPT® codes: CPT® 78102, CPT® 78103, or CPT® 78104), OR
  - Radiopharmaceutical inflammatory imaging (CPT® codes: CPT® 78805, CPT® 78806, or CPT® 78807)
  - MRI without contrast of specific painful body areas when plain x-ray and bone scan are insufficient to direct acute patient care decisions.
  - Literature suggests MRI may have greater sensitivity for clinically occult vertebral lesions than bone scan. Given possible complications of vertebral involvement, MRI of the spine without and with contrast (CPT® 72156, 72157, 72158) can be approved on an annual basis for screening of clinically occult radiographically active lesions of the vertebral bodies.
Whole body MRI is considered investigational for CRMO at this time due to lack of standardization in technique and lack of published evidence showing improvement in patient outcomes over monitoring with clinical symptoms, plain radiography, and bone scan. See Preface-5.2: Whole Body MR Imaging for additional details.

**PEDMS-10.3: Inflammatory Muscle Diseases**

- A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination, and plain radiography should be performed prior to considering advanced imaging.

**Inflammatory Muscle Diseases:** These include dermatomyositis, polymyositis, and sporadic inclusion body myositis. MRI without contrast of a single site is indicated in these disorders for the following purposes:
  - Selection of biopsy site
  - Treatment monitoring
  - Detection of occult malignancy

**Juvenile Dermatomyositis:**

- MRI without contrast can frequently confirm the diagnosis and thus avoid a biopsy.
- CT without contrast (CPT® 73700) is indicated to follow progressive calcification in muscles, but MRI (CPT® 73718) is often used instead since it permits assessment of the primary muscle disease as well.
  - Both CT and MRI are rarely indicated concurrently, and these requests should be forwarded for medical director review.
- Contrary to adult dermatomyositis, juvenile dermatomyositis is very rarely paraneoplastic in nature, and routine screening for occult neoplasm is not indicated.
  - For patients with palpable lymphadenopathy or hepatosplenomegaly, CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast are indicated.

**References**


Pediatric Musculoskeletal Imaging

PEDMS-11: Muscle/Tendon Unit Injuries

Muscle and tendon unit injury imaging indications in pediatric patients are identical to those for adult patients. See MS-11: Muscle/Tendon Unit Injuries/Diseases for imaging guidelines.
PEDMS-12: Osgood-Schlatter Disease

- Osgood-Schlatter Disease is defined as traction apophysitis of the tibial tubercle in skeletally immature individuals. Diagnosis is by clinical examination and x-ray, and treatment is conservative.
- Advanced imaging is not indicated in this disorder.

References
**PEDMS-13: Popliteal (Baker) Cyst**

Popliteal or Baker cyst in children is a different clinical entity than in adults and is almost never due to intra-articular pathology. These lesions are usually treated conservatively and rarely require surgery.

- Ultrasound (CPT® 76881 or CPT® 76882) is the appropriate initial imaging study.
- MRI without contrast (CPT® 73721) is indicated for preoperative planning or if ultrasound is non-diagnostic.

**References**

Slipped capital femoral epiphysis (SCFE) should be considered in young adolescents or preadolescents with groin, anterior thigh, or atraumatic knee pain. Symptoms often include a history of intermittent limp and pain for several weeks or months that are often poorly localized to the thigh, groin, or knee. Any obese adolescent or preadolescent presenting with a history of a limp and thigh, knee, or groin pain for several weeks to one month should be presumed to have a slipped capital femoral epiphysis (SCFE).

**Imaging studies:**

- Anteroposterior and lateral x-rays (frog leg or cross table lateral) of both hips will confirm or exclude the diagnosis.
  - If clinical suspicion remains after negative plain films, MRI without contrast (CPT® 73721) or without and with contrast (CPT® 73723) is indicated to detect widening of the physis before the femoral head is displaced (pre-slip).

- Because a significant percentage of SCFE is bilateral at presentation, it is reasonable to evaluate the contralateral hip if requested, as some surgeons advocate surgical treatment of pre-slip. All bilateral hip requests should be forwarded for Medical Director Review.
  - For unilateral hip use CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast).
  - For bilateral hips use a single CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast) and add modifier -50.

- If MRI was not completed for diagnosis, MRI without contrast is indicated for preoperative planning.

**References**

PEDMS-15: Limb Length Discrepancy

- Limb length discrepancy imaging indications in pediatric patients are identical to those for adult patients. See MS-17.1: Limb Length Discrepancy for imaging guidelines.
### PEDMS-16: Congenital Anomalies of the Foot

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PEDMS-16.1: Tarsal Coalition (Calcaneonavicular Bar/Rigid Flat Foot)

- Plain x-rays should be performed initially since the calcaneonavicular bar is readily visible in older children and adults.
  - Talocalcaneal coalition is more difficult to evaluate on plain x-rays.
- If tarsal coalition is suspected (because of restricted hindfoot motion on physical exam), and plain x-rays are inconclusive, CT without contrast (CPT® 73700) or MRI without contrast (CPT® 73781) is indicated.

PEDMS-16.2: Club Foot

Club Foot is a congenital foot contracture with foot in equinus (plantar flexion) and heel and forefoot in varus/adduction (turned in). Immediate diagnosis and specialty evaluation in the first week of life provide the best chance for successful correction.

- Plain x-rays should be performed initially since the anomaly is readily visible in older children and adults.
- Ultrasound can be used to characterize the cartilaginous tarsal bones and demonstrate tarsal bone alignment in infants with non-ossified tarsal bones.
- MRI is not currently used to image clubfoot, and limited experiences are published in the literature. MRI (CPT® 73718) or CT (CPT® 73700) can be approved to determine residual deficits following repair.

PEDMS-16.3: Vertical Talus

- Congenital vertical talus (also known as congenital rocker-bottom foot) is a fixed foot deformity characterized by irreducible talonavicular dislocation. The talus is plantar flexed and does not articulate with the navicular bone.
- Plain x-rays should be performed initially since the anomaly is readily visible in older children and adults.
- MRI (CPT® 73718) or CT (CPT® 73700) can be approved to determine residual deficits following repair.
References
## Pediatric Neck Imaging Guidelines

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## Procedure Codes Associated with Neck Imaging

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# PEDNECK-1: General Guidelines

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**PEDNECK-1.1: Age Considerations**

Many conditions affecting the neck in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients who are < 18 years old should be imaged according to the Pediatric Neck Imaging Guidelines, and patients who are ≥18 years old should be imaged according to the Adult Neck Imaging Guidelines, except where directed otherwise by a specific guideline section.

**PEDNECK-1.2: Appropriate Clinical Evaluation**

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, and appropriate laboratory studies should be performed prior to considering advanced imaging (CT, MR, Nuclear Medicine), unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation.

- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the neck is not supported. Advanced imaging of the neck should only be approved in patients who have documented active clinical signs or symptoms of disease involving the neck.

- Unless otherwise stated in a specific guideline section, repeat imaging studies of the neck are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.

**PEDNECK-1.3: Modality General Considerations**

- MRI
  - MRI Neck is generally performed without and with contrast (CPT® 70543) unless the patient has a documented contraindication to gadolinium or otherwise stated in a specific guideline section.
  - Due to the length of time for image acquisition and the need for the patient to lie still, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
    - MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use since the patient already has intravenous access for anesthesia.
    - Recent evidence based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast.
The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.

If requesting clinicians indicate that a non-contrast study is being requested due to concerns regarding the use of gadolinium, the exam can be approved.

If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session.

- The presence of surgical hardware or implanted devices may preclude MRI.
- The selection of best examination may require coordination between the provider and the imaging service.

CT

- CT Neck typically extends from the base of the skull to the upper thorax.
- A separate CPT® code for head imaging in order to visualize the skull base is not necessary.
- In some cases, especially in follow-up of a known finding, it may be appropriate to limit the exam to the region of concern to reduce radiation exposure.
- CT Neck is generally performed with contrast (CPT® 70491) unless the patient has a documented contraindication to CT contrast or otherwise stated in a specific guideline section.
- CT Neck may be indicated for further evaluation of abnormalities suggested on prior US or MRI Procedures.
- In general, CT Neck is appropriate when evaluating trauma, malignancy, and for preoperative planning.
- CTA Neck (CPT® 70498) is indicated for evaluation of the vessels of the neck, especially with concern for dissection.
- CT should not be used to replace MRI in an attempt to avoid sedation unless listed as a recommended study in a specific guideline section.
- The selection of best examination may require coordination between the provider and the imaging service.

Ultrasound

- Ultrasound of the soft tissues of the neck (CPT® 76536) is indicated as an initial study for evaluating adenopathy, other palpable mass or swelling, thyroid, parathyroid, parotid and other salivary glands, and cysts.
- For those patients who do require additional advanced imaging after ultrasound, ultrasound can be very beneficial in selecting the proper modality, body area, image sequences, and contrast level that will provide the most definitive information for the patient.
Nuclear Medicine

- Nuclear medicine studies of the neck in pediatric patients are most commonly used to evaluate neck masses, or thyroid and parathyroid disease following initial studies with anatomic imaging, such as ultrasound, CT, or MRI. See PEDNECK-2: Neck Masses (Pediatric) and PEDNECK-6: Thyroid and Parathyroid for imaging guidelines.

- Salivary Gland Nuclear Imaging (one of CPT® 78230, CPT® 78231, or CPT® 78232) is indicated for the following:
  - Evaluation of salivary gland function in patients with dry mouth (xerostomia) and one of the following:
    - Sjögren syndrome
    - Sialadenitis
    - History of head or neck radiation therapy
  - Evaluation of children with cerebral palsy.

The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

References
PEDNECK-2: Neck Masses (Pediatric)

Evaluation of neck masses in pediatric patients involves careful consideration of clinical history and accurate physical examination. The patient's age and knowledge of the anatomy and common lesions of the neck are very important in narrowing the differential diagnosis.

- Ultrasound Neck (CPT® 76536) is indicated as the initial imaging study of choice. Ultrasound helps define the size and extent of localized superficial masses and helps confirm whether they are cystic or solid. Color Doppler ultrasound (CPT® 93880 bilateral study or carotid arteries or CPT® 93882 unilateral study) can evaluate the vasculature.

- Neck MRI without and with contrast (CPT® 70543) or Neck CT with contrast (CPT® 70491) can be approved if ultrasound is inconclusive or to further characterize abnormalities seen on ultrasound.

- Cervical lymphadenitis is common in children and follows most viral or bacterial infections of the ears, nose, and throat. No advanced imaging is necessary with uncomplicated lymph node enlargement. When lymphadenopathy persists for more than 4 weeks of treatment or there is suspicion of complications, such as abscess formation, ultrasound is indicated, See PEDNECK-3: Cervical Lymphadenopathy.

- Congenital cervical cysts frequently present in children and include thyroglossal duct cyst (55% of cases), cystic hygroma (25%), branchial cleft cysts (16%), bronchogenic cyst (0.91%), and thymic cyst (0.3%).
  - Barium swallow and MRI Neck without and with contrast (CPT® 70543) or CT Neck with contrast (CPT® 70491) are indicated for diagnosis of fourth branchial pouch cysts.
  - Ultrasound is indicated for initial evaluation of a suspected cystic neck mass.
  - Neck MRI without and with contrast (CPT® 70543) or Neck CT with contrast (CPT® 70491) may be indicated for preoperative planning.

- Salivary gland nuclear imaging (one of CPT® 78230, CPT® 78231, or CPT® 78232) is indicated for evaluation of parotid masses to allow preoperative diagnosis of Warthin’s tumor.

Practice Notes

- The most common malignant ENT tumors in children are lymphoma and rhabdomyosarcoma.
Differential Diagnosis of Neck Lesions by Anatomic Region:

- **Subcutaneous tissues:**
  - Teratoma (includes dermoid cysts)
    - Cervical teratomas are typically large bulky masses discovered at birth or in the first year of life.
    - Large lesions may cause stridor, dyspnea, or dysphagia.
    - Most teratomas arise in the anterior suprahoid neck and may be midline or off midline in location and adjacent to or within a thyroid lobe.
  - Vascular malformations
  - Lipoma
  - Cellulitis
  - Plexiform neurofibromas
  - Keloid
  - Scar
  - Subcutaneous fat fibrosis (in neonates)

- **Retropharyngeal space:**
  - Abscess, cellulitis, adenitis
    - Usually involves children under age 6.
    - Patients have history of upper respiratory tract infection followed by high fever, dysphagia, and neck pain.
  - Lymphadenopathy
  - Extension of goiter
  - Extension of pharyngeal tumor

- **Retrovisceral space (posterior to the cervical esophagus):**
  - Gastrointestinal duplication cysts (usually are diagnosed in first year of life).

- **Pretracheal space (contains trachea, larynx, cervical esophagus, recurrent laryngeal nerves, and thyroid and parathyroid glands):**
  - Thyroglossal duct cyst
    - Thyroglossal duct cyst is most common before the age of 20, 75% present as a midline mass and 43% of patients present with an infected mass.
    - Usually presents as an enlarging, painless midline mass.
    - Thyroid carcinoma occurs in 1% of thyroglossal duct cysts.
  - Goiter
  - Laryngocele
  - Lymphadenopathy
  - Abscess
  - Extopic thymus or cervical extension of normal thymus

- **Danger space (closed space lying between the skull base and the posterior mediastinum and between the alar and prevertebral fasciae in a sagittal plane):**
  - Cellulitis
  - Abscess

- **Prevertebral space:**
  - Neuroenteric cyst
  - Cellulitis
Abscess
Spondylodiskitis
Lymphadenopathy
Cellulitis
Abscess
Paraganglioma

Carotid sheath space:
- Jugular vein thrombosis or phlebitis
- Lymphadenopathy
- Cellulitis
- Abscess
- Paraganglioma

Parotid gland space:
- Parotid lymphadenopathy
- Retromandibular vein thrombosis
- Parotiditis
- Sialodochitis (inflammation of the salivary gland duct)
- Salivary duct stone

Submandibular and sublingual spaces:
- Thyroglossal duct cyst
- Branchial cleft cyst
  - 90% of branchial abnormalities arise from the second branchial apparatus.
  - Second branchial cleft cysts are the most common branchial cleft cyst and usually present in patients between 10 and 40 years as painless fluctuant masses.
  - They typically present as slowly growing, nontender masses in the upper neck
  - Most second branchial cleft cysts are located in the submandibular space, at the anteromedial border of the sternocleidomastoid muscle, lateral to the carotid space, or posterior to the submandibular gland.

Masticator space (includes masseter and pterygoid muscles):
- Venous or lymphatic malformation
- Cellulitis
- Abscess
- Rhabdomyosarcoma

Parapharyngeal space:
- Cellulitis
- Abscess
- Rhabdomyosarcoma
- Extension of lymphoma

Paravertebral space:
- Cervical dermal sinus (epithelium-lines dural tubes that connect the skin with the central nervous system or its covering)
- Meningocele
- Rhabdomyosarcoma
Extension of lymphoma
Cervical neuroblastoma

Posterior cervical space:
Lymphadenopathy
Lymphatic malformation

References
**PEDNECK-3.1: Imaging**

- Painful acute lymphadenopathy and other painful neck masses (including neck "swelling") should be treated with a trial of conservative therapy for at least 4 weeks, including antibiotics if appropriate.
  - If there is improvement with conservative treatment, advanced imaging is not indicated.
  - If there is unexplained fever with a temperature > 100.4°F and there is clinical concern for suppurative lymphadenopathy or a neck abscess, ultrasound (CPT® 76536) is indicated without 4 weeks of treatment and observation.

  - Ultrasound Neck (CPT® 76536) is indicated as an initial evaluation if lymphadenopathy persists following 4 weeks of treatment and/or observation.

  - MRI Neck without and with contrast (CPT® 70543) or CT Neck with contrast (CPT® 70491) can be approved if ultrasound is inconclusive or to further characterize abnormalities seen on ultrasound. Both are superior to ultrasound for defining the relationship of an abscess to adjacent structures, particularly the airway; and detecting posterior cervical, mediastinal and intracranial extension.

- If systemic symptoms or other clinical findings suggest malignancy, See PEDONC-5: Pediatric Lymphomas.

**Practice Notes**

Inflammatory lymph nodes from acute lymphadenitis are usually painful, tender and mobile, frequently associated with upper respiratory infection, pharyngitis or dental infection.

Occasionally, sarcoidosis or toxoplasmosis and Human immunodeficiency virus (HIV) can cause inflammatory lymphadenopathy as well.

**References**


PEDNECK-4: Dystonia/Torticollis

Infants under 12 Months of Age (Congenital Muscular Torticollis)

- Ultrasound Neck (CPT® 76536) is indicated as the initial study to evaluate suspected congenital muscular torticollis, also called fibromatosis coli.
  - Patients usually present by 2 weeks of life with an anterior neck mass, which is commonly right sided (75% of cases). A history of a traumatic breech or forceps delivery is common.
  - If Ultrasound Positive → No further imaging is needed since diagnosis is defined.
  - Negative → CT Neck with contrast (CPT® 70491) or MRI Neck without and with contrast (CPT® 70543) can be approved to evaluate for other structural causes.

Children and Adults (Acquired Torticollis)

- If there has been recent trauma, plain radiographs of the cervical spine should be obtained as an initial evaluation when the suspicion of injury is low. CT Neck with contrast (CPT® 70491) and/or CT Cervical spine without contrast (CPT® 72125) is indicated as the initial study to identify fracture or malalignment if plain radiographs are inconclusive or in patients with a high risk mechanism of cervical spine injury within the last 3 months (See below**). MRI Cervical spine without contrast (CPT® 72141) is also appropriate in the clinical setting of cervical spine trauma with an associated neurologic deficit.

- In the absence of trauma, CT Neck with contrast (CPT® 70491), CT Cervical spine without contrast (CPT® 72125), MRI Cervical spine without contrast (CPT® 72141), MRI Neck without and with contrast (CPT® 70543), or MRA Neck without and with contrast (CPT® 70549) can be approved to identify underlying bony, muscular, vascular, or neurologic causes.
  - Positive → Further advanced imaging is not required if a local cause has been identified.
  - Negative → MRI of the brain without and with contrast (CPT® 70553) to exclude CNS cause.

**High risk mechanisms of cervical spine injury may include:

- Head trauma and/or maxillofacial trauma
- Pedestrian in a motor vehicle accident
- Fall from above standing height
- Diving accident
- Head-on motor vehicle collision without/with airbag deployment
- Rollover motor vehicle collision
- Ejection from the vehicle in a motor vehicle collision
- High speed of the vehicle at the time of collision
- Not wearing a seatbelt/shoulder harness in a motor vehicle collision
- Patients with ankylosing spondylitis are at high risk of cervical spine fractures even with minor direct/indirect trauma to the cervical spine which can result in quadriplegia/quadriplegia
**Practice Note**
Torticollis or cervical dystonia is an abnormal twisting of the neck with head rotated or twisted. The causes are variable and may be congenital, acquired (caused by trauma, infection, inflammation, or neoplasm), or idiopathic. It occurs more frequently in children and on the right side (75%).

**References**
PEDNECK-5: Dysphagia

- Dysphagia imaging indications in pediatric patients are very similar to those for adult patients. See NECK-3: Dysphagia and Esophageal Disorders for imaging guidelines.

- Pediatric-specific imaging considerations include the following:
  - X-rays of the neck and chest may be appropriate as the initial imaging study when concerned for foreign body ingestion as cause of dysphagia.
  - Esophageal motility study (CPT® 78258) is indicated for any of the following:
    - Dysphagia associated with chest pain and difficulty swallowing both solids and liquids.
    - Gastroesophageal reflux.

- Chest CTA or MRA is indicated for a suspected vascular ring, which can be associated with dysphagia:
  - A right aortic arch or double arch noted on chest radiography is an indication for CTA or MRA.

References
## PEDNECK-6: Thyroid and Parathyroid

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PEDNECK-6.1: Thyroid Masses or Nodules

- Ultrasound Neck (CPT® 76536) is the recommended initial study for evaluation of thyroid masses or nodules in pediatric patients.
  - If TSH normal or elevated, fine needle aspiration (FNA) under ultrasound guidance (CPT® 76942) is indicated.
  - If TSH is low, nuclear thyroid scintigraphy (either CPT® 78013 or CPT® 78014), is indicated.
    - Hyperfunctioning nodules should be resected surgically.
    - Hypofunctioning nodules should undergo FNA under ultrasound guidance (CPT® 76942).

- CT Neck without (CPT® 70490) or with (CPT® 70491) contrast, or MRI Neck without and with contrast (CPT® 70543) is indicated for preoperative planning in patients with large or fixed masses, vocal cord paralysis, or bulky cervical or supraclavicular adenopathy.
  - CT Chest without (CPT® 71250) or with (CPT® 71260) contrast is also indicated for patients with substernal extension of the thyroid, pulmonary symptoms, or abnormalities on recent chest x-ray.

- If any biopsy reveals thyroid carcinoma, See ONC-6: Thyroid Cancer for further imaging guidelines.

- If the biopsy shows indeterminate findings, repeat ultrasound (CPT® 76536) and/or FNA (CPT® 76942) is indicated 3 months following initial biopsy.
  - If the nodule is stable and/or FNA is benign, repeat ultrasound (CPT® 76536) is indicated in 6 months.
  - If the nodule is growing or the FNA is not benign, the nodule should be resected surgically.

- If the initial biopsy shows benign findings, repeat ultrasound (CPT® 76536) is indicated 6 months following initial biopsy.
  - If the nodule is stable, repeat ultrasound (CPT® 76536) is indicated annually.
  - If the nodule is growing or concerning new findings are present, the nodule should undergo repeat FNA (CPT® 76942) or be resected surgically.
  - Benign nodules that have been surgically resected do not require routine imaging follow up in the absence of clinical or laboratory changes suggesting recurrence.

PEDNECK-6.2: Hyperthyroidism

- Ultrasound Neck (CPT® 76536) is the recommended initial study for evaluation of hyperthyroidism. Common causes are Graves disease and autoimmune disorders (lupus, rheumatoid arthritis and Sjogren syndrome).
  - If a nodule or mass is discovered on ultrasound, the patient should be imaged according to PEDNECK-6.1: Thyroid Masses or Nodules.

- For all other patients with documented hyperthyroidism, thyroid uptake nuclear imaging (either CPT® 78012 or CPT® 78014) is indicated.
PEDNECK-6.3: Hypothyroidism

- Causes include thyroid congenital dysgenesis, dyshormonogenesis autoimmune thyroiditis, Hashimoto thyroiditis, subacute thyroiditis, and abnormality in the pituitary gland or hypothalamus. Congenital hypothyroidism is usually diagnosed in the neonate on a routine perinatal screening examination.

- Ultrasound (CPT® 76536) is the recommended initial study for evaluation of hypothyroidism.
  - If a nodule or mass is discovered on ultrasound, the patient should be imaged according to PEDNECK-6.1: Thyroid Masses or Nodules.

- For patients with documented congenital hypothyroidism, thyroid uptake nuclear imaging (either CPT® 78014) is indicated.

PEDNECK-6.4: Parathyroid Imaging

- Either ultrasound (CPT® 76536) or sestamibi parathyroid nuclear imaging (one of CPT® 78070, CPT® 78071, or CPT® 78072) is indicated for initial evaluation of primary or recurrent hyperparathyroidism, generally indicated by one of the following:
  - Serum calcium (> 1 mg/dL over upper limit of normal).
  - Elevated serum calcium and elevated serum parathyroid hormone (PTH).

- CT Neck without and with contrast (CPT® 70492) or MRI Neck without and with contrast (CPT® 70543) is indicated for any of the following:
  - Preoperative planning for localization.
  - Serum calcium (> 1 mg/dL over upper limit of normal).
  - Recurrent or persistent hyperparathyroidism following neck exploration (MRI preferred unless contraindicated).

References


19. Gao P, Scheibel S, D’Amour P, et al. Development of a novel immunoradiometric assay exclusively for biologically active whole parathyroid hormone 1-84: implication for improvement of accurate assessment of parathyroid function. *J Bone Miner Res*. 2001 Apr; 16 (4) 605-614. Accessed November 27, 2017. [http://onlineibrary.wiley.com/doi/10.1359/jbmr.2001.16.4.605/abstract?systemMessage=Wiley+Onlin e+Library+usage+report+download+page+will+be+unavailable+on+Friday+24th+November+2017+at+at+21%3A00+EST+%26%2320%3B+%26%2320%2F+02.%26%2320%3B+00+GMT+%26%2320%3B+%26%2320%3B+10%3A00%26%2320%3B+SGT+%26%2320%3B+%26%2320%3B+28%26%2320%3B+Saturday+25th+Nov+for+SGT](http://onlinelibrary.wiley.com/doi/10.1359/jbmr.2001.16.4.605/abstract?systemMessage=Wiley+Onlin e+Library+usage+report+download+page+will+be+unavailable+on+Friday+24th+November+2017+at+at+21%3A00+EST+%26%2320%3B+%26%2320%3B+02.%26%2320%3B+00+GMT+%26%2320%3B+%26%2320%3B+10%3A00%26%2320%3B+SGT+%26%2320%3B+%26%2320%3B+28%26%2320%3B+Saturday+25th+Nov+for+SGT).


PEDNECK-7: Esophagus

Esophagus imaging indications in pediatric patients are very similar to those for adult patients. See NECK-3: Dysphagia and Esophageal Disorders for imaging guidelines.

Pediatric-specific imaging considerations include the following:
- Esophagram is the study of choice for evaluating congenital atresia with associated tracheoesophageal fistula.
- Plain radiographs alone usually suffice for the diagnosis of other types of esophageal atresia and a contrast examination of the esophagus is not warranted but may be indicated for post-operative evaluation.
- Neck CT with contrast (CPT® 70491) and Chest CT with contrast (CPT® 71260) are indicated for evaluation of suspected congenital malformations if x-rays are inconclusive.
  - 3D rendering on a dedicated workstation may be approvable for preoperative planning in complex cases.

References
Trachea imaging indications in pediatric patients are very similar to those for adult patients. See NECK-9: Trachea and Bronchus for imaging guidelines.

Pediatric-specific imaging considerations include the following:
- Neck CT with contrast (CPT® 70491) and Chest CT with contrast (CPT® 71260) are indicated for evaluation of suspected congenital malformations if x-rays are inconclusive.
  - 3D rendering on a dedicated workstation may be approvable for preoperative planning in complex cases.
  - CT is not routinely performed to evaluate foreign body aspiration, but it may be considered in complicated cases.

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<tr>
<td>AFP</td>
<td>Alpha-fetoprotein (tumor marker)</td>
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<td>ALCa</td>
<td>Anaplastic large cell lymphoma</td>
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<tr>
<td>ALL</td>
<td>Acute lymphoblastic leukemia</td>
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<tr>
<td>AML</td>
<td>Acute myelogenous leukemia</td>
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<tr>
<td>β-hCG</td>
<td>Human chorionic gonadotropin beta-subunit (tumor marker)</td>
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<tr>
<td>BKL</td>
<td>Burkitt’s lymphoma</td>
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<tr>
<td>BWT</td>
<td>Bilateral Wilms tumor</td>
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<tr>
<td>CCSK</td>
<td>Clear cell sarcoma of the kidney</td>
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<tr>
<td>CNS</td>
<td>Central nervous system</td>
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<tr>
<td>COG</td>
<td>Children’s Oncology group</td>
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<tr>
<td>CPT®</td>
<td>Current procedural terminology; trademark of the American Medical Association</td>
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<tr>
<td>CSF</td>
<td>Cerebrospinal fluid</td>
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<tr>
<td>CT</td>
<td>Computed tomography</td>
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<td>CXR</td>
<td>Chest x-ray</td>
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<td>DAWT</td>
<td>Diffuse anaplasia Wilms tumor</td>
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<td>ESFT</td>
<td>Ewing sarcoma family of tumors</td>
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<td>FAWT</td>
<td>Focal anaplasia Wilms tumor</td>
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<td>FHWTO</td>
<td>Favorable histology Wilms tumor</td>
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<td>HL</td>
<td>Hodgkin lymphoma</td>
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<tr>
<td>HSCT</td>
<td>Hematopoietic stem cell transplant (bone marrow or peripheral blood)</td>
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<td>Homovanillic acid</td>
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<td>LL</td>
<td>Lymphoblastic lymphoma</td>
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<td>MIBG</td>
<td>Metaiodobenzylguanidine (nuclear scan using $^{123}$I or $^{131}$I)</td>
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<tr>
<td>MPNST</td>
<td>Malignant peripheral nerve sheath tumor</td>
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<td>MRI</td>
<td>Magnetic resonance imaging</td>
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<td>Neuroblastoma</td>
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<td>NED</td>
<td>No evidence of disease</td>
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<td>Nasopharyngeal carcinoma</td>
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<td>NRSTS</td>
<td>Nonrhabdomyosarcomatous soft tissue sarcomas</td>
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# PEDONC-1: General Guidelines

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PEDONC-1.1: Age Considerations

The majority of malignancies occurring in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management between pediatric and adult medical oncologists due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients who are < 18 years old at initial diagnosis should be imaged according to the Pediatric Oncology Imaging Guidelines, and patients who are ≥ 18 years at initial diagnosis should be imaged according to the adult Oncology Imaging Guidelines, except where directed otherwise by a specific guideline section.

- Patients who are 15 to 39 years old at initial diagnosis are defined as Adolescent and Young Adult (AYA) Oncology patients. There is significantly more overlap between cancer types in this age group.
  - When unique guidelines for a specific cancer type exist only in either Oncology or Pediatric Oncology, AYA patients should be imaged according to the guideline section for their specific cancer type, regardless of the patient’s age.
PEDONC-1.2: Appropriate Clinical Evaluations

- In general, a recent (within 60 days) detailed history and physical examination and appropriate laboratory studies should be performed prior to considering advanced imaging, unless the patient is undergoing guideline-supported scheduled off-therapy surveillance evaluation.
  - Because of the relatively small number of childhood cancer treatment centers, it is common to combine off-therapy visits with imaging and other subspecialist visits to accommodate families traveling long distances for their child’s care
- The majority of pediatric oncology imaging indications are listed in the diagnosis-specific guideline sections, but for rare malignancies and other circumstances not specifically addressed elsewhere in the pediatric oncology guidelines, the following general principles apply:
  - Routine imaging of brain, spine, neck, chest, abdomen, pelvis, bones, or other body areas is not indicated in the absence of localizing symptoms or abnormalities on plain radiography or ultrasound.

The overwhelming majority of pediatric Oncology patients treated in the United States will be enrolled on or treated according to recent Children’s Oncology Group (COG) protocols. These imaging guidelines are consistent with evaluations recommended by COG protocols commonly used for direct patient care (whether formally enrolled on study or not).

- For patients enrolled on a COG study, imaging recommended by COG protocols should generally be approved unless the imaging is being performed solely to address a study objective and would not be indicated in usual clinical care.
Phases of Pediatric Oncology Imaging:

- **Screening:**
  - All imaging studies requested for patients at increased risk for a particular cancer in the absence of any clinical signs or symptoms.
  - Screening using advanced imaging is only supported for conditions listed in **PEDONC-2: Screening Imaging In Cancer Predisposition Syndromes**.

- **Initial staging:**
  - All imaging studies requested from the time cancer is first clinically suspected until the initiation of specific treatment (which may be surgical resection alone).
  - Pediatric malignancies in general behave more aggressively than adult cancers, and the time from initial suspicion of cancer to specific therapy initiation can be measured in hours to days for most pediatric cancers.
    - It is recommended that children with pediatric solid tumors undergo CT evaluation of the Chest prior to general anesthesia for biopsy or resection due to the risk of post-operative atelectasis mimicking pulmonary metastasis resulting in inaccurate staging and/or delay in therapy initiation.
    - If CTs of other body areas are indicated, (Neck, Abdomen, Pelvis), they should be performed concurrently with Chest CT to avoid overlapping fields and the resulting increase in radiation exposure.
    - Metastatic CNS imaging and nuclear medicine imaging are generally deferred until after a histologic diagnosis is made, with the exception of aggressive non-Hodgkin Lymphomas.

- **Treatment response:**
  - All imaging studies completed during any type of active treatment (chemotherapy or other medications, radiation therapy, or surgery), including evaluation at the end of planned active treatment.
  - Unless otherwise stated in the diagnosis-specific guidelines, imaging for treatment response can be approved after every 2 cycles, which is usually ~6 weeks of therapy for solid tumors and usually ~8 to 12 weeks for CNS tumors.

- **Surveillance:**
  - All routine imaging studies requested for a patient who is not receiving any active treatment, even if residual imaging abnormalities are present.
  - Unlike adult cancers, in most pediatric cancers surveillance does not begin until all planned multimodal therapy is completed. Pediatric cancers where surgical resection is considered curative are listed in the diagnosis-specific guideline sections.
  - The recommended timing for surveillance imaging studies in these guidelines refers to patients who are asymptomatic or have stable chronic symptoms.
  - Certain tumor types do not require surveillance with advanced imaging as patient outcomes following relapse are not improved by surveillance imaging. See diagnosis-specific guideline sections for details.
  - PET imaging is not supported for surveillance imaging unless specifically stated in elsewhere in the diagnosis-specific guideline sections.
Patients with new or changing clinical signs or symptoms suggesting recurrent disease should have symptom-appropriate imaging requests approved even when surveillance timing recommendations are not met.

Recurrence:
- All imaging studies completed at the time a recurrence or progression of a known cancer is documented or is strongly suspected based on clinical signs or symptoms, laboratory findings, or results of basic imaging studies such as plain radiography or ultrasound.
- Following documented recurrence of childhood cancer, any studies recommended for initial staging of that cancer type in the diagnosis-specific imaging guideline section should be approved.
- During active treatment for recurrent pediatric cancer, conventional imaging evaluation (CT or MRI, should use the same modality for ongoing monitoring as much as possible) of previously involved areas should be approved according to the treatment response imaging in the diagnosis-specific guideline section:
  - Imaging may be indicated more frequently than recommended by guidelines with clinical documentation that the imaging results are likely to result in a treatment change for the patient, including a change from active treatment to surveillance.
- Unless otherwise specified for a specific cancer type, PET is generally not indicated for routine treatment response evaluation during active treatment for recurrent pediatric cancer.
  - In rare circumstances, PET may be appropriate when results are likely to result in a treatment change for the patient, including a change from active treatment to surveillance.
  - These requests will be forwarded for Medical Director review.
- If a patient with recurrent pediatric cancer completes active treatment with no evidence of disease (NED), s/he should be imaged according to the diagnosis-specific surveillance guideline sections.

**Radiation Treatment Planning in Pediatric Oncology:**
- Imaging performed in support of radiation therapy treatment planning should follow guidelines outlined in **ONC-1.5: General Guidelines – Coding and Payor Notes.**
**Cardiac Function Assessment in Pediatric Oncology during Active Treatment:**

- Echocardiography (CPT® 93306, CPT® 93307, or CPT® 93308) is preferred for evaluation of cardiac function prior to cardiotoxic chemotherapy and can be performed as often as each chemotherapy cycle at the discretion of the treating pediatric oncologist based on:
  - Cumulative cardiotoxic therapy received to date
  - Patient's age and gender
  - Most recent echocardiogram results
  - New or worsening cardiac symptoms

- **Multi-gated acquisition (MUGA, CPT® 78472)** blood pool nuclear medicine scanning should not be approved for cardiac function monitoring in pediatric Oncology patients unless one of the following applies:
  - Echocardiography yielded a borderline shortening fraction (< 30%) and additional left ventricular function data are necessary to make a chemotherapy decision
  - Echocardiography windowing is suboptimal due to body habitus or tumor location

**Immunosuppression during Pediatric Cancer therapy and imaging ramifications:**

- Patients may be severely immunocompromised during active chemotherapy treatment and any conventional imaging request to evaluate for infectious complications during this time frame should be approved immediately

- Imaging requests for infectious disease concerns for all patients with absolute neutrophil count (ANC) < 500 or inconclusive findings on Chest x-ray or US at any ANC during active treatment should be approved as requested

- Additionally, patients may have therapy-induced hypogammaglobulinemia which requires supplemental intravenous immune globulin (IVIG) during maintenance therapy. Patients receiving supplemental IVIG should be treated similarly to patients with ANC < 500 with regards to imaging for infectious disease.

- Some patients are treated with very intensive chemotherapy regimens (including autologous stem cell transplantation - See **ONC-29: Hematopoietic Stem Cell Transplantation** and spend the majority of their chemotherapy treatment phase in the hospital. Due to the high risk of invasive infections, frequent CT may be indicated to evaluate known sites of invasive fungal infection, and in general these should be approved as requested.

  - Surveillance imaging of asymptomatic patients to detect invasive fungal infection has not been shown to impact patient outcomes. Imaging requests in these circumstances should only be approved when acute clinical decisions will be made based on the imaging.
**Hematopoietic Stem Cell Transplant (HSCT) in Pediatric Oncology:**

- Transplantation of hematopoietic stem cells from bone marrow, peripheral blood, or cord blood is commonly used in the following clinical situations in pediatric hematology and oncology patients:
  - High risk or recurrent leukemia (allogeneic)
  - Recurrent lymphoma (allogeneic or autologous)
  - Hemophagocytic lymphohistiocytosis (allogeneic)
  - High risk sickle cell disease (allogeneic)
  - High risk neuroblastoma (autologous)
  - High risk CNS tumors (autologous)
  - Recurrent Ewing sarcoma family of tumors (autologous, rarely allogeneic)

- Imaging considerations for HSCT should follow guidelines in: **ONC-29: Hematopoietic Stem Cell Transplantation.**
PEDONC-1.3: Modality General Considerations

- **Plain radiography**
  - CXR can provide a prompt means to evaluate primary intraThoracic tumors and continues to be the initial imaging study recommended to detect complications, such as suspected infection, in symptomatic patients undergoing treatment.
  - CXR continues to be the initial imaging study recommended for pulmonary surveillance for some pediatric cancers. See diagnosis-specific guideline sections for details.
  - Plain radiography continues to be the initial imaging study recommended for evaluation of lesions involving the appendicular skeleton, both during and after completion of treatment. See diagnosis-specific guideline sections for details.
  - Plain abdominal radiographs have been replaced by ultrasound, CT, or MRI

- **Ultrasound**
  - Ultrasound is not widely used in pediatric oncology for staging, but is frequently used for surveillance in patients who have successfully treated (primarily abdominal or pelvic) tumors with little or no residual disease. See diagnosis-specific guideline sections for details.

- **CT**
  - CT with contrast is the imaging study of choice in pediatric patients with lymphomas or solid tumors of the neck, thorax, abdomen, and/or pelvis
    - If CT contrast use is contraindicated due to allergy or impaired renal function, either CT without contrast or MRI without and with contrast may be substituted at the discretion of the ordering physician

- **MRI**
  - MRI without and with contrast is the study of choice for CNS and musculoskeletal tumors
    - If MRI contrast use is contraindicated due to allergy or impaired renal function, MRI without contrast may be substituted at the discretion of the ordering physician
    - Due to the length of time for image acquisition and the need for stillness, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of avoiding a short-interval repeat anesthesia exposure due to insufficient information using the following considerations:
      - MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use, since the patient already has intravenous access for anesthesia.
      - Recent evidence based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast.
      - The U.S. food and drug administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAS) use is not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information
provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAS should be assessed.

- If requesting clinicians indicate that a non-contrast study is being requested due to concerns regarding the use of gadolinium, the exam can be approved.
- If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session.
  - Whole body MRI imaging is considered investigational for all pediatric oncology indications at this time. See **PREFACE-5.2: Whole Body MRI Imaging** for details.

- **Nuclear medicine**
  - General PET imaging consideration can be found in **PEDONC-1.4: PET Imaging** in Pediatric Oncology.
  - Bone scan is frequently used for evaluation of bone metastases during initial treatment, treatment response, and surveillance in pediatric oncology.
    - For the purposes of these guidelines, any of the following codes can be approved where “bone scan” is indicated:
      - CPT® 78300
      - CPT® 78305
      - CPT® 78306
      - CPT® 78320
      - CPT® 78305 and CPT® 78320
      - CPT® 78306 and CPT® 78320
      - If CPT® 78300 and CPT® 78320 are requested together, only CPT® 78320 should be approved.
      - CPT® 78315 has no specific indications for evaluation of malignant disease.
  - $^{123}$I-metaiodobenzylguanidine (MIBG) scintigraphy is the preferred metabolic imaging for neuroblastoma and is positive in 90 to 95% of neuroblastomas, and is also used for evaluation of pheochromocytomas, paragangliomas, ganglioneuromas, and ganglioneuroblatomas.
    - For the purposes of these guidelines, any of the following codes can be approved where “MIBG” is indicated:
      - CPT® 78800
      - CPT® 78801
      - CPT® 78802
      - CPT® 78803
      - CPT® 78804
  - Octreotide and gallium scans use the same CPT codes as MIBG.
**PEDONC-1.4: PET Imaging in Pediatric Oncology**

**Note:** Some payors have specific restrictions on PET imaging, and those coverage policies may supersede the recommendations for PET imaging in these guidelines.

Throughout these guidelines, the term “PET” refers specifically to $^{18}$F-FDG-PET imaging and also applies to PET/CT fusion studies.

- PET imaging in pediatric Oncology should use PET/CT fusion imaging (CPT® 78815 or CPT® 78816) unless there is clear documentation that the treating facility does not have fusion capacity, in which case PET alone (CPT® 78812 or CPT® 78813) can be approved along with the appropriate CT studies. Unbundling PET/CT imaging into separate PET and diagnostic CT codes is otherwise not supported.
- The decision whether to use skull base to mid-femur (“eyes to thighs”) procedure code for PET (CPT® 78812 or CPT® 78815) or whole body PET (CPT® 78813 or CPT® 78816) is addressed in the diagnosis-specific guideline sections.
- PET imaging is not reliable for the detection of anatomic lesions smaller than 8 mm in size.
- PET imaging using isotopes other than $^{18}$F-FDG and $^{68}$Ga-DOTATATE is considered investigational at this time.
- PET has not been shown to be diagnostically useful in all forms of childhood cancer. PET is supported for pediatric malignancies with significant published evidence regarding its diagnostic accuracy and importance in accurately directing patient care decisions. See diagnosis-specific guideline sections for details.
- PET imaging is not specific to cancer, and has a high rate of false positivity. Inflammation, infection (especially granulomatous), trauma, and post-operative healing may show high levels of FDG uptake and be false-positive for malignant lesions.
PET for rare malignancies not specifically addressed by eviCore guidelines is generally not indicated, due to lack of available evidence regarding diagnostic accuracy of PET in the majority of rare cancers. Conventional imaging studies should be used for initial staging and treatment response for these diagnoses. PET can be approved if all of the following apply:

- Conventional imaging (CT, MRI, US, plain film) reveals findings that are equivocal or suspicious
- No other specific metabolic imaging (MIBG, octreotide, technetium, etc.) is appropriate for the cancer type
- The submitted clinical information describes a specific decision regarding the patient’s care that will be made based on the PET results
- These requests will be forwarded for Medical Director review

PET imaging is not supported for surveillance imaging unless specifically stated elsewhere in the diagnosis-specific guideline sections.

Unless otherwise specified for a specific cancer type, once PET has been documented to be negative for a given patient’s cancer or all PET-avid disease has been surgically resected, PET should not be used for continued disease monitoring or surveillance unless one of the following applies:

- Conventional imaging (CT, MRI, US, plain film) reveals findings that are inconclusive or suspicious for recurrence
  - Residual mass that has not changed in size since the last conventional imaging does not justify PET imaging
  - PET avidity in a residual mass at the end of planned therapy is not an indication for PET imaging during surveillance.
- Very rare circumstances where tumor markers or obvious clinical symptoms show strong evidence suggesting recurrence and PET would replace conventional imaging modalities
- The patient is undergoing salvage treatment for a recurrent solid tumor with residual measurable disease on conventional imaging and confirmed repeat negative PET imaging will allow the patient to transition from active treatment to surveillance.
- These requests will be forwarded for Medical Director review.

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End of PEDONC-1.4
**PEDONC-1.5: Diagnostic Radiation Exposure in Pediatric Oncology**

Young children are presumed to be at increased risk for malignancy from diagnostic radiation exposure, most commonly from CT and nuclear medicine imaging. They are more sensitive to radiation than adults and generally live longer after receiving radiation doses from medical procedures, resulting in a larger number of years during which to manifest a cancer.

- Because of this presumed increased risk in young children, requests to substitute MRI without and with contrast for CT with contrast to avoid radiation exposure can be approved if all of the following criteria apply:
  - The patient is presently a young child and the ordering physician has documented the reason for MRI, rather than CT, is to avoid radiation exposure.
  - The disease-specific guidelines do not list CT as superior to MRI for the current disease and time point, meaning the MRI will provide equivalent or superior information relative to CT.
  - The request is for a body area other than Chest as MRI is substantially inferior to CT for detection of small pulmonary metastases.

The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

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End of PEDONC-1.5


23. Coccia PF, Pappo AS, Beaupin L, et al. National Comprehensive Cancer Network (NCCN) Guidelines Version 2.2018—October 11, 2017, Adolescent and Young Adult (AYA) Oncology, available at: [https://www.nccn.org/professionals/physician_gls/pdf/aya.pdf](https://www.nccn.org/professionals/physician_gls/pdf/aya.pdf), referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Adolescent and Young Adult (AYA) Oncology V2.2018 10/11/17. ©2017 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
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**PEDONC-2.1: General Considerations**

This section is intended to give guidance for screening imaging prior to diagnosis with a specific malignancy. Once a patient with a cancer predisposition syndrome has been diagnosed with a malignant disease, future imaging decisions should be guided by the appropriate disease-specific guidelines except as explicitly stated elsewhere in this section.

This section’s guidelines are limited to cancer predisposition syndromes with screening imaging considerations. Syndromes requiring only clinical or laboratory screening are not discussed here.

- In general, a recent (within 60 days) detailed history and physical examination and appropriate laboratory studies should be performed prior to considering advanced imaging, unless the patient is undergoing guideline-supported scheduled screening evaluation identified in this section.

- Many of these cancer predisposition syndromes also affect adults as survival continues to improve for these patients. Adults with syndromes covered in this section may follow these imaging guidelines except where contradicted by specific statements in the adult imaging guidelines or payor-specific coverage policies.

Documentation of genetic or molecular confirmation of the appropriate syndrome with increased cancer risk is preferred for any patient to qualify for screening imaging. There are a number of complex ethical, social, and financial issues involved in the decision to complete genetic testing in a pediatric patient:

- Note: Some payors consider certain genetic tests to be experimental, and those coverage policies supersede the recommendations for genetic testing in this section.

- From the 2013 AAP Policy Statement, “Predictive genetic testing for adult-onset conditions generally should be deferred unless an intervention initiated in childhood may reduce morbidity or mortality.” **Imaging surveillance is one such intervention and should not be performed without justifiable cause.**

- Genetic testing should be performed in conjunction with genetic counseling for appropriate communication of risks identified by testing.

- When genetic testing is not possible or not supported by health plan coverage policies, formal diagnosis after evaluation by a physician with significant training and/or experience in cancer predisposition syndromes (most commonly a geneticist or oncologist) is generally sufficient to confirm eligibility for screening imaging.

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End of PEDONC-2.1
PEDONC-2.2: Li-Fraumeni Syndrome (LFS)

Syndrome inherited in an autosomal dominant manner (50% risk to offspring) associated with germline mutations in TP53 resulted in an increased susceptibility to a variety of cancers.

- Eighty percent of individuals will have germline TP53 mutation:
  - Tumor-specific TP53 mutations are much more common than germline TP53 mutations and are not associated with an increased risk for subsequent cancers
  - If TP53-negative, formal diagnosis of LFS should be assigned by a physician with significant training and/or experience in LFS (most commonly a geneticist or oncologist) based on specified clinical criteria prior to beginning a screening imaging program
  - TP53 mutations may be present in 50 to 80% of pediatric adrenocortical carcinoma, 10% of pediatric rhabdomyosarcoma, and 10% of pediatric osteosarcoma patients

- Patients with LFS have an increased sensitivity to ionizing radiation, so screening strategies resulting in significant radiation exposure are not appropriate (CT and nuclear medicine).

- Because of the wide variety of possible malignancies, there is not currently a standard approach for screening that is supported by evidence:
  - Several longitudinal trials are ongoing to establish an optimal screening protocol for LFS patients:
    - Whole body MRI (WBMRI) is frequently studied in these protocols\(^{13-19}\)
    - Several studies have demonstrated the ability to detect cancers using WBMRI, but only a small percentage of the cancers are detected using WBMRI alone
    - The false positive rates are extremely variable, and range up to 87%\(^{17}\)
      - A recent meta-analysis\(^{16}\) reported that 31% of 578 screened LFS patients had investigable lesions but only 7% of patients were subsequently diagnosed with a new malignant neoplasm.
    - False negatives also occur with WBMRI, most frequently in the brain, but also include tumors such as osteosarcoma and adrenocortical carcinoma. This is felt to be primarily due to the limited images used for WBMRI approaches.
    - Substantial variation continues to exist in WBMRI techniques, with lack of consensus around even such basic principles as which anatomic views to use (coronal, sagittal, and/or axial) and whether contrast is important, and a CPT code for WBMRI has not yet been assigned.
  - At this time, the evidence remains too contradictory to support WBMRI as a standard of care for screening of LFS patients outside the clinical trial setting.
The following imaging studies should be considered appropriate in patients with LFS:

Annual complete detailed physical examinations, complete blood counts, and urinalyses form the backbone of LFS cancer screening.

- Annual MRI Brain without and with contrast (CPT® 70553) for all patients
- Abdominal (CPT® 76700) and Pelvic (CPT® 76856) ultrasound every 3 months
- Annual Breast MRI (CPT® 77059) alternating every 6 months with breast ultrasound for breast cancer surveillance is appropriate for LFS patients beginning at age 20 to 25 (See BR-6: Breast MRI Indications)
- Targeted MRI imaging without and with contrast of any body area(s) with documented signs or symptoms suggestive of possible malignancy
  - When a specific malignancy is suspected, the patient should be imaged according to the eviCore imaging guideline specific to the suspected cancer type
- Studies ordered as part of a screening imaging program based on specific family cancer history that has been developed for an individual patient in conjunction with a multidisciplinary team including at least genetics and Oncology
  - Specifics of the program should be obtained and available for the Medical Director reviewing the case
  - Even in this setting, whole body MRI is not supported for LFS
**PEDONC-2.3: Neurofibromatosis 1 and 2 (NF1 and NF2)**

**NF1:**
Common syndrome inherited in an autosomal dominant manner (50% risk to offspring) affecting 1 in 2500 people. The diagnosis is commonly made based on established clinical criteria including café-au-lait spots, lisch nodules of the iris, axillary freckling, family history, and the presence of NF-associated tumors.

Genetic testing is encouraged for children with possible NF1 and no family history prior to assigning a diagnosis, but will not identify a mutation for all patients with NF1. The majority of tumors are benign in nature, but malignant degeneration can occur.

NF1-affected persons have increased sensitivity to ionizing radiation, so CT and nuclear medicine imaging are not appropriate screening or surveillance studies for these patients. CT and/or nuclear medicine studies may be indicated for acute clinical situations and should be judged on a case-by-case basis. These requests will be forwarded for Medical Director review.

Annual ophthalmology evaluation is recommended beginning at the time of diagnosis of NF1 to evaluate for optic pathway abnormalities:

- Screening MRIs of the Brain (CPT® 70553) and Orbits (CPT® 70543) for asymptomatic individuals are not generally recommended due to the ~60% rate of unidentified bright objects (UBOs, T2-weighted signal abnormalities) which mostly disappear by age 30
  - A one-time MRI Brain (CPT® 70553) and Orbits (CPT® 70543) without and with contrast can be approved to clarify the diagnosis of NF1 if evaluation by a physician with significant training and/or experience in neurofibromatosis is inconclusive (most commonly a neurologist, geneticist, ophthalmologist, or oncologist)
  - Routine follow up imaging of UBOs is not warranted in the absence of acute symptoms suggesting new or worsening intracranial disease
  - Children with negative brain and orbital screening at age 15 months generally do not develop optic pathway gliomas
- Patients with NF1 and documented optic pathway gliomas should be imaged according to PEDONC-4.2: Intracranial Low Grade Gliomas.
NF1 patients are at increased risk for plexiform neurofibromas (PN) and malignant peripheral nerve sheath tumors (MPNST—a high grade sarcoma).

- Screening imaging of asymptomatic patients for these tumors is not supported by evidence. PET imaging is not supported for PN surveillance in asymptomatic patients at this time as the positive predictive value is only 60 to 65% even in symptomatic patients.
- MRI imaging without and with contrast is appropriate for any clinical symptoms suggestive of change in a known PN in a patient with NF1.
- Although PET imaging has a positive predictive value of only 61 to 63% in NF1 patients with suspected transformation to MPNST, the negative predictive value is high (96 to 99%)
  - PET imaging is indicated for evaluating NF1 patients with clinical symptoms concerning for malignant transformation of a known PN when all of the following conditions exist:
    - Recent MRI is inconclusive regarding transformation or progression
    - Negative PET will result in a decision to avoid biopsy in a difficult or morbid location
  - Inconclusive PET findings should lead to biopsy of the concerning lesion
    - Repeat PET studies are not indicated due to the poor positive predictive value in this setting
- Patients with NF1 and known plexiform neurofibromas should be imaged according to PEDPN-2.1: Neurofibromatosis 1.
- Patients with NF1 and new soft tissue masses should be imaged according to ONC-12: Sarcoma or PEDONC-8.3: Non-Rhabdomyosarcoma Soft Tissue Sarcomas, depending on the patient’s age at the time the mass is discovered.
- Patients with NF1 and new bone masses should be imaged according to PEDONC-9: Bone Tumors.
NF2:
NF2 is substantially less common than NF1. It is inherited in an autosomal dominant manner (50% risk to offspring) affecting ~1 in 25000 people. NF2 is associated with increased risk for meningiomas (50% of affected individuals), vestibular schwannomas, and spinal tumors (75% of affected individuals).

- Patients with NF2 and known vestibular schwannomas should be imaged according to guidelines in PEDPN-2.2: Neurofibromatosis 2.
- Patients with NF2 and known meningioma should be imaged according to guidelines in ONC-2.8: Meningiomas.
- Patients with NF2 and known ependymoma should be imaged according to guidelines in PEDONC-4: Ependymoma.

Recommended cancer screening imaging includes:
- Annual MRI Brain without and with contrast (CPT® 70553) beginning at age 10 years
- MRI spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved every 3 years beginning at age 10 years for patients without spinal tumors
  - Annual MRI spine can be approved for patients with NF2 and a history of spinal tumors

Additional appropriate imaging requests include:
- MRI Brain without and with contrast (CPT® 70553) should be approved for any patient with NF2 and clinical symptoms of intracranial mass or vestibular disease
- MRI spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) should be approved for any patient with NF2 and:
  - Clinical symptoms suggestive of spinal or paraspinal tumors, including uncomplicated back pain or radiculopathy
  - Recent diagnosis with a meningioma or vestibular schwannoma
PEDONC-2.4: Beckwith-Wiedemann Syndrome (BWS)

Inherited syndrome characterized by macroglossia, hemihypertrophy, macrosomia, organomegaly, and neonatal hypoglycemia. Patients with isolated hemihypertrophy are also imaged according to this guideline.

Caused by mutation at chromosome 11p15, affected children are predisposed to Wilms tumor, hepatoblastoma, rhabdomyosarcoma, and adrenal tumors.

**Recommended cancer screening imaging includes:**

- Abdominal ultrasound (CPT® 76700) every 3 months from birth to the 8th birthday
  - Patients found to have adrenal masses on screening ultrasound should receive additional imaging as follows:
    - Purely cystic mass:
      - Continue screening ultrasound every 3 months without additional imaging
    - Solid or mixed mass in patients age 0 to 5 months:
      - If mass 0 to 3 cm in diameter → MIBG imaging and either CT or MRI Abdomen (contrast as requested)
        - If no evidence of malignancy based on MIBG, CT or MRI, Urine HVA/VMA, and serum ACTH, then repeat abdominal ultrasound every 6 weeks for 2 years
      - If mass > 3 cm in diameter → MIBG imaging and MRI Abdomen (contrast as requested)
    - Solid or mixed mass in patients age 6 months or greater:
      - MIBG imaging prior to biopsy or resection
      - If no evidence of malignancy on biopsy or resection, resume screening abdominal ultrasound every 3 months
  - Patients with BWS and known renal tumors should be imaged according to guidelines in **PEDONC-7: Pediatric Renal Tumors**.
  - Patients with BWS and known hepatoblastoma should be imaged according to guidelines in **PEDONC-11.2: Hepatoblastoma**.
  - Patients with BWS and known neuroblastoma should be imaged according to guidelines in **PEDONC-6: Neuroblastoma**.
  - Patients with BWS and known adrenocortical carcinoma should be imaged according to guidelines in **PEDONC-14: Pediatric Adrenocortical Carcinoma**.
  - Patients with BWS and known pheochromocytoma should be imaged according to guidelines in **ONC-15: Neuroendocrine Cancers and Adrenal Tumors**.

---

End of PEDONC-2.4
**PEDONC-2.5: Denys-Drash Syndrome (DDS)**

Characterized by pseudohermaphroditism, early renal failure, and > 90% risk of Wilms tumor development in each kidney. Associated with mutations at 11p13, risk of renal failure after detection of symptomatic Wilms tumor is 62%, so early detection may allow for renal-sparing surgical approaches.

**Recommended cancer screening imaging includes:**

- Abdominal ultrasound (CPT® 76700) every 3 months from birth to the 8th birthday
- Patients with DDS and known renal tumors should be imaged according to guidelines in **PEDONC-7: Pediatric Renal Tumors**.

---

**PEDONC-2.6: Wilms Tumor-Aniridia-Growth Retardation (WAGR)**

Named for the components of the disorder, it is associated with mutations at 11p13. As the name suggests, patients are predisposed to Wilms tumor, with 57% of patients in one cohort developing Wilms tumor. Risk of renal failure after detection of symptomatic Wilms tumor is 38%, so early detection may allow for renal-sparing surgical approaches.

**Recommended cancer screening imaging includes:**

- Abdominal US (CPT® 76700) every 3 months from birth to the 8th birthday
- Patients with WAGR and known renal tumors should be imaged according to guidelines in **PEDONC-7: Pediatric Renal Tumors**.

---

End of PEDONC-2.6
**PEDONC-2.7: Familial Adenomatous Polyposis (FAP) and Related Conditions**

Inherited in an autosomal dominant manner (50% risk to offspring), it is also known as Adenomatous Polyposis Coli (APC). It is associated with the development of thousands of colonic polyps by age 20 and > 90% risk of colorectal carcinoma. Prophylactic total colectomy is recommended by age 20 for most patients. FAP is also associated with hepatoblastoma, tumors of the pancreas and small bowel, medulloblastoma, and thyroid cancer.

Patients with Lynch, Gardner, and Turcot syndromes should also be imaged according to these guidelines.

**Recommended cancer screening imaging includes:**

- Abdominal US (CPT® 76700) every 3 months from birth to the 6th birthday
  - Annual Abdominal US for life after age 6 with family history of desmoid tumors
- Serum AFP every 3 months to the 6th birthday
- Annual colonoscopy beginning at age 7
- Annual esophagastroduodenoscopy beginning at age 10
- Annual thyroid ultrasound (CPT® 76536) beginning at age 12
- Annual pelvic ultrasound (CPT® 76856) beginning at age 30
- Patients with FAP and known colorectal tumors should be imaged according to guidelines in **ONC-16: Colorectal Cancer.**
- Patients with FAP and known desmoid tumors should be imaged according to guidelines in **PEDONC-8.3: Non-Rhabdomyosarcoma Soft Tissue Sarcomas (NRSTS).**
PEDONC-2.8: Multiple Endocrine Neoplasias (MEN)

Inherited in an autosomal dominant manner (50% risk to offspring)

MEN1 is characterized by parathyroid, pancreatic islet cell, and pituitary gland tumors (3 P’s), as well as carcinoid tumors in the chest and abdomen, and 28% of patients will develop at least one tumor by age 15.

MEN2a is characterized by medullary thyroid carcinoma, parathyroid adenomas, and pheochromocytomas.

MEN2b is characterized by ganglioneuromas of the GI tract and skeletal abnormalities presenting in infancy.

**Recommended cancer screening imaging includes:**

- **MEN1**
  - Annual MRI Brain without and with contrast (CPT® 70553) can be approved beginning at age 5
  - Annual MRI Abdomen without and with contrast (CPT® 74183), CT Abdomen with contrast (CPT® 74160), or ultrasound (CPT® 76700) can be approved beginning at age 5
  - Annual MRI Chest without and with contrast (CPT® 71552) or CT Chest with contrast (CPT® 71260) can be approved beginning at age 15
  - Annual Octreotide study (CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78803, or CPT® 78804) can be approved beginning at age 5
- Patients with MEN1 and known thyroid cancer should be imaged according to guidelines in **ONC-6: Thyroid Cancer**
- Patients with MEN1 and known pheochromocytoma should be imaged according to guidelines in **ONC-15: Neuroendocrine Cancers and Adrenal Tumors**

- **MEN2a and MEN2b**
  - Annual measurement of catecholamines for pheochromocytoma screening
  - MRI Abdomen without and with contrast (CPT® 74183) can be approved every 3 years beginning at age 5
  - Octreotide study (CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78803, or CPT® 78804) or Adrenal Nuclear Imaging (CPT® 78075) can be approved for elevated catecholamines or inconclusive adrenal mass on MRI
- Patients with MEN2a or MEN2b and known pheochromocytoma should be imaged according to guidelines in **ONC-15: Neuroendocrine Cancers and Adrenal Tumors**

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End of PEDONC-2.8---
**PEDONC-2.9: Tuberous Sclerosis Complex (TSC)**

Inherited in an autosomal dominant manner (50% risk to offspring), affecting ~1 in 6000 individuals, it is associated with benign tumors, hypopigmented skin macules (ash leaf spots), pulmonary lymphangioleiomyomatosis, developmental delay, and epilepsy.

**Malignancies associated with this syndrome include:**
- Subependymal giant cell astrocytomas (SEGA tumors)
  - Historically, early surgery was important to reduce morbidity related to these tumors
  - More recently, everolimus has been successfully used to treat these tumors without surgery, and early detection remains an important feature for success
- Renal cell carcinoma
- Cardiac rhabdomyosarcoma
- Pulmonary lymphangioleiomyomatosis

**Recommended cancer screening imaging includes:**
- Annual ophthalmologic evaluation
- Annual Brain MRI without and with contrast (CPT® 70553) beginning at age 3
- Annual Renal US (CPT® 76770) beginning at age 3
  - Annual MRI Abdomen without and with contrast (CPT® 74183) can be substituted for Renal US in patients with documented renal lesions
- Annual Echocardiography beginning at age 4
- CT Chest without contrast (CPT® 71250) every 5 years beginning at age 18 years
  - Additional CTs may be approved every 1 year for patients with documented abnormalities
  - CT Chest without contrast should be approved for evaluation of any new pulmonary symptoms or worsening pulmonary function testing
- Patients with TSC and known SEGA tumors should be imaged according to **PEDONC-4.2: Intracranial Low Grade Gliomas**
- Patients with TSC and known renal cell carcinoma should be imaged according to **PEDONC-7.4: Renal Cell Carcinoma**
**PEDONC-2.10: Von Hippel-Lindau Syndrome (VHL)**

Inherited in an autosomal dominant manner (50% risk to offspring), it is associated with CNS hemangioblastomas, retinal angiomas, endolymphatic sac tumors, renal cell carcinoma, and pheochromocytomas and other neuroendocrine tumors.

**Recommended cancer screening imaging includes:**

- Annual ophthalmologic evaluation
- Annual measurement of catecholamines beginning at age 2
  - Octreotide study (CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78803, or CPT® 78804) or Adrenal Nuclear imaging (CPT® 78075) can be approved for elevated catecholamines or inconclusive adrenal mass on MRI
- Audiology assessment every 2 to 3 years beginning at age 5
  - If frequent ear infections are present, MRI Brain without and with contrast (CPT® 70553) with attention to internal auditory canals can be approved
- MRI Brain without and with contrast (CPT® 70553) every 2 years beginning at age 12
  - Patients with known hemangioblastoma that has not been resected can have MRI Brain every 1 year or for any new or worsening symptoms
- MRI Spine without and with contrast (Cervical-CPT® 72156), Thoracic-CPT® 72157, and Lumbar-CPT® 72158) every 2 years beginning at age 16
  - Patients with known hemangioblastoma that has not been resected can have MRI Spine every 1 year or for any new or worsening symptoms
- Annual Abdominal US (CPT® 76700) beginning at age 5
- MRI Abdomen without and with contrast (CPT® 74183) every 2 years beginning at age 16
- Patients with VHL and known CNS Hemangioblastoma should be imaged according to **PEDONC-4.2: Intracranial Low Grade Gliomas**
- Patients with VHL and known renal cell carcinoma should be imaged according to **PEDONC-7.4: Renal Cell Carcinoma**
- Patients with VHL and known pheochromocytoma or other neuroendocrine tumors should be imaged according to guidelines in **ONC-15: Neuroendocrine Cancers And Adrenal Tumors**
PEDONC-2.11: Rhabdoid Tumor Predisposition Syndrome

Inherited in an autosomal dominant manner (50% risk to offspring), it is associated with malignant rhabdoid tumors of the kidney and extrarenal locations, and atypical teratoid/rhabdoid tumors of the CNS. It is caused by a germline mutation in INI1 or SMARCB1, and is associated with a more variable prognosis than de novo rhabdoid tumors.

There is insufficient evidence to date to provide screening recommendations for advanced imaging, but targeted advanced imaging should be approved for any patient with this syndrome and any clinical symptoms to suggest malignancy.

End of PEDONC-2.11

PEDONC-2.12: Familial Retinoblastoma Syndrome

This syndrome is inherited in an autosomal dominant manner (50% risk to offspring). As the name suggests, it is associated with retinoblastoma, as well as osteosarcoma, pediatric melanoma, and a significantly increased risk for radiation-related malignancies.

Regular physical and ophthalmologic evaluations under anesthesia are the hallmark of surveillance strategies for these patients, and asymptomatic screening imaging does not have a defined role at this time.

When advanced imaging is necessary, ultrasound or MRI should be used if at all possible in lieu of CT or nuclear imaging to avoid radiation exposure in these patients.

End of PEDONC-2.12
**PEDONC-2.13: Hereditary Paraganglioma-Pheochromocytoma Syndromes**

Caused by mutations in \(SDHx\) genes, this syndrome is inherited in an autosomal dominant manner (50% risk to offspring), and is associated with pheochromocytomas and paragangliomas.

Patients with multiple endocrine neoplasias should not use this guideline and should be imaged according to **PEDONC-2.8: Multiple Endocrine Neoplasias (MEN)**.

Cancer screening should begin at age 10 or at least 10 years before the youngest age at pheochromocytoma or paraganglioma diagnosis in the family history, whichever is earlier. The following recommended imaging can be approved:

- **All patients with \(SDHx\) mutations:**
  - Annual measurement of catecholamines
  - MIBG imaging (See PEDONC-1.3: Modality General Considerations) for evaluation of elevated catecholamines
    - MRI without and with contrast or CT with contrast can be approved to evaluate abnormal MIBG findings

- **Patients with \(SDHC\) or \(SDHD\) mutations:**
  - MRI Orbits/Face/Neck without and with contrast (CPT® 70543) every 2 years
  - MIBG imaging every 4 years (See PEDONC-1.3: Modality General Considerations)
    - MRI without and with contrast or CT with contrast can be approved to evaluate abnormal MIBG findings
  - There is no documented role for PET/CT imaging in screening for these patients

- **Patients with \(SDHB\) mutations:**
  - CT Chest (CPT® 71260) and Abdomen/Pelvis with contrast (CPT® 74177) or MRI Chest (CPT® 71552), Abdomen (CPT® 74183 ), and Pelvis (CPT® 72197) without and with contrast, and every 2 years
  - MIBG imaging every 4 years (See PEDONC-1.3: Modality General Considerations)
    - There is no documented role for PET/CT imaging in screening for these patients

- **Patients with \(SDHA\) or \(SDH5\) mutations:**
  - No specific imaging screening has been shown to improve patient outcomes to date

- **Patients with VHL and known pheochromocytoma or other neuroendocrine tumors should be imaged according to guidelines in ONC-15: Neuroendocrine Cancers and Adrenal Tumors**

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End of PEDONC-2.13
**PEDONC-2.14: Costello Syndrome**

Caused by mutations in *HRAS* genes, this syndrome is inherited in an autosomal dominant manner (50% risk to offspring), and is associated with rhabdomyosarcoma and neuroblastoma in early childhood, and transitional cell cancer of the bladder in older children and adults.

**Recommended Screening Imaging Includes:**

- Following initial diagnosis, any or all of the following are indicated:
  - Echocardiogram (CPT® 93306)
  - MRI Brain (CPT® 70553) without and with contrast
  - MRI Cervical (CPT® 72156) and Thoracic Spine (CPT® 72157) without and with contrast
- Ultrasound of the Abdomen (CPT® 76700) and Pelvis (CPT® 76856) every 3 months from birth to 10th birthday
- Echocardiogram (CPT® 93306) as requested for patients with Costello syndrome and known cardiac disease
- Patients with Costello syndrome and known rhabdomyosarcoma should be imaged according to guidelines in PEDONC-8.2: Rhabdomyosarcoma (RMS)
- Patients with Costello syndrome and known neuroblastoma should be imaged according to guidelines in PEDONC-6: Neuroblastoma
References – PEDONC-2


## PEDONC-3: Pediatric Leukemias

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PEDONC-3.1: Pediatric Leukemia General Considerations

The overwhelming majority of leukemias occurring in children are acute. Chronic myelogenous leukemia (CML) is rare in children, and the occurrence of chronic lymphocytic leukemia (CLL) appears to have only been reported once in pediatric patients to date.

- MRI Brain without and with contrast (CPT® 70553) can be performed in patients exhibiting CNS symptoms and in patients found to have high tumor burden on CSF cytology.
- There is not sufficient evidence to support the use of PET imaging for any indication in the management of acute lymphoblastic leukemia, acute myeloid leukemia, or chronic myeloid leukemia.
- Routine advanced imaging is not indicated in the evaluation and management of chronic myeloid leukemia in the absence of specific localizing clinical symptoms or clearance for hematopoietic stem cell transplantation. See ONC-29: Hematopoietic Stem Cell Transplantation for imaging guidelines related to transplant.
**PEDONC-3.2: Acute Lymphoblastic Leukemia (ALL)**

- The majority of ALL patients have B-precursor all and routine advanced imaging is not necessary.
- Patients with B-precursor or T-cell lymphoblastic lymphoma without bone marrow involvement are treated similarly to leukemia patients of the same cell type and should be imaged according to this guideline section.
- This section does not apply to patients with mature B-cell histology (primarily Burkitt’s in children). Please refer to **PEDONC-5.3: Pediatric Aggressive Mature B-Cell Non-Hodgkin Lymphomas (NHL)** for guidelines for these patients.
- CXR should be performed to evaluate for mediastinal mass in suspected cases or upon initial diagnosis.
  - If mediastinal widening is seen on CXR, CT Chest with contrast (CPT® 71260) is indicated immediately to evaluate for airway compression and anesthesia safety prior to attempting histologic diagnosis.
  - Patients with known or strongly suspected T-cell histology can have CT Neck (CPT® 70491), Chest (CPT® 71260) and CT Abdomen/Pelvis (CPT® 74177) with contrast approved for initial staging purposes.
- MRI Brain without and with contrast (CPT® 70553) can be performed in patients exhibiting CNS symptoms and in patients found to have high tumor burden on CSF cytology.

**Additional imaging in lymphoblastic lymphoma:**

- Follow up CT to assess response to therapy is indicated only for patients with known bulky nodal disease (usually with T-cell histology) at the end of induction (~4 to 6 weeks). Patients with residual masses can be evaluated with every new therapy phase (Consolidation, Interim maintenance, etc., generally every 8 to 12 weeks) until disease resolution is seen.
  - PET/CT (CPT® 78815) can be approved when residual mass ≥ 8 mm in diameter is present on recent CT imaging and there is documentation of how PET findings will affect immediate treatment decision making. These requests should be forwarded for Medical Director review.
- Once CT imaging shows no evidence of disease, further surveillance should use CXR or Abdominal Ultrasound (CPT® 76700) only, as indicated by site(s) of bulky disease present at diagnosis.
  - Patients with persistent residual masses can have CT of all involved bulky nodal areas performed as part of an end of therapy evaluation.
**Immunosuppression during ALL therapy and imaging ramifications:**

- ALL patients are severely immunocompromised during the first 4 to 6 weeks of treatment (induction) and any conventional imaging request to evaluate for infectious complications during this time frame should be approved immediately.
- Imaging requests for infectious disease concerns for ALL patients with absolute neutrophil count (ANC) < 500 or inconclusive findings on chest x-ray or US at any ANC during active treatment should be approved as requested.
- Additionally, patients may have therapy-induced hypogammaglobulinemia which requires supplemental intravenous immune globulin (IVIG) during maintenance therapy. Patients receiving supplemental IVIG should be treated similarly to patients with ANC < 500 with regards to imaging for infectious disease.

**Imaging during therapy for relapsed ALL:**

- Relapsed ALL patients are treated with very intensive chemotherapy regimens and most patients spend the majority of their chemotherapy treatment phase in the hospital. Due to the high risk of invasive infections, frequent CT may be indicated to evaluate known or suspected new sites of invasive fungal or other aggressive infections, and in general these should be approved as requested.
  - Surveillance imaging of asymptomatic patients to detect invasive fungal infection has not been shown to impact patient outcomes. Imaging requests in these circumstances should only be approved when acute clinical decisions will be made based on the imaging.
**Imaging of known or suspected osteonecrosis in ALL:**

- Osteonecrosis (ON) in ALL patients is a relatively common complication of ALL and its treatment, primary corticosteroids. Approximately 3% of younger children and 12 to 15% of adolescents are affected by ON at some point during therapy. The peak incidence occurs approximately one year from the time of diagnosis.
  - For patients with symptoms suggesting osteonecrosis, MRI without contrast or without and with contrast of the affected joint(s) can be approved.
    - CT without contrast can be approved when MRI is contraindicated or unavailable, or for diagnosis of suspected subchondral fracture
  - Screening MRI of asymptomatic patients age ≤ 10 years to detect osteonecrosis has not been shown to impact patient outcomes, and it is not standard to alter treatment based on imaging findings alone without symptoms
    - A single screening MRI Bilateral Hips (CPT® 73721 or CPT® 73723 with modifier -50) can be approved 6 to 9 months after diagnosis for patients age ≥ 11 years
  - If osteonecrosis is detected on initial MRI, corticosteroids are often withheld during maintenance chemotherapy (but continued in earlier phases of therapy).
  - In patients whose symptoms have resolved and are still receiving active treatment, repeat MRI without contrast of the affected joint(s) can be approved every 2 cycles of maintenance (~every 6 months) if reintroduction of corticosteroids is being considered.
  - MRI without contrast of the affected joint(s) can be approved if requested for preoperative planning in patients undergoing core decompression
  - See PEDONC-19.4: Osteonecrosis In Long Term Cancer Survivors for information on osteonecrosis in ALL patients who have completed therapy
PEDONC-3.3: Acute Myeloid Leukemia (AML)

The majority of AML patients do not have any bulky disease and routine advanced imaging is not necessary.

Advanced imaging may be indicated for rare patients with bulky tumor masses (chloromas) noted on physical examination or other imaging such as plain film or ultrasound.

► AML patients are treated with very intensive chemotherapy regimens and spend the majority of their chemotherapy treatment phase in the hospital. Due to the high risk of invasive infections, frequent CT imaging may be indicated to evaluate known sites of invasive fungal infection, and in general these should be approved as requested.

♦ Surveillance imaging of asymptomatic patients to detect invasive fungal infection has not been shown to impact patient outcomes. Imaging requests in these circumstances should only be approved when acute clinical decisions will be made based on the imaging.

End of PEDONC-3.3
References – PEDONC-3


# PEDONC-4: Pediatric CNS Tumors

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**PEDONC-4.1: Pediatric CNS Tumors General Considerations**

Central nervous system tumors are the second most common form of childhood cancer, accounting for ~20% of all pediatric malignancies.

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<td>Any headache complaint from a child age ≤ 5 years</td>
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- MRI is the preferred imaging modality for all pediatric CNS tumors. The primary imaging study for pediatric brain tumors is MRI Brain without and with contrast (CPT® 70553).
  - For children able to undergo MRI without sedation, MRI Brain without contrast (CPT® 70551) can be approved if requested for initial evaluation of suspected CNS tumor.
  - Younger patients requiring sedation for MRI should have their initial MRI performed without and with contrast in order to avoid a second anesthesia exposure.
- CT can be approved for evaluation of ventriculomegaly or other operative considerations, or for children who cannot undergo MRI safely.
  - Because of the significant percentage of pediatric CNS tumors occurring in the posterior fossa, CT is not a recommended study for evaluation of pediatric headache when brain tumor is clinically suspected because of its limited diagnostic accuracy in this area. MRI should be used as first line imaging in these cases.
  - CT should not be used in place of MRI to avoid sedation in young children when red flag symptoms for CNS tumors are present
  - CT can also be approved for evaluation of headaches related to head trauma or evaluation of skull or facial bone abnormalities
- MRA or CTA are not routinely indicated in pediatric CNS tumors but can be approved for preoperative planning or to clarify inconclusive findings on MRI or CT.
- Definitive imaging should be completed prior to considering biopsy given the high degree of morbidity associated with operating on the CNS
  - Occasionally biopsy is not necessary because the imaging findings provide a definitive diagnosis. Examples include diffuse intrinsic pontine glioma and optic pathway gliomas in a patient with known neurofibromatosis.
Perioperative imaging frequency

- Children may undergo very frequent imaging in the immediate perioperative period around resection or debulking of a CNS tumor due to the small anatomic spaces involved. Requests for imaging during this time period to specifically evaluate postoperative course or ventriculoperitoneal shunt functioning should, in general, be approved as requested.

- A one-time MRI Brain without and with contrast (CPT® 70553) can be approved in the immediate preoperative period (even if another study has already been completed) to gain additional information which can be important in optimizing patient outcomes, such as:
  - Completion of additional specialized MRI sequences such as diffusion-tensor imaging, perfusion imaging, tractography, or other sequences not reported under a separate CPT® code but not part of a routine MRI Brain series
  - Repeat MRI Brain that is being requested solely for loading into operative navigation software should not be requested as a diagnostic code, but can be approved under a treatment planning code (CPT® 76498). These requests should be forwarded for Medical Director review.

**MR Spectroscopy (MRS, CPT® 76390):**

**Note:** Some payors have specific restrictions on MR Spectroscopy, and those coverage policies may supersede the recommendations for MRS in these guidelines.

- MRS is only supported for use in brain tumors of specified histologies where diagnostic accuracy has been established in peer-reviewed literature
  - See diagnosis-specific guidelines for MRS indications
- MRS is considered investigational/experimental for all other histologies and indications not listed in a diagnosis-specific guideline section
- MR spectroscopy is not indicated for routine surveillance
- Requests for MRS should be forwarded for Medical Director review
PET Brain Imaging (CPT® 78608 and CPT® 78609):

Note: Some payors have specific restrictions on PET Brain Metabolic imaging, and those coverage policies may supersede the recommendations for this study in these guidelines.

- PET Brain Metabolic imaging (CPT® 78608) is only supported for use in brain tumors of specified histologies where diagnostic accuracy has been established in peer-reviewed literature
  - See diagnosis-specific guidelines for PET indications
- PET Brain Metabolic imaging is considered investigational/experimental for all other histologies and indications not listed in a diagnosis-specific guideline section
- PET Brain Perfusion imaging (CPT® 78609) is not indicated in the evaluation or management of primary CNS tumors
- Fusion PET/CT studies (CPT® 78814, CPT® 78815, or CPT® 78816) are not indicated in the evaluation or management of primary CNS tumors
- PET Brain Metabolic is not indicated for routine surveillance
- Requests for PET Brain Metabolic should be forwarded for Medical Director review

End of PEDONC-4.1
PEDONC-4.2: Intracranial Low Grade Gliomas (LGG)

Account for 40 to 60% of pediatric CNS tumors. These tumors are defined as having a WHO histologic grade of I or II (out of IV), can occur anywhere in the CNS, and includes the following tumors:

- Pilocytic Astrocytoma
- Fibrillary (or Diffuse) Astrocytoma
- Optic Pathway Gliomas
- Pilomyxoid Astrocytoma
- Oligodendroglioma
- Oligoastrocytoma
- Oligodendrocytoma
- Subependymal Giant Cell Astrocytoma (SEGA)
- Ganglioglioma
- Gangliocytoma
- Dysembryoplastic Infantile Astrocytoma (DIA)
- Dysembryoplastic Infantile Ganglioglioma (DIG)
- Dysembryoplastic Neuroepithelial Tumor (DNT)
- Tectal Plate Gliomas
- Cervicomedullary Gliomas
- Pleomorphic Xanthoastrocytoma (PXA)
- Any other glial tumor with a WHO grade of I or II

PET Brain Metabolic imaging (CPT® 78608) can be approved in the following circumstances:

- To determine need for biopsy when transformation to high grade glioma is suspected based on clinical symptoms or recent MRI findings
- To evaluate a brain lesion of indeterminate nature when the PET findings will be used to determine whether biopsy/resection can be safely postponed

MR spectroscopy (MRS, CPT® 76390) can be approved in the following circumstances:

- To distinguish low grade from high grade gliomas
- To evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed
- To distinguish radiation-induced tumor necrosis from progressive disease within 18 months of completing radiotherapy.

Note: Some payors have specific restrictions on PET Brain Metabolic imaging and/or MR Spectroscopy, and those coverage policies may supersede the recommendations for PET Brain or MRS in these guidelines

Low Grade Gliomas Initial Staging:

- MRI Brain without and with contrast (CPT® 70553) is indicated for all LGG
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved for all LGG patients if requested, and spinal imaging is particularly recommended for patients with:
  - Multicentric tumors
Intracranial leptomeningeal disease
Clinical signs or symptoms suggesting spinal cord involvement
MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain.

Patients with neurofibromatosis and small optic pathway tumors may not undergo biopsy or resection and will proceed directly to treatment or surveillance.

**Low Grade Gliomas Treatment Response:**

- Children who have resection of the tumor can have a single MRI Brain without and with contrast (CPT® 70553) approved following resection to establish baseline imaging and those with a complete resection should then be imaged according to surveillance guidelines.
- Children with neurofibromatosis and small optic pathway gliomas may be observed without specific treatment and should be imaged according to surveillance guidelines for LGG.
- Patients age > 10 years with incompletely resected tumors usually receive adjuvant radiation therapy and can have a single MRI Brain without and with contrast (CPT® 70553) approved at completion of radiotherapy and should then be imaged according to surveillance guidelines.
- Patients age ≤ 10 years with incompletely resected tumors are commonly treated with chemotherapy and can have MRI Brain without and with contrast (CPT® 70553) approved every 2 cycles during active treatment and at the end of planned chemotherapy.
- Spinal imaging is not indicated during treatment response for patients without evidence of spinal cord involvement at initial diagnosis.
- Spinal imaging is appropriate every 2 cycles during induction chemotherapy for patients with measurable spinal cord disease on MRI.
**Low Grade Gliomas Surveillance:**

- MRI Brain without and with contrast (CPT® 70553) can be approved after completion of therapy every 3 months for 2 years, then every 6 months for 3 years, then annually thereafter.
- MRI Spine is not indicated during surveillance in patients without prior history of spinal involvement except to evaluate symptoms suspicious for spinal cord recurrence.
- For patients with cord involvement at diagnosis, MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved after completion of therapy every 3 months for 2 years, then every 6 months for 3 years, then annually thereafter.
  - MRI Spine with contrast only can be approved (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) if being performed immediately following a contrast-enhanced MRI Brain.
- MR Spectroscopy and PET Brain Metabolic are not indicated for routine surveillance.
**PEDONC-4.3: High Grade Gliomas (HGG)**

Rare in children compared with the adult population, but represent 10 to 20% of pediatric CNS tumors. Prognosis is very poor, and survival significantly beyond 3 years from diagnosis is rare, even with complete surgical resection at initial diagnosis.

These tumors are defined as having a WHO histologic grade of III or IV (out of IV) can occur anywhere in the CNS (though the majority occur in the brain), and includes the following tumors:

- Anaplastic astrocytoma
- Glioblastoma multiforme
- Diffuse intrinsic pontine glioma (DIPG, or “Brainstem glioma”)
- Gliomatosis cerebri
- Gliosarcoma
- Anaplastic oligodendroglioma
- Anaplastic ganglioglioma
- Anaplastic mixed glia
- Anaplastic mixed ganglioneuronal tumors
- Any other glial tumor with a WHO grade of III or IV

**PET Brain Metabolic Imaging (CPT® 78608) can be approved in the following circumstances:**

- To distinguish radiation-induced tumor necrosis from progressive disease within 18 months of completing radiotherapy
- To evaluate inconclusive MRI findings when the PET findings will be used to determine need for biopsy or change in therapy, including a change from active therapy to surveillance
- To evaluate a brain lesion of indeterminate nature when the PET findings will be used to determine whether biopsy/resection can be safely postponed
- PET Brain is not indicated in gliomas occurring in the brain stem due to poor uptake and lack of impact on patient outcomes

**MR Spectroscopy (MRS, CPT® 76390) can be approved in the following circumstances:**

- To distinguish low grade from high grade gliomas
- To evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed
- To distinguish radiation-induced tumor necrosis from progressive disease within 18 months of completing radiotherapy.

**Note:** Some payors have specific restrictions on MR Spectroscopy, and those coverage policies may supersede the recommendations for MRS in these guidelines.
High Grade Gliomas Initial Staging:

- MRI Brain without and with contrast (CPT® 70553) is indicated for all HGG
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved for all HGG patients if requested, and spinal imaging is particularly recommended for patients with:
  - Multicentric tumors
  - Intracranial leptomeningeal disease
  - Clinical signs or symptoms suggesting spinal cord involvement
  - MRI spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain

High Grade Gliomas Treatment Response:

- Patients who have resection of the tumor can have a single MRI Brain without and with contrast (CPT® 70553) approved following resection to establish baseline imaging and those with a complete resection should then be imaged according to surveillance guidelines
- If receiving adjuvant radiotherapy after a completely resected tumor, an additional MRI Brain without and with contrast (CPT® 70553) can be approved at the end of radiotherapy
- Patients with incompletely resected tumors are commonly treated with chemotherapy and can have MRI Brain without and with contrast (CPT® 70553) approved every 2 cycles during active treatment and at the end of planned chemotherapy
- Spinal imaging is not indicated during treatment response for patients without evidence of spinal cord involvement at initial diagnosis
- Spinal imaging is appropriate every 2 cycles during induction chemotherapy for patients with measurable spinal cord disease on MRI

High Grade Gliomas Surveillance:

- MRI Brain without and with contrast (CPT® 70553) can be approved after completion of therapy every 3 months for 3 years, then every 6 months thereafter
- MRI Spine is not indicated during surveillance in patients without prior history of spinal involvement except to evaluate symptoms suspicious for spinal cord recurrence
- For patients with cord involvement at diagnosis, MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved after completion of therapy every 3 months for 3 years, then every 6 months thereafter
  - MRI Spine can be performed with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) if being performed immediately following a contrast-enhanced MRI Brain
- MR Spectroscopy and PET Brain Metabolic are not indicated for routine surveillance
PEDONC-4.4: Medulloblastoma (MDB), Supratentorial Primitive Neuroectodermal Tumors (sPNET), and Pineoblastoma

Account for 15 to 25% of pediatric CNS tumors, prognosis is generally favorable. Leptomeningeal spread is common and can occur after initial diagnosis.

<table>
<thead>
<tr>
<th>Includes the following tumors:</th>
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<tbody>
<tr>
<td>Medulloblastoma and Pineoblastoma</td>
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<td>sPNET</td>
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<tr>
<td>‣ Medulloepithelioma</td>
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<tr>
<td>‣ Cerebral or cerebellar neuroblastoma</td>
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<tr>
<td>‣ Cerebral or cerebellar ganglioneuroblastoma</td>
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<tr>
<td>‣ Ependymoblastoma</td>
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Risk assessment is important in determining optimal treatment

High risk features include the following:

|➤ Spinal metastasis (including cytology positive only) |
|➤ Multifocal intracranial tumors |
|➤ Anaplastic histology |
|➤ All sPNET and pineoblastomas |
|➤ > 1.5 cm² residual tumor area on postoperative MRI and age < 3 years |

Patients without any high risk features are considered “average risk”

➤ PET BrainMetabolic Imaging (CPT® 78608) can be approved in the following circumstances:
  ‣ To distinguish radiation-induced tumor necrosis from progressive disease within 18 months of completing radiotherapy
  ‣ To evaluate inconclusive MRI findings when the PET findings will be used to determine need for biopsy or change in therapy, including a change from active therapy to surveillance
  ‣ To evaluate a Brain lesion of indeterminate nature when the PET findings will be used to determine whether biopsy/resection can be safely postponed

➤ MR Spectroscopy (CPT® 76390) can be approved in the following circumstances:
  ‣ To evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed
**Medulloblastoma, sPNET, Pineoblastoma Initial Staging:**

- Preoperative MRI Brain without and with contrast (CPT® 70553) is indicated for all patients
- Postoperative MRI Brain without and with contrast (CPT® 70553) is required (preferably within 48 hours of surgery) to quantify residual tumor volume
- MRI spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is required for all patients either preoperatively or within 28 days postoperatively
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain

**Medulloblastoma, sPNET, Pineoblastoma Treatment Response:**

Patients generally proceed to chemoradiotherapy within 31 days of surgical resection. All patients receive adjuvant chemotherapy lasting 6 to 12 months that begins ~6 weeks after completion of chemoradiotherapy.

- MRI Brain without and with contrast (CPT® 70553) and MRI spine without and with contrast (Cervical-CPT® 72156, Thoracic CPT® 72157, Lumbar-CPT® 72158) is appropriate at the start of adjuvant chemotherapy and every 2 cycles until therapy is completed
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
  - Children age < 3 years are often treated with multiple cycles of high dose chemotherapy with autologous stem cell rescue in lieu of radiotherapy, and disease evaluations may occur prior to each cycle (every 4 to 6 weeks) if needed for response determination.
- End of treatment evaluation should include MRI Brain without and with contrast (CPT® 70553) and MRI Spine (with or without and with contrast)

**Medulloblastoma, sPNET, Pineoblastoma Surveillance:**

- MRI Brain without and with contrast (CPT® 70553) can be approved after completion of therapy every 3 months for 2 years, then every 6 months for 3 years, then annually thereafter
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved after completion of therapy every 3 months for 2 years, then every 6 months for 2 years, then annually thereafter
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
- MR Spectroscopy and PET Brain Metabolic are not indicated for routine surveillance
**PEDONC-4.5: Atypical Teratoid/Rhabdoid Tumors (ATRT)**

Highly aggressive tumor occurring primarily in very young children that has a clinical presentation very similar to medulloblastoma with a much higher rate of leptomeningeal spread. Metastases can occur outside the CNS, and associated tumors can also arise in the kidneys (Malignant Rhabdoid Tumor of the Kidney, MRT). Rhabdoid malignancies occurring outside the CNS should be imaged according to **PEDONC-7.6: Malignant Rhabdoid Tumor of the Kidney (MRT) and Other Extracranial Sites**.

Overall prognosis is poor, with < 20% of patients surviving beyond 2 years from diagnosis.

**Atypical Teratoid/Rhabdoid Tumor Initial Staging:**

- Preoperative MRI Brain without and with contrast (CPT® 70553) is indicated for all patients
- Postoperative MRI Brain without and with contrast (CPT® 70553) is required (preferably within 48 hours of surgery) to quantify residual tumor volume
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is required for all patients either preoperatively or within 28 days postoperatively
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
- Renal US (CPT® 76770) is indicated to evaluate for renal masses at initial diagnosis
  - CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) can be approved if a renal lesion is detected on US.
  - If a renal lesion is also present, imaging guidelines for MRT should be followed (See: **PEDONC-7.6: Malignant Rhabdoid Tumor of the Kidney (MRT) and Other Extracranial Sites**)
- PET Brain Metabolic does not have a defined role in the evaluation of ATRT at this time
- MR Spectroscopy (CPT® 76390) can be approved in the following circumstances:
  - To evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed
Atypical Teratoid/Rhabdoid Tumor Treatment Response:

Patients generally proceed to induction chemotherapy shortly following surgical resection or biopsy.

- MRI Brain without and with contrast (CPT® 70553) and MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is appropriate after every 2 cycles of induction chemotherapy
  - MRI spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
  - Children with ATRT are often treated using consolidation chemotherapy with 2 to 4 cycles of high dose chemotherapy with autologous stem cell rescue. Disease evaluation is indicated following the end of the planned stem cell rescues but may occur prior to each cycle (every 4 to 6 weeks) if needed for response determination.

- Following completion of chemotherapy some patients will proceed to radiotherapy. MRI performed at the end of consolidation therapy should serve as the diagnostic MRI prior to radiotherapy.

- MRI Brain without and with contrast (CPT® 70553) and MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is appropriate at the end of all planned therapy
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain.

Atypical Teratoid/Rhabdoid Tumor Surveillance:

- MRI Brain without and with contrast (CPT® 70553) can be approved after completion of therapy every 3 months for 2 years, then every 6 months for 3 years, then annually thereafter

- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved after completion of therapy every 3 months for 2 years, then every 6 months for 3 years, then annually thereafter
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain.

- MR Spectroscopy is not indicated for routine surveillance
**PEDONC-4.6: Pineocytomas**

Low grade malignancy that is similar in presentation to LGG. PET Brain Metabolic imaging and MR Spectroscopy do not have a defined role in the evaluation of pineocytoma.

**Pineocytomas Initial Staging:**
- MRI Brain without and with contrast (CPT® 70553) is indicated for all patients
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved for patients with:
  - Multicentric tumors
  - Atypical histology including pineoblastoma-like elements
  - Clinical signs or symptoms suggesting spinal cord involvement
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain

**Pineocytomas Treatment Response:**
- Surgical resection is curative for most patients. Patients who have resection of the tumor can have a single MRI Brain without and with contrast (CPT® 70553) approved following resection to establish baseline imaging and those with a complete resection should then be imaged according to surveillance guidelines
- Patients with incompletely resected tumors may receive adjuvant radiation therapy and can have a single MRI Brain without and with contrast (CPT® 70553) approved at completion of radiotherapy and should then be imaged according to surveillance guidelines
  - Spinal imaging is not indicated for patients without evidence of spinal cord involvement at initial diagnosis
  - Spinal imaging is appropriate at completion of radiotherapy for patients with measurable spinal cord disease on MRI
Pineocytomas Surveillance:

- MRI Brain without and with contrast (CPT® 70553) can be approved after completion of therapy every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually thereafter.
- MRI Spine is not indicated during surveillance in patients without prior history of spinal involvement except to evaluate symptoms suspicious for spinal cord recurrence.
- For patients with cord involvement at diagnosis, MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved after completion of therapy every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually thereafter.
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain.
PEDONC-4.7: CNS Germinomas and Non-Germinomatous Germ Cell Tumors (NGGCT)

More common in older school age children and younger adolescents, but can occur throughout the pediatric age range. Although leptomeningeal spread is common, prognosis is excellent due to high sensitivity to chemotherapy and radiotherapy.

<table>
<thead>
<tr>
<th>Includes the following tumors:</th>
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<tr>
<td>CNS Germinoma</td>
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<tr>
<td>Non-Germinomatous Germ Cell Tumors (NGGCT)</td>
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<tr>
<td>☰ Embryonal carcinoma</td>
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<td>☰ Yolk sac tumor</td>
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<td>☰ Choriocarcinoma</td>
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<tr>
<td>☰ Teratoma</td>
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<tr>
<td>☰ Mixed germ cell tumor</td>
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- PET Metabolic Brain imaging does not have a defined role in the evaluation of CNS GCT.
- MR Spectroscopy (CPT® 76390) can be approved in the following circumstances:
- To evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed

**CNS Germinoma & NGGCT Initial Staging:**

- MRI Brain without and with contrast (CPT® 70553) is indicated for all patients
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is indicated for all patients
- MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
**CNS Germinoma & NGGCT Treatment Response:**

Patients generally proceed to chemotherapy shortly following surgical resection or biopsy and will usually receive 2 to 4 cycles.

- MRI Brain without and with contrast (CPT® 70553) is appropriate after every 2 cycles of induction chemotherapy
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is appropriate at the end of induction chemotherapy for patients with localized intracranial tumors
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
  - Spinal imaging is appropriate every 2 cycles during induction chemotherapy for patients with measurable spinal cord disease on MRI
- Following completion of chemotherapy some patients will proceed to second-look surgery and/or radiotherapy
  - MRI of all known sites of measurable disease can be performed prior to surgery and prior to radiotherapy, if necessary
- MRI Brain without and with contrast (CPT® 70553) and MRI Spine (with or without and with contrast) is appropriate at the end of all planned therapy

**CNS Germinoma & NGGCT Surveillance:**

- MRI Brain without and with contrast (CPT® 70553) can be approved every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually until 5 years after completion of therapy
  - For additional imaging guidelines for patients in long term follow up after CNS tumor treatment that included radiation therapy, See PEDONC-19.3: SMN—CNS Tumors
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually until 5 years after completion of therapy
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
PEDONC-4.8: Ependymoma

Occur primarily intracranially, roughly 2/3 in the posterior fossa. Overall prognosis is very good, with supratentorial tumors faring better. Primary spinal tumors can also occur, and are more common in adult patients than pediatric patients.

- Surgery is the primary treatment modality. Radiotherapy +/- chemotherapy is used for:
  - Incompletely resected tumors
  - Anaplastic histology
  - Infratentorial location

- PET Brain Metabolic imaging does not have a defined role in the evaluation of ependymoma.

- MR Spectroscopy (CPT® 76390) can be approved in the following circumstances:
  - To evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed

Ependymoma Initial Staging:

- MRI Brain without and with contrast (CPT® 70553) is indicated for all patients
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is indicated for all patients
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
Ependymoma Treatment Response:

- Patients who have resection of the tumor can have a single MRI Brain without and with contrast (CPT® 70553) or involved spinal level(s) approved following resection to establish baseline imaging and those with a complete resection should then be imaged according to surveillance guidelines.
- Patients with incomplete resection or high risk histology receiving adjuvant radiation therapy can have a single MRI Brain without and with contrast (CPT® 70553) or involved spinal level(s) approved at completion of radiotherapy and should then be imaged according to surveillance guidelines.
- Patients treated with chemotherapy can have MRI Brain without and with contrast (CPT® 70553) or involved spinal level(s) approved every 2 cycles during active treatment and at the end of planned chemotherapy.
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is appropriate at the end of induction chemotherapy for patients with localized intracranial tumors.
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain.
- MRI Brain without and with contrast (CPT® 70553) is appropriate at the end of induction chemotherapy for patients with localized intraspinal tumors.
- Following completion of chemotherapy some patients will proceed to second-look surgery and/or radiotherapy.
  - MRI of all known sites of measurable disease can be performed prior to surgery and prior to radiotherapy, if necessary.
- MRI Brain without and with contrast (CPT® 70553) and MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is appropriate at the end of all planned therapy for all patients.
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain.
**Ependymoma Surveillance:**

- For patients with primary **intracranial** ependymoma:
  - MRI Brain without and with contrast (CPT® 70553) can be approved after completion of therapy every 3 months for 1 year, then every 6 months for 1 year, then annually thereafter
  - MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved annually for 2 years after completion of therapy for patients with no history of spinal cord involvement
  - For patients with metastatic cord involvement at diagnosis, MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved after completion of therapy every 3 months for 1 year, then every 6 months for 1 year, then annually thereafter
    - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain

- For patients with primary **intraspinal** ependymoma:
  - MRI without and with contrast of the involved spinal level(s) can be approved after completion of therapy every 3 months for 1 year, then every 6 months for 1 year, then annually thereafter
  - MRI Brain without and with contrast (CPT® 70553) can be approved annually for 2 years after completion of therapy for patients with no history of intracranial involvement
  - For patients with metastatic intracranial involvement at diagnosis, MRI Brain without and with contrast (CPT® 70553) can be approved after completion of therapy every 3 months for 1 year, then every 6 months for 1 year, then annually thereafter
  - MR Spectroscopy is not indicated for routine surveillance
PEDONC-4.9: Malignant Tumors of the Spinal Cord

Treatment principles are the same as tumors of the brain, and should follow imaging guidelines according to the specific histologic type.

Multiple spinal cord tumors should raise suspicion for neurofibromatosis.

Common histologies of primary spinal cord tumor in children include:

- Low Grade Glioma, See PEDONC-4.2: LOW GRADE GLIOMA for guidelines
- Ependymoma, See PEDONC-4.8: Ependymoma for guidelines
- Any type can occur, but other histologies are rare

Primary site imaging should always include MRI Spine without and with contrast of all involved levels (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT®72158)
- Entire spine imaging may be indicated based on the histologic type

MRI Brain without and with contrast (CPT® 70553) is indicated at initial diagnosis, but may be not be necessary during treatment response and surveillance
- Given the rarity of primary spinal cord tumors in children, MRI Brain requests should, in general, be approved for surveillance after recent evaluation by a physician with significant training and/or experience in pediatric spinal cord tumors (most commonly a pediatric neurosurgeon or pediatric oncologist) as the need for intracranial surveillance is highly individualized

Asymptomatic surveillance imaging should generally end at the time point appropriate for the specific tumor type
**PEDONC-4.10: Craniopharyngioma and Pituitary Tumors**

Imaging guidelines and treatment approaches for pediatric pituitary tumors other than craniopharyngioma are consistent with those used for adults with pituitary tumors. For these tumors follow guidelines in **HD-19: Pituitary**.

Craniopharyngiomas are less common, accounting for 6 to 8% of pediatric CNS tumors. Most commonly affects children in the preadolescent ages.

- PET Brain Metabolic Imaging and MR Spectroscopy do not have a defined role in the evaluation of craniopharyngioma.

**Craniopharyngioma Initial Staging:**

- MRI Brain without and with contrast (CPT® 70553) is indicated for all patients
- CT imaging can demonstrate calcifications but is usually unnecessary if MRI is completed
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved for patients with:
  - Multicentric tumors
  - Clinical signs or symptoms suggesting spinal cord involvement
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain

**Craniopharyngioma Treatment Response:**

- Surgical resection is curative for many patients. Patients who have resection of the tumor can have a single MRI Brain without and with contrast (CPT® 70553) approved following resection to establish baseline imaging and those with a complete resection should then be imaged according to surveillance guidelines.
- Patients with incomplete resection and receiving adjuvant radiation therapy can have a single MRI Brain (CPT® 70553) approved at completion of radiotherapy and should then be imaged according to surveillance guidelines.
- Rare patients treated with chemotherapy can have MRI Brain without and with contrast (CPT® 70553) approved every 2 cycles during active treatment and at the end of planned chemotherapy
  - Spinal imaging is appropriate every 2 cycles during induction chemotherapy for patients with measurable spinal cord disease on MRI
**Craniopharyngioma Surveillance:**

- MRI Brain without and with contrast (CPT® 70553) can be approved every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually until 10 years after completion of therapy as late progressions can occur.
- For additional imaging guidelines for patients in long term follow up after CNS tumor treatment that included radiation therapy, see [PEDONC-19.3: SMN—CNS Tumors](#).
- MRI Spine is not indicated during surveillance in patients without prior history of spinal involvement except to evaluate symptoms suspicious for spinal cord recurrence.

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*End of PEDONC-4.10*
**PEDONC-4.11: Primary CNS Lymphoma**

Primary CNS lymphoma is a solitary or multifocal mass occurring in the brain without evidence of systemic (bone marrow or lymph node) involvement. Usually associated with immunodeficiency, this is a very rare entity in pediatrics accounting for < 0.1% of pediatric malignancies, so age-specific guidelines have not been established.

Primary CNS lymphoma imaging indications in pediatric patients are identical to those for adult patients. See **ONC-2.7: CNS lymphoma** for imaging guidelines.

CNS lymphomas also involving bone marrow and/or lymph nodes should be imaged according to: **PEDONC-5.3: Pediatric Aggressive Mature B-Cell Non-Hodgkin Lymphomas (NHL).**

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**PEDONC-4.12: Meningiomas**

Account for 1 to 3% of pediatric CNS tumors. Usually associated with neurofibromatosis type 2 (NF-2) or prior therapeutic radiation exposure to the brain. Lifetime risk may be as high as 20% for young children receiving whole brain radiotherapy, most commonly occurring 15 to 20 years after radiation exposure.

Meningioma imaging indications in pediatric patients are identical to those for adult patients. See **ONC-2.8: CNS Meningioma** for imaging guidelines.

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PEDONC-4.13: Choroid Plexus Tumors

As a group these account for 1 to 4% of pediatric CNS tumors, and 70% of choroid plexus tumors present within the first 2 years of life.

- Includes the following tumors:
  - Choroid plexus papilloma
  - Choroid plexus adenoma, or atypical choroid plexus papilloma
  - Choroid plexus carcinoma
- PET Metabolic Brain imaging does not have a defined role in the evaluation of choroid plexus tumors.
- MR Spectroscopy (CPT® 76390) can be approved in the following circumstances:
  - To evaluate a brain lesion of indeterminate nature when the MRS findings will be used to determine whether biopsy/resection can be safely postponed

Choroid Plexus Papilloma

Choroid plexus papillomas outnumber other choroid plexus tumors by 4 to 5 times. These ventricular tumors commonly present with hydrocephalus caused by increased CSF production, resulting in signs of increased intracranial pressure. Appearance on MRI Brain without and with contrast (CPT® 70553) is typical, and they are usually treated by excision.

- Regrowth is rare, but repeat MRI Brain without and with contrast (CPT® 70553) is indicated if return of hydrocephalus is suspected or Seen on CT imaging

Choroid Plexus Adenoma or Atypical Choroid Plexus Papilloma

These are extremely rare tumors with features midway in the malignant spectrum between papillomas and carcinomas. They are more prone to local invasion, but rarely to metastasis. Presenting symptoms are similar to papillomas. Appearance on MRI Brain with and without contrast (CPT® 70553) is typical, and they are usually treated by excision.

- Spinal imaging may be approved if requested at initial diagnosis
- Regrowth is rare, but repeat MRI Brain without and with contrast is indicated if return of hydrocephalus is suspected or Seen on CT imaging

Choroid Plexus Carcinoma

This is a very aggressive malignancy, with high rates of metastasis to other parts of the CNS. Prognosis is significantly less favorable than for papillomas with overall survival rates of 35 to 40%.
**Choroid Plexus Carcinoma Initial Staging:**

- MRI Brain without and with contrast (CPT® 70553) is indicated for all patients
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is indicated for all patients
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain

**Choroid Plexus Carcinoma Treatment Response:**

- Surgical resection is curative for many patients. Patients who have resection of the tumor can have a single MRI Brain without and with contrast (CPT® 70553) approved following resection to establish baseline imaging and those with a complete resection should then be imaged according to surveillance guidelines.
- Patients with incomplete resection and receiving adjuvant radiation therapy can have a single MRI approved at completion of radiotherapy and should then be imaged according to surveillance guidelines.
- Patients treated with chemotherapy can have MRI Brain without and with contrast (CPT® 70553) approved every 2 cycles during active treatment and at the end of planned chemotherapy.
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is appropriate at the end of induction chemotherapy for patients with localized intracranial tumors
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
  - Spinal imaging is appropriate every 2 cycles during induction chemotherapy for patients with measurable spinal cord disease on MRI
- Following completion of chemotherapy some patients will proceed to second-look surgery and/or radiotherapy
  - MRI of all known sites of measurable disease can be performed prior to surgery and prior to radiotherapy, if necessary
- MRI Brain without and with contrast (CPT® 70553) and MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is appropriate at the end of all planned therapy
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
Choroid Plexus Carcinoma Surveillance:

- MRI Brain without and with contrast (CPT® 70553) can be approved every 4 months for 3 years, then every 6 months for 2 years after completion of therapy
  - For additional imaging guidelines for patients in long term follow up after CNS tumor treatment that included radiation therapy, See PEDONC-19.3: SMN—CNS Tumors
- MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved at 12 and 24 months after completion of therapy for patients with no history of spinal cord involvement
  - For patients with cord involvement at diagnosis, MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) can be approved every 4 months for 3 years, then every 6 months for 2 years after completion of therapy
  - MRI Spine with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) can be approved if being performed immediately following a contrast-enhanced MRI Brain
- MR Spectroscopy is not indicated for routine surveillance
References – PEDONC-4


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PEDONC-5.1: Pediatric Lymphoma General Considerations

- Pediatric lymphomas are generally Hodgkin Lymphomas, Aggressive B-Cell Non-Hodgkin Lymphomas, Lymphoblastic Lymphomas, or Anaplastic Large Cell Lymphomas.
- Patients with Lymphoblastic Lymphoma (even those with bulky nodal disease) are treated using the leukemia treatment plan appropriate to the cell type (B or T cell). These patients should be imaged using guidelines in PEDONC-3.2: Acute Lymphoblastic Leukemia.
- Other histologies are rare in pediatric patients, and should be imaged according to the following guidelines:
  - Follicular lymphoma: ONC-27.3: Follicular Lymphoma
  - Marginal zone or MALT lymphomas: ONC-27.4: Marginal Zone Lymphomas
  - Mantle cell lymphomas: ONC-27.5: Mantle Cell Lymphoma
  - Cutaneous lymphomas: ONC-27.8: Cutaneous Lymphomas
    - Exception: Cutaneous B-Lymphoblastic Lymphoma should be imaged using guidelines in PEDONC 3.2: Acute: Lymphoblastic Leukemia
  - Castleman’s Disease: ONC-31.11: Castleman’s Disease
- All CT imaging recommended in this section refers to CT with contrast only.
- Noncontrast CT imaging has not been shown to be beneficial in the management of pediatric lymphomas.
- Given the limited utility of noncontrast CT imaging in pediatric lymphomas, MRI without or without and with contrast is recommended in place of CT for patients who cannot tolerate CT contrast due to allergy or impaired renal function.
- MRI without and with contrast of symptomatic or previously involved bony areas can be approved in known lymphoma patients without prior plain x-ray or bone scan evaluation.
- Bone scan is inferior to MRI for evaluation of known or suspected bone metastases in lymphoma.
- MRI Brain without and with contrast (CPT® 70553) is the preferred study for evaluation of suspected Brain metastases in pediatric lymphoma.
- CT Head with (CPT® 70460) or without and with contrast (CPT® 70470) can be approved when MRI is contraindicated.
**PEDONC-5.2: Pediatric Hodgkin Lymphoma (HL)**

**Pediatric Hodgkin Lymphoma Initial Staging:**

- All patients should undergo CT Neck (CPT® 70491), Chest (CPT® 71260), Abdomen/Pelvis (CPT® 74177), and CT with contrast or MRI without and with contrast any other symptomatic body area is indicated for all patients (See PEDONC-5.1: Pediatric Lymphoma General Considerations) as pediatric patients have a high rate of neck and Waldeyer’s ring involvement with Hodgkin Lymphoma.
- PET/CT (CPT® 78815) is indicated for initial staging of all patients, and can be performed prior to biopsy if necessary for patient scheduling.
  - Whole body PET/CT (CPT® 78816) may be approved if there is clinical suspicion of skull or distal lower extremity involvement.
- CT or MRI of other body areas (See PEDONC-5.1: Pediatric Lymphoma General Considerations) may be indicated for rare patients based on physical findings or PET/CT results.

**Pediatric Hodgkin Lymphoma Treatment Response:**

- Restaging for treatment response can be performed as often as every 2 cycles of chemotherapy.
- Both CT of Neck (CPT® 70491), Chest (CPT® 71260), and Abdomen/Pelvis (CPT® 74177) and other previously involved areas and PET/CT (CPT® 78815) can be approved during early treatment response evaluations as decisions about chemotherapy drug selection and radiation treatment are frequently made based on both anatomic (CT-based) and metabolic (PET/CT-based) responses.
  - For patients with low risk (stage IA or IIA) mixed cellularity Hodgkin lymphoma, PET/CT can be performed for treatment response after cycles 1 and 3 instead of cycles 2 and 4.
- Once a particular patient has a negative PET/CT (either Deauville or Lugano 1, 2 or 3 as reported in formal radiology interpretation), all subsequent treatment response evaluations should use CT only, including end of therapy evaluation.
**Pediatric Hodgkin Lymphoma Surveillance:**

Most patients experiencing recurrence are detected based on physical findings, and frequent CT surveillance imaging of Hodgkin Lymphoma after completion of therapy does not improve post-recurrence overall survival.

- CT of the Neck (CPT® 70491), Chest (CPT® 71260), Abdomen/Pelvis (CPT® 74177) and other previously involved or currently symptomatic areas should be approved for any patient with clinical symptoms suggesting recurrence.

- Patients with stage I or II HL:
  - CT of the Neck/Chest (CPT® 70491 and CPT® 71260) and other previously involved areas at 6 months and 12 months after completing therapy
  - Surveillance at other time points from the end of therapy should use physical exam and CXR only

- Patients with stage III or IV HL:
  - CT of the Neck (CPT® 70491), Chest (CPT® 71260), and Abdomen/Pelvis (CPT® 74177) and other previously involved areas at 6 months and 12 months after completing therapy
  - Surveillance at other time points from the end of therapy should use physical exam and CXR only

- Patients with recurrent HL with no evidence of disease following successful treatment:
  - CT of the Neck/Chest/Abdomen/Pelvis every 3 months for 1 year after completing therapy for recurrence

- PET/CT is not indicated for surveillance, but can be approved to clarify inconclusive findings on conventional imaging to evaluate the need for biopsy to establish recurrence. These requests should be forwarded for Medical Director review.
**PEDONC-5.3: Pediatric Aggressive Mature B-Cell Non-Hodgkin Lymphomas (NHL)**

- Aggressive mature B-Cell NHL includes all of the following diagnoses, all of which should be imaged according to this section:
  - Burkitt’s lymphoma/leukemia (BL)
  - Diffuse Large B-Cell Lymphoma (DLBCL)
  - Primary Mediastinal Large B-Cell Lymphoma (PMBCL)
  - Post-transplant Lymphoproliferative Disorder (PTLD)
    - Most commonly occurs following solid organ transplantation
  - Viral-associated lymphoproliferative disorders
    - Most commonly occurs following hematopoietic stem cell transplantation or in patients with primary immunodeficiency

**Pediatric Aggressive Mature B-Cell NHL Initial Staging:**

- CT of the Neck (CPT® 70491), Chest (CPT® 71260), and Abdomen/Pelvis (CPT® 74177) and CT with contrast or MRI without and with contrast any other symptomatic body area is indicated for all patients (See **PEDONC-5.1: Pediatric Lymphoma General Considerations**)
- MRI Brain without and with contrast (CPT® 70553) is indicated if symptoms or extent of disease suggest intracranial extension (skull base involvement, for example) or metastasis
- PET/CT (CPT® 78815) is indicated for initial staging for all patients
  - Whole body PET/CT (CPT® 78816) may be approved if there is clinical suspicion of skull or distal lower extremity involvement.
  - Due to the extremely aggressive nature of this group of tumors (the doubling time can be as short as 8 hours) it may not be possible to obtain PET/CT prior to therapy initiation. PET/CT should be approved for treatment response in these cases as these lymphomas are nearly universally FDG-avid.
**Pediatric Aggressive Mature B-Cell NHL Treatment Response:**

- Initial treatment is 7 days of low intensity therapy, with early response evaluation determining next steps in therapy using CT with contrast or MRI without and with contrast of previously involved areas performed around day 6.
  - Patients are customarily still inpatient for this evaluation so outpatient requests should be rare for this time point.
- Following initial response evaluation, restaging for treatment response using CT with contrast or MRI without and with contrast (should be same modality as initial diagnosis if possible) of previously involved areas and PET/CT can be performed as often as every cycle of chemotherapy (~every 3 weeks).
- Once a particular patient has a negative PET/CT (either Deauville or Lugano 1, 2 or 3 as reported in formal radiology interpretation), all subsequent treatment response evaluations should use CT imaging only, including end of therapy evaluation.
  - PET/CT may be indicated to assess disease activity in inconclusive residual masses seen on conventional imaging.

**Pediatric Aggressive Mature B-Cell NHL Surveillance:**

Routine asymptomatic surveillance with advanced imaging has not been found to impact patient outcomes as the majority of these patients present clinically at relapse due to the highly aggressive nature of these lymphomas.

- CXR and Abdominal (CPT® 76700) and Pelvic (CPT® 76856) ultrasound are sufficient to follow asymptomatic patients with residual masses in the chest or abdomen/pelvis. Surveillance imaging with CT or MRI has not been shown to improve patient outcomes following recurrence and is not the standard of care.
- CT of the Neck (CPT® 70491), Chest (CPT® 71260), Abdomen/Pelvis (CPT® 74177) and other previously involved or currently symptomatic areas should be approved for any patient with clinical symptoms or laboratory findings suggesting recurrence.
  - PET/CT (CPT® 78815) can be approved for suspected PTLD recurrence with documentation of new palpable nodes, rising LDH, or rising quantitative EBV PCR.
- PET/CT is not indicated for surveillance, but can be approved to clarify inconclusive findings on conventional imaging to evaluate the need for biopsy to establish recurrence. These requests should be forwarded for Medical Director review.
PEDONC-5.4: Anaplastic Large Cell Lymphoma (ALCL)

Similar in presentation to Hodgkin Lymphoma, and may be indistinguishable until immunocytology and molecular studies are complete.

**Anaplastic Large Cell Lymphoma Initial Staging:**

- All patients should undergo CT of the Neck/Chest/Abdomen/Pelvis (CPT® 70491, CPT® 71260, and CPT® 74177) and CT with contrast or MRI without and with contrast any other symptomatic body area is indicated for all patients (See **PEDONC-5.1: Pediatric Lymphoma General Considerations**)
- PET/CT (CPT® 78815) is indicated for initial staging of all patients and can be performed prior to biopsy if necessary for patient scheduling.
  - Whole body PET/CT (CPT® 78816) may be approved if there is clinical suspicion of skull or distal lower extremity involvement.
- CT or MRI of other body areas may be indicated for rare patients based on physical findings or PET/CT results. Rarely patients will have primary tumor sites outside the Neck→Pelvis region, and MRI without and with contrast may be substituted for soft tissue extremity or paraspinal primary masses as necessary.
- Bone scan (See **PEDONC-1.3: Modality General Considerations**) is indicated for patients with bony primary tumors or metastatic disease

**Anaplastic Large Cell Lymphoma Treatment Response:**

- Restaging for treatment response using CT with contrast or MRI without and with contrast of previously involved areas (should be same modality as initial diagnosis if possible) should be performed at the end of induction chemotherapy (commonly 4 to 6 weeks)
- For patients treated with cytotoxic chemotherapy, either CT of previously involved areas or PET/CT may be approved for treatment response as often as every 2 cycles of chemotherapy as decisions about chemotherapy drug selection and radiation treatment can be made based on either anatomic or metabolic responses.
  - If CT is performed for primary treatment response, PET/CT can be approved to clarify inconclusive findings detected on conventional imaging
  - If PET/CT is performed for primary treatment response, CT or MRI can be approved to clarify inconclusive findings detected on PET imaging
- Once a particular patient has a negative PET/CT (either Deauville or Lugano 1, 2 or 3 as reported in formal radiology interpretation), all subsequent treatment response evaluations should use CT Imaging only, including end of therapy evaluation.
**Anaplastic Large Cell Lymphoma Surveillance:**

- CT of the Neck (CPT® 70491), Chest (CPT® 71260), Abdomen/Pelvis (CPT® 74177) and other previously involved or currently symptomatic areas should be approved for any patient with clinical symptoms suggesting recurrence.
- CT with contrast or MRI without and with contrast of all previously involved areas is indicated at 3, 6, 12, and 18 months after therapy is completed.
- Bone scan (See **PEDONC-1.3: Modality General Considerations**) is indicated at 3, 6, 12, and 18 months after therapy is completed for patients with bony primary tumors or metastatic disease.
- PET/CT is not indicated for surveillance, but can be approved to clarify inconclusive findings on conventional imaging to evaluate the need for biopsy to establish recurrence. These requests should be forwarded for Medical Director review.

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End of PEDONC-5.4
Pediatric Oncology Imaging

References – PEDONC-5


PEDONC-6: Neuroblastoma

Note: Some payors consider PET to be experimental for the treatment of neuroblastoma, and those coverage policies may supersede the recommendations for PET in this section.

Neuroblastoma is the most common extracranial solid tumor of childhood, and may be divided into very low, low, intermediate, and high risk disease based on International Neuroblastoma Risk Group (INRG) Staging System. The treatments for each disease group vary widely and have distinct imaging strategies.

90 to 95% of neuroblastomas secrete the catecholamine metabolites homovanillic acid (HVA) and vanillylmandelic acid (VMA) in the urine, and urine HVA/VMA should be performed at every disease evaluation for patients with positive HVA or VMA at diagnosis.

- Esthesioneuroblastoma should be imaged according to guidelines in ONC-3: Squamous Cell Carcinomas Of The Head And Neck
- PET imaging is rarely indicated in neuroblastoma, but can be approved in the following situations:
  - Patients with MIBG-negativity documented at initial diagnosis. For these patients, MIBG should not be repeated and whole body PET (CPT® 78816) may be performed rather than MIBG for metabolic tumor assessment.
  - Patients who are MIBG positive at diagnosis and then become MIBG negative in response to treatment should continue to use MIBG (See PEDONC-1.3: Modality General Considerations) for metabolic imaging indications
  - PET may be approved at major decision points such as hematopoietic stem cell transplantation or surgery if MIBG and CT/MRI findings are inconclusive
  - Patients currently receiving medications that may interfere with MIBG uptake that cannot safely be discontinued prior to imaging, including:
    - Tricyclic antidepressants (amitriptyline, imipramine, etc.)
    - Selective serotonin reuptake inhibitors (SSRI’S, sertraline, paroxetine, escitalopram, etc.)
    - Neuroleptics (risperidone, haloperidol, etc.)
    - Antihypertensive drugs (alpha or beta blockers, calcium channel blockers)
    - Decongestants (phenylephrine, ephedrine, pseudoephedrine)
    - Stimulants (methylphenidate, dextroamphetamine, etc.)
  - PET should only be approved for this indication when specific documentation of the medication interaction is included with the current PET imaging request. These requests will be forwarded for Medical Director review.
Neuroblastoma Initial Staging:

- CT with contrast of the Neck/Chest/Abdomen/Pelvis (CPT® 70491, CPT® 71260, and CPT® 74177) or MRI without and with contrast of the Neck/Chest/Abdomen/Pelvis (CPT® 70543, CPT® 71552, CPT® 74183, and CPT® 72197) for all patients.

- MRI without and with contrast is preferred for evaluation of paraspinal tumors where cord compression is a possibility.

- Metabolic imaging in neuroblastoma:
  - Adrenal nuclear imaging (CPT® 78075) can be approved for evaluation of suspected adrenal neuroblastoma, ganglioneuroblastoma, or ganglioneuroma when CT or MRI is inconclusive.
  - $^{123}$I-metaiodobenzylguanidine (MIBG) scintigraphy is the preferred metabolic imaging for neuroblastoma and is positive in 90 to 95% of neuroblastomas.
    - MIBG provides superior sensitivity and sensitivity for detecting viable osseous disease compared with bone scintigraphy so technetium bone scan is not necessary when MIBG is utilized.
  - Most MIBG imaging studies are SPECT/CT studies using CT for localization only. Separate diagnostic CT codes should not be approved for this purpose. See PREFACE-4.6: SPECT/CT imaging.
  - Occasionally MIBG cannot be performed prior to initiation of therapy. In this circumstance MIBG should be completed within 3 weeks of therapy initiation as the reduction in MIBG avidity in response to chemotherapy is not immediate. Inability to complete MIBG before starting therapy is not an indication to approve PET imaging.

- Brain metastases are rare in neuroblastoma, but if clinical signs/symptoms suggest brain involvement, MRI Brain without and with contrast (CPT® 70553) is preferred for evaluation.
  - MRI Brain of asymptomatic patients with no history of brain metastases is not indicated for neuroblastoma.
Neuroblastoma Treatment Response Imaging (Risk Group Dependent):
Risk grouping will not be known at the time of initial staging, but is critical for all imaging decisions after initial staging is complete. **The treating oncologist should always know the patient’s risk grouping.** It is not possible to establish the appropriate imaging plan for a neuroblastoma patient without knowing his/her risk group.

Very Low Risk and Low Risk Neuroblastoma Not Receiving Chemotherapy:
- All patients can have CT with contrast or MRI without and with contrast of the primary tumor site 6 to 8 weeks after diagnosis to determine if additional treatment is necessary.
- Many patients will be treated with surgical resection only without adjuvant therapy, so patients enter immediately into surveillance.

All Intermediate Risk Neuroblastoma and Very Low Risk or Low Risk Neuroblastoma Receiving Chemotherapy:
Patients generally receive 2 to 12 cycles of moderate-intensity chemotherapy depending on response to treatment.

Surgical resection may occur prior to or following chemotherapy depending on disease stage. Restaging prior to surgery is appropriate.

- Treatment response assessment can be approved as often as every 2 cycles of chemotherapy (~every 6 weeks and at the end of planned treatment) and includes:
  - CT, with contrast of the Chest/Abdomen/Pelvis (CPT® 71260, and CPT® 74177) or MRI, without and with contrast, (CPT® 71552, CPT® 74183, and CPT® 72197) and other sites with prior measurable disease
  - Urine HVA/VMA (if positive at diagnosis)
  - Bone marrow aspiration/biopsy if positive at diagnosis
- MIBG scan (See PEDONC-1.3: Modality General Considerations) can be approved every 4 cycles and at the end of planned treatment
**High Risk Neuroblastoma:**

This group of patients receives highly aggressive therapy using sequential chemotherapy, surgery, stem cell rescue, radiotherapy, monoclonal antibody (mAb) therapy, and biologic therapy.

- Treatment response assessment can be approved as often as every 2 cycles of chemotherapy, mAb, or biologic therapy (~every 6 weeks) and includes:
  - CT, with contrast, of the Chest/Abdomen/Pelvis (CPT® 71260, and CPT® 74177) or MRI, without and with contrast, (CPT® 71552, CPT® 74183, and CPT® 72197) and other sites with prior measurable disease
  - Urine HVA/VMA (if positive at diagnosis)
  - Bone marrow aspiration/biopsy if positive at diagnosis
  - MIBG scan (See PEDONC-1.3: Modality General Considerations)
    - MIBG scan is also indicated following $^{131}$I-MIBG therapy
- Treatment response assessment is necessary at every change in modality (prior to surgery, HSCT, XRT, and mAb therapy)
- More frequent imaging can be approved around the time of surgery if needed for preoperative planning
Neuroblastoma Surveillance Imaging (Risk Group Dependent):

Very Low Risk and Low Risk Neuroblastoma:
- Urine HVA/VMA (if positive at diagnosis) at 1, 2, 3, 6, 9, 12, 18, 24, 36, 48, and 60 months after surgery
- CT with contrast or MRI without and with contrast of the primary tumor site 3, 6, 9, 12, 18, 24, and 36 months after surgery. If negative at 36 months, no further advanced imaging is necessary.
  - Ultrasound may be sufficient to evaluate the primary tumor site for certain patients and may be approved if requested to replace CT or MRI.
- MIBG is not indicated for surveillance of low risk neuroblastoma, but can be used to clarify findings suspicious for disease recurrence
- CT Chest is not indicated in asymptomatic surveillance imaging of neuroblastoma patients with no prior history of thoracic disease

Intermediate Risk Neuroblastoma:
- Urine HVA/VMA (if positive at diagnosis) every month until 12 months after completion of therapy, then at 14, 16, 18, 21, 24, 30, and 36 months after completion of therapy, then annually until 10 years after completion of therapy
- CT with contrast or MRI without and with contrast of the primary tumor and known metastatic sites at 3, 6, 9, 12, 18, 24, and 36 months after completion of therapy. If negative at 36 months, no further advanced imaging is necessary.
  - Ultrasound may be sufficient to evaluate the primary tumor site for certain patients and may be approved if requested to replace CT or MRI
- For all patients with stage 4 or M disease or patients with stage 4S or MS disease AND positive MIBG at completion of therapy, MIBG scan (See PEDONC-1.3: Modality General Considerations) at 3, 6, 9, 12, 24, and 36 months after completion of therapy.
  - If negative at 36 months, no further MIBG imaging is necessary.
  - For all other intermediate risk neuroblastoma patients, MIBG (or PET, if MIBG-negative at initial diagnosis) during surveillance is not indicated.
- CT Chest is not indicated in asymptomatic surveillance imaging of neuroblastoma patients with no prior history of thoracic disease.
**High Risk Neuroblastoma:**

- Urine HVA/VMA (if positive at diagnosis) at 3, 6, 9, 12, 18, 24, 30, 36, 42, 48, 54, and 60 months after completion of therapy, then annually until 10 years after completion of therapy.
- CT with contrast or MRI without and with contrast of the primary tumor site at 3, 6, 9, 12, 18, 24, 30, 36, 42, 48, 54, and 60 months, then annually until 10 years after completion of therapy. If negative at 10 years, no further advanced imaging is necessary.
- MIBG scan (See PEDONC-1.3: Modality General Considerations) at 3, 6, 9, 12, 18, 24, 30, and 36 months after completion of therapy. If negative at 36 months, no further MIBG or PET imaging is necessary.
  - Early detection of recurrence with $^{123}$I-MIBG has been shown to improve post-relapse outcomes in high risk neuroblastoma
- CT Chest is not indicated in asymptomatic surveillance imaging of neuroblastoma patients with no prior history of Thoracic disease.
Staging and Risk Grouping – Neuroblastoma:

- Most recent treatment protocols are using the recently validated international Neuroblastoma Risk Group (INRG) staging system, which is primarily defined by the complexity of local tumor extension and the presence or absence of distant metastases:
  - L1: Localized tumor not involving vital structures as defined by the list of image-defined risk factors and confined to one body compartment
    - Image-defined risk factors include a list of specific imaging findings defining patients less likely to be candidates for complete surgical resection
    - These risk factors involve the encasement of major blood vessels, airway, skull base, costovertebral junction, brachial plexus, spinal canal, or major organs or structures
  - L2: Locoregional tumor with presence of one or more image-defined risk factors
  - M: Distant metastatic disease (except stage MS)
  - MS: Metastatic disease in children younger than 18 months with metastases confined to skin, liver, and/or bone marrow with < 10% involvement (MIBG must be negative in bone and bone marrow)

- Neuroblastoma was historically staged according to the International Neuroblastoma Staging System (INSS) which uses age, histology, sites of disease, and MYCN status to determine appropriate therapy, and some standard protocols for neuroblastoma treatment still use this staging system:
  - Stage 1: Localized tumor with complete gross excision, with or without microscopic residual disease; representative ipsilateral lymph nodes negative for tumor microscopically (nodes attached to and removed with the primary tumor may be positive)
  - Stage 2A: Localized tumor with incomplete gross resection; representative ipsilateral non-adherent lymph nodes negative for tumor microscopically
  - Stage 2B: Localized tumor with or without complete gross excision, with ipsilateral non-adherent lymph nodes positive for tumor; enlarged contralateral lymph nodes must be negative microscopically
  - Stage 3: Localized tumor with or without complete gross excision, with ipsilateral non-adherent lymph nodes positive for tumor; enlarged contralateral lymph nodes must be negative microscopically
    - The midline is defined as the vertebral column. Tumors originating on one side and crossing the midline must infiltrate to or beyond the opposite side of the vertebral column
  - Stage 4: Any primary tumor with dissemination to distant lymph nodes, bone, bone marrow, liver, skin, and/or other organs (except as defined for stage 4S)
  - Stage 4S: infants < 1 year of age with localized primary tumor (as defined for stage 1, 2A or 2B) with dissemination limited to skin, liver, and/or bone marrow with < 10% involvement
### INRG Neuroblastoma Risk Grouping

#### Very low risk neuroblastoma (28% of patients, event-free survival > 85%) includes:
- Stage L1 or L2 maturing ganglioneuroma or intermixed ganglioneuroblastoma
- Stage MS patients meeting all of the following:
  - Age < 18 months
  - Without MYCN amplification
  - Without 11q aberration

#### Low Risk Neuroblastoma (27% of patients, event-free survival > 75 to ≤ 85%) includes:
- Stage L2 patients age < 18 months meeting all of the following:
  - Any histology except maturing ganglioneuroma or intermixed ganglioneuroblastoma
  - Without MYCN amplification
  - Without 11q aberration
- Stage L2 patients age ≥ 18 months meeting all of the following:
  - Differentiating neuroblastoma or nodular ganglioneuroblastoma
  - Without MYCN amplification
  - Without 11q aberration
- Stage M patients meeting all of the following:
  - Age < 18 months
  - Without MYCN amplification
  - With hyperdiploidy (tumor DNA index > 1)

#### Intermediate Risk Neuroblastoma (9% of patients, event-free survival ≥ 50 to ≤ 75%) includes:
- Stage L2 patients age < 18 months meeting all of the following:
  - any histology except maturing ganglioneuroma or intermixed ganglioneuroblastoma
  - With 11q aberration
- Stage L2 patients age ≥ 18 months meeting all of the following:
  - Neuroblastoma or nodular ganglioneuroblastoma
  - Without MYCN amplification
  - With 11q aberration
- Stage M patients meeting all of the following:
  - Age < 18 months
  - Without MYCN amplification
  - With diploidy (tumor DNA index = 1)

#### High Risk Neuroblastoma (36% of patients, event-free survival < 50%, includes the following)
- All patients age ≥ 18 months with stage M disease regardless of other factors
- All patients with neuroblastoma and MYCN amplification regardless of other factors
- All stage MS patients with 11q aberration regardless of other factors
## INSS Neuroblastoma Risk Grouping

### Low Risk Neuroblastoma (overall survival 99%, includes the following)
- All stage 1 patients regardless of other factors
- Stage 2A/2B patients meeting all of the following:
  - Without MYCN amplification
  - With ≥ 50% tumor resection
  - No clinical symptoms
- Stage 4S patients meeting all of the following:
  - Without MYCN amplification
  - With ≥ 50% tumor resection
  - No clinical symptoms

### Intermediate Risk Neuroblastoma (overall survival 96%, includes the following):
- Stage 2A/2B patients with any of the following:
  - < 50% tumor resection or
  - With clinical symptoms
- Stage 3 patients with any of the following:
  - Age < 18 months with no high risk features
  - Age ≥ 18 months with favorable INPC histology
- Stage 4 patients with any of the following:
  - Age < 12 months with no high risk features
  - Age ≥ 12 and < 18 months with favorable INPC histology AND tumor DNA index > 1
- Stage 4S patients with any of the following:
  - Without MYCN amplification
  - With unfavorable INPC histology
  - Tumor DNA index = 1
  - Clinical symptoms

### High Risk Neuroblastoma (overall survival ~40%, includes the following)
- All patients age ≥ 18 months with stage 4 disease regardless of other factors
- All patients with stages 2 to 4 or 4S disease and MYCN amplification regardless of other factors
- All stage 3 patients age ≥ 18 months with unfavorable INPC histology
- All stage 4 patients age ≥ 12 months with unfavorable INPC histology or tumor DNA index = 1
References – PEDONC-6


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PEDONC-7.1: Pediatric Renal Tumors General Considerations

Note: Some payors consider PET imaging to be experimental for the treatment of Wilms tumor and other kidney tumors, and those coverage policies may supersede the recommendations for PET imaging in this section.

- A variety of tumors can occur in the pediatric kidney, and include the following:
  - Wilms Tumor
    - Favorable Histology (FHWT)
    - Focal Anaplasia (FAWT)
    - Diffuse Anaplasia (DAWT)
    - Bilateral Wilms Tumor (BWT)
  - Renal Cell Carcinoma (RCC)
  - Clear Cell Sarcoma of the Kidney (CCSK)
  - Malignant Rhabdoid Tumor of the Kidney (MRT)
  - Congenital Mesoblastic Nephroma (CMN)
  - Other cancers occurring in the kidney:
    - Neuroblastoma
    - Primitive Neuroectodermal Tumor
    - Rhabdomyosarcoma
    - Non-Rhabdomyosarcoma Soft Tissue Sarcomas
  - These and other rare tumors have been reported occurring primarily in the kidney and should be imaged according to the guidelines for the specific histologic diagnosis.
**PEDONC-7.2: Unilateral Wilms Tumor (UWT)**

**Unilateral Wilms Tumor Initial Staging:**

Many patients will present with an asymptomatic abdominal mass, and will undergo ultrasound as a primary evaluation. Doppler ultrasound to evaluate for tumor thrombus is no longer necessary unless CT findings are inconclusive, and should not be performed if CT is already completed.

- CT Abdomen/Pelvis with contrast (CPT® 74177) is indicated for all unilateral Wilms tumor patients
  - If bilateral renal lesions are noted on ultrasound or CT, MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast and should be strongly considered for better characterization
- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) should be completed prior to anesthesia exposure if possible
- MRI Brain without and with contrast (CPT® 70553) is indicated for initial staging for any patient with neurologic signs or symptoms raising suspicion of CNS metastases as only ~0.5% of Wilms tumor patients will ever develop brain metastases
- Bone scan (See PEDONC-1.3) is indicated for any patient with signs or symptoms raising suspicion of bony metastases
- PET is not indicated in the initial staging of any pediatric renal tumor

**Unilateral Wilms Tumor Treatment Response:**

A very low risk subset of stage I FHWT will be observed after nephrectomy, and enter directly into surveillance.

The majority of patients will receive chemotherapy with or without XRT, beginning within 14 days of initial surgery.

- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) can be performed every 2 cycles during treatment and at the end of planned therapy
- CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast can be performed every 2 cycles during treatment and at the end of planned therapy
- PET is not routinely utilized to assess treatment response in Wilms tumor.
  - However, since most Wilms tumors are FDG-avid, rare circumstances may occur where PET imaging should be approved to establish the presence of active disease only when a major therapeutic decision depends on PET avidity. These requests will be forwarded for Medical Director review.
Unilateral Wilms Tumor Surveillance Imaging:

There are no data to support the use of PET imaging for routine surveillance in any patient with Wilms tumor.

- **Very low risk FHWT treated with nephrectomy only:**
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) at 3, 6, 12, and 18 months after nephrectomy
  - CT Abdomen and Pelvis with contrast (CPT® 74177) at 3, 6, 12, and 18 months after nephrectomy
  - Surveillance pelvic imaging is indicated in this patient group due to higher risk of recurrence in surgery only treatment
  - Other surveillance imaging should be by Abdominal US (CPT® 76700) and CXR

- **FHWT treated with chemotherapy with or without XRT:**
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 6 months for 3 years after completion of all therapy
  - CT Abdomen with contrast (CPT® 74160) or MRI Abdomen without and with contrast (CPT® 74183) every 6 months for 3 years after completion of all therapy
  - Pelvic imaging is not indicated for surveillance unless prior pelvic involvement has been documented or there was tumor rupture at diagnosis
  - Other surveillance imaging should be by Abdominal US and CXR

- **FAWT or DAWT treated with chemotherapy with or without XRT:**
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 3 months for 2 years after completion of all therapy
  - CT Abdomen and Pelvis with contrast (CPT® 74177) or MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) every 3 months for 2 years after completion of all therapy
  - Other surveillance imaging should be by Abdominal US and CXR

- **Surveillance imaging with CT of the Chest/Abdomen/Pelvis (CPT® 71260 and CPT® 74177) following successful treatment for recurrent unilateral Wilms tumor can be approved at every 3 months for 1 year after completing therapy for recurrence.**
  - Surveillance imaging later than 12 months after completing therapy for recurrence should follow the standard timing listed in this surveillance section.
**PEDONC-7.3: Bilateral Wilms Tumor (BWT)**

**Bilateral Wilms Tumor Initial Staging:**

Many patients will present with an asymptomatic abdominal mass, and will undergo ultrasound as a primary evaluation. Doppler ultrasound to evaluate for tumor thrombus is no longer necessary unless CT findings are inconclusive, and should not be performed if CT is already completed.

Patients with bilateral Wilms Tumor may begin therapy without a histologic diagnosis to preserve a localized disease stage and attempt to shrink the tumors to allow for renal-sparing surgical approaches.

- MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) is the preferred imaging modality for patients with bilateral Wilms tumor
  - CT Abdomen and Pelvis with contrast (CPT® 74177) is often performed prior to discovery of bilateral lesions and should not prevent MRI from being approved
  - CT Abdomen and Pelvis with contrast (CPT® 74177) may be used for patients with a contraindication to MRI
    - Avoidance of anesthesia exposure is not a contraindication to MRI for these patients
- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated in the initial workup of all pediatric renal tumors and should be completed prior to anesthesia exposure if possible
- MRI Brain without and with contrast (CPT® 70553) is indicated for initial staging for any patient with neurologic signs or symptoms raising suspicion of CNS metastases as only ~0.5% of Wilms tumor patients will ever develop brain metastases
- Bone scan (See **PEDONC-1.3: Modality General Considerations**) is indicated for any patient with signs or symptoms raising suspicion of bony metastases
- PET is not indicated in the initial staging of any pediatric renal tumor
**Bilateral Wilms Tumor Treatment Response:**

- MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) can be performed every 2 cycles during treatment and at the end of planned therapy
  - CT Abdomen and Pelvis with contrast (CPT® 74177) may be used for patients with a contraindication to MRI
  - If treating with chemotherapy without a biopsy, disease evaluation is indicated at week 6. If either tumor has not shrunk 50%, then open biopsy is indicated to confirm favorable histology.
  - If partial nephrectomy still not feasible at week 6, the next disease evaluation is at week 12. Surgical resection should occur no later than week 12.
- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) can be performed every 2 cycles during treatment and at the end of planned therapy
- PET is not routinely utilized to assess treatment response in Wilms tumor.
  - However, since most Wilms tumors are FDG-avid, rare circumstances may occur where PET should be approved to establish the presence of active disease only when a major therapeutic decision depends on PET avidity. These requests will be forwarded for Medical Director review.

**Bilateral Wilms Tumor Surveillance Imaging:**

- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 6 months for 3 years after completion of all therapy
- CT Abdomen with contrast (CPT® 74160) or MRI Abdomen without and with contrast (CPT® 74183) every 6 months for 3 years after completion of therapy
  - “Extra” one-time imaging is supported at 3 months after completion of all therapy because close surgical margins occur frequently in patients undergoing nephron-sparing surgical approaches, and the risk for early local recurrence is higher
- Pelvic imaging is not indicated for surveillance unless prior pelvic involvement has been documented or there was tumor rupture at diagnosis
- Other surveillance imaging should be by Abdominal US (CPT® 76700) and CXR
  - When CT or MRI Abdomen no longer indicated, patients with bilateral Wilms tumor should have screening Abdominal ultrasound every 3 months until age 8
- Surveillance imaging with CT of the Chest/Abdomen/Pelvis (CPT® 71260 and CPT® 74177) following successful treatment for recurrent bilateral Wilms tumor can be approved every 3 months for 1 year after completing therapy for recurrence.
  - Surveillance imaging later than 12 months after completing therapy for recurrence should follow the standard timing listed in this surveillance section.
**PEDONC-7.4: Pediatric Renal Cell Carcinoma (RCC)**

A majority of pediatric cases have a novel subtype involving TFE3 or TFEB translocations, which have a different natural history than “adult type” RCC. Patients of any age with TFE3 or TFEB translocated RCC should be imaged according to this guideline section.

40 to 45% of pediatric RCC cases have similar histologies to adult RCC (clear cell, papillary, chromophobe, etc.) and imaging decisions will be similar to adult oncology guidelines. Patients with all other subtypes of RCC should be imaged according to **ONC-17: Renal Cell Cancer (RCC)**.

**Pediatric Renal Cell Carcinoma Initial Staging:**

Many patients will present with an asymptomatic abdominal mass, and will undergo ultrasound as a primary evaluation. Doppler ultrasound to evaluate for tumor thrombus is no longer necessary unless CT findings are inconclusive, and should not be performed if CT is already completed.

- **CT Abdomen and Pelvis with contrast (CPT® 74177)** is indicated in all patients
  - If bilateral renal lesions are noted on ultrasound or CT, **MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197)** should be strongly considered
- **CT Chest with (CPT® 71260) or without contrast (CPT® 71250)** should be completed prior to anesthesia exposure if possible
- Other staging imaging should be deferred until a histologic diagnosis is made, by complete nephrectomy for most unilateral renal tumors and biopsy for bilateral renal tumors or inoperable unilateral tumors
- **MRI Brain without and with contrast (CPT® 70553)** is indicated for any patient with neurologic signs or symptoms raising suspicion of CNS metastases
- **Bone scan (See PEDONC-1.3: Modality General Considerations)** is indicated for any patient with signs or symptoms raising suspicion of bony metastases
- **PET scan** is not indicated in the initial staging of any pediatric renal tumor
**Pediatric Renal Cell Carcinoma Treatment Response:**

Most patients will have surgical resection of all disease at the time of diagnosis and will enter directly into surveillance.

- Patients with residual measurable disease after initial surgery and receiving adjuvant medical therapy can have CT Chest with (CPT® 71260) or without contrast (CPT® 71250) and CT Abdomen with contrast (CPT® 74160) every 3 months during active treatment.
- Pelvic imaging is not indicated unless prior pelvic involvement has been documented.
- PET is not routinely utilized to assess treatment response in pediatric RCC.
  - However, since some RCC tumors are FDG-avid, rare circumstances may occur when a major therapeutic decision depends on PET avidity these requests will be forwarded for Medical Director review.

**Pediatric Renal Cell Carcinoma Surveillance Imaging:**

- All pediatric RCC patients:
  - MRI Brain without and with contrast (CPT® 70553) every 6 months for 2 years after completion of all therapy only for patients with documented CNS metastases or new signs/symptoms suggestive of CNS recurrence.
- TFE3 or TFEB subtype:
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 3 months for 2 years after completion of all therapy
  - CT Abdomen with contrast (CPT® 74160) or MRI Abdomen without and with contrast (CPT® 74183) every 3 months for 2 years after completion of all therapy
  - Pelvic imaging is not indicated for surveillance unless prior pelvic involvement has been documented.
- All other histologies:
  - Surveillance imaging is appropriate as listed in the adult Oncology Imaging Guidelines: [ONC-17.4: Renal Cell Cancer Surveillance](#)
PEDONC-7.5: Clear Cell Sarcoma of the Kidney (CCSK)

Be careful not to confuse the diagnosis with clear cell RCC. See ONC-17: Renal Cell Cancer (RCC) for imaging guidelines.

Clear Cell Sarcoma Of The Kidney Initial Staging:

Many patients will present with an asymptomatic abdominal mass, and will undergo ultrasound as a primary evaluation. Doppler ultrasound to evaluate for tumor thrombus is no longer necessary unless CT findings are inconclusive, and should not be performed if CT is already completed.

- CT Abdomen and Pelvis with contrast (CPT® 74177) is indicated in all patients
  - If bilateral renal lesions are noted on ultrasound or CT, MRI Abdomen and Pelvis without and with contrast should be strongly considered
- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) should be completed prior to anesthesia exposure if possible
- Other staging imaging should be deferred until a histologic diagnosis is made, by complete nephrectomy for most unilateral renal tumors and biopsy for bilateral renal tumors or inoperable unilateral tumors
- MRI Brain without and with contrast (CPT® 70553) is indicated for initial staging in all patients with clear cell sarcoma of the kidney
- Bone scan (See PEDONC-1.3: Modality General Considerations) is indicated in all patients with clear cell sarcoma of the kidney
- PET is not indicated in the initial staging of any pediatric renal tumor

Clear Cell Sarcoma Of The Kidney Treatment Response:

- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) can be performed every 2 cycles during treatment and at the end of planned therapy
- CT Abdomen and Pelvis with contrast (CPT® 4177) or MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) can be performed every 6 weeks during treatment and at the end of planned therapy
- MRI Brain without and with contrast (CPT® 70553) can be performed:
  - Every 2 cycles during treatment for patients with CNS metastases at initial staging
  - At the end of planned therapy for all patients with CCSK
- Bone scan (See PEDONC-1.3: Modality General Considerations) at the end of planned therapy
- PET is not routinely utilized to assess treatment response in CCSK
  - However, since clear cell sarcomas have been shown to be FDG-avid in other anatomic locations, rare circumstances may occur where PET should be approved to establish the presence of active disease only when a major therapeutic decision depends on PET avidity. These requests will be forwarded for Medical Director review.
Clear Cell Sarcoma Of The Kidney Surveillance Imaging:

- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 3 months for 2 years after completion of all therapy
- CT Abdomen and Pelvis with contrast (CPT® 74177) or MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) every 3 months for 2 years after completion of all therapy
- MRI Brain without and with contrast (CPT® 70553) every 6 months for 3 years after completion of all therapy
- Bone scan (See PEDONC-1.3: Modality General Considerations) every 3 months for 1 year, then every 6 months for 1 year after completion of all therapy
  - If negative at 36 months, no further advanced imaging is necessary.
- Other surveillance imaging should be by Abdominal US (CPT® 76700) and CXR
**PEDONC-7.6: Malignant Rhabdoid Tumor of the Kidney (MRT) and Other Extracranial Sites**

**Be careful not to confuse the diagnosis with rhabdomyosarcoma.** See **PEDONC-8.2: Rhabdomyosarcoma (RMS) for Imaging Guidelines.**

A highly aggressive histologic variant that can also occur in other locations and all non-CNS sites should follow these guidelines.

Primary CNS rhabdoid malignancies should be imaged according to **PEDONC-4.5: Atypical Teratoid/Rhabdoid Tumors (ATRT).**

**Malignant Rhabdoid Tumor Initial Staging:**

Many patients will present with an asymptomatic abdominal mass, and will undergo ultrasound as a primary evaluation. Doppler ultrasound to evaluate for tumor thrombus is no longer necessary unless CT findings are inconclusive, and should not be performed if CT is already completed.

- **CT Abdomen and Pelvis with contrast (CPT® 74177)** is indicated in all patients
  - If bilateral renal lesions are noted on ultrasound or CT, MRI Abdomen and Pelvis without and with contrast should be strongly considered
- **CT Chest with (CPT® 71260) or without contrast (CPT® 71250)** should be completed prior to anesthesia exposure if possible
- Other staging imaging should be deferred until a histologic diagnosis is made, by complete nephrectomy for most unilateral renal tumors and biopsy for bilateral renal tumors or inoperable unilateral tumors
- **MRI Brain without and with contrast (CPT® 70553)** is indicated for all patients with MRT of the kidney or other non-CNS site
- **Bone scan (See PEDONC-1.3: Modality General Considerations)** is indicated in all patients with MRT of the kidney or other non-CNS site
- **PET** is not indicated in the initial staging of any pediatric renal tumor
Malignant Rhabdoid Tumor Treatment Response:

- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) can be performed every 2 cycles during treatment and at the end of planned therapy
- CT Abdomen and Pelvis with contrast (CPT® 74177) or MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) can be performed every 2 cycles during treatment and at the end of planned therapy
  - If primary site other than kidney, perform CT with contrast or MRI without and with contrast of primary site in place of abdominal and pelvic imaging
- MRI Brain without and with contrast (CPT® 70553) can be performed:
  - Every 2 cycles during treatment for patients with CNS metastases at initial staging
  - At the end of planned therapy for all patients with MRT
- Bone scan (See PEDONC-1.3: Modality General Considerations) at the end of planned therapy only if positive at initial diagnosis
- PET is not routinely utilized to assess treatment response in MRT.
  - However, since malignant rhabdoid tumors have been shown to be FDG-avid, rare circumstances may occur where PET should be approved to establish the presence of active disease only when a major therapeutic decision depends on PET avidity. These requests will be forwarded for Medical Director review.

Malignant Rhabdoid Tumor Surveillance Imaging:

- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 3 months for 2 years after completion of all therapy
- CT Abdomen and Pelvis with contrast (CPT® 74177) or MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) every 3 months for 3 years after completion of all therapy
  - If primary site other than kidney, perform CT with contrast or MRI without and with contrast of primary site in place of abdominal imaging
- MRI Brain without and with contrast (CPT® 70553) every 3 months for 1 year, then every 6 months for 1 year after completion of all therapy
- Bone scan (See PEDONC-1.3: Modality General Considerations) every 3 months for 1 year, then every 6 months for 1 year after completion of all therapy only if positive at initial diagnosis
  - If negative at 36 months, no further advanced imaging is necessary
- Other surveillance imaging should be by Abdominal US (CPT® 76700) and CXR
**PEDONC-7.7: Congenital Mesoblastic Nephroma (CMN)**

This is the most common primary renal tumor occurring in young infants, and the overall prognosis is very good.

Complete surgical removal is curative in most cases, and histologically confirmed metastatic disease or bilateral disease has never been reported.

**Congenital Mesoblastic Nephroma Initial Staging**

Many patients will present with an asymptomatic abdominal mass at the time of birth or abnormal prenatal ultrasound, and will undergo ultrasound as a primary evaluation.

- CT Abdomen and Pelvis with contrast (CPT® 74177) is indicated in all patients
- CT Chest with (CPT® 71260) can be approved to evaluate inconclusive findings on Chest X-ray
- PET is not indicated in the initial staging of any pediatric renal tumor

**Congenital Mesoblastic Nephroma Treatment Response:**

- Surgical resection is curative in most patients. Children who have resection of the tumor can have a single CT Abdomen and Pelvis with contrast (CPT® 74177) approved following resection to establish baseline imaging and those with a complete resection should then be imaged according to surveillance guidelines
- Some patients will receive preoperative chemotherapy to facilitate safer resection and can have CT Abdomen and Pelvis with contrast (CPT® 74177) approved every 2 cycles of therapy until surgery, and should then be imaged according to surveillance guidelines after their postoperative baseline imaging study

**Congenital Mesoblastic Nephroma Surveillance Imaging**

- Recurrences are rare, but most occur within 12 months of diagnosis
- Given the young age of the patients with CMN, ultrasound is the preferred surveillance imaging modality to avoid radiation and anesthesia exposures
  - CT Abdomen and Pelvis with contrast (CPT® 74177) or MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) can be approved every 3 months for 1 year after completion of all therapy for patients with residual abnormalities present on post-operative imaging or inconclusive findings on ultrasound
References – PEDONC-7


# PEDONC-8: Pediatric Soft Tissue Sarcomas

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**PEDONC-8.1: General Considerations**

Soft tissue sarcomas occur in both adult and pediatric patients, but some histologic types are more common in one age group than the other. Unless specified below, patients who are < 18 years old should be imaged according to this guideline section. Exceptions include:

- Rhabdomyosarcoma patients of all ages should be imaged according to guidelines in **PEDONC-8.2: Rhabdomyosarcoma**
- Kaposi’s sarcoma patients of all ages should be imaged according to guidelines in **ONC-31.10: Kaposi’s Sarcoma**

**Note:** Some payors consider PET to be experimental for the treatment of rhabdomyosarcoma and other soft tissue sarcomas, and those coverage policies may supersede the recommendations for PET in this section.

Pediatric soft tissue sarcomas are divided into two groups:

1. Rhabdomyosarcoma (RMS) accounts for ~60% of soft tissue sarcomas in young patients, but only ~25% of soft tissue sarcomas in adolescents
2. Non-rhabdomyosarcoma soft tissue sarcomas (NRSTS) which encompasses all other histologic subtypes

Evaluation of soft tissue masses of uncertain nature prior to biopsy should follow general imaging guidelines in **PEDMS-3: Soft Tissue and Bone Masses** for patients who are age 0 (newborn) through 17 years old, and **MS-10: Soft Tissue Mass Or Lesion Of Bone** for patients who are ≥ 18 years old.

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End of PEDONC-8.1
PEDONC-8.2: Rhabdomyosarcoma (RMS)

Rhabdomyosarcoma Initial Staging:

- Because RMS can arise from any muscle tissue, the presenting symptoms and primary tumor sites vary widely and strongly influence the appropriate imaging decisions.
  - Either CT with contrast or MRI without and with contrast is acceptable for primary site imaging of RMS arising in the abdomen or pelvis at the discretion of the treating oncologist.
  - CT with contrast is the preferred primary site imaging modality for RMS arising in the thoracic cavity (not the chest wall).
  - MRI without and with contrast is the preferred primary site imaging modality for RMS occurring in all other anatomic locations, including the chest wall.
- In addition, evaluation for lung metastases using CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated in the initial workup of all pediatric soft tissue sarcomas and should be completed prior to anesthesia exposure if possible.
- Other staging imaging should be deferred until a histologic diagnosis is made.
  - PET/CT is superior to conventional imaging for detection of nodal and bony metastases in pediatric RMS and is indicated in the initial staging of all patients after histologic diagnosis is established.
    - Whole body PET/CT (CPT® 78816) is the preferred study for initial staging of RMS.
    - Bone scan (See PEDONC 1.3: Modality General Considerations) may be substituted for PET imaging if PET not available.
  - CT Abdomen and Pelvis with contrast (CPT® 74177) is not routinely indicated in the initial metastatic staging of pediatric RMS, but can be approved in the following situations:
    - Evaluation of inconclusive PET findings
    - Primary site of abdomen or pelvis
    - Lower extremity primary sites
  - MRI Brain (CPT® 70553) and Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) is indicated for initial staging in the following pediatric RMS:
    - Primary site involving the paraspinal or paravertebral region
    - PET or bone scan-avid lesions in skull, neck, vertebrae
    - Any patient with neurologic signs or symptoms raising suspicion of CNS metastases.
**Rhabdomyosarcoma Treatment Response:**

- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) can be performed every 2 cycles during treatment and at the end of planned therapy
- Primary site imaging:
  - CT with contrast or MRI without and with contrast can be performed every 2 cycles during treatment and at the end of planned therapy
  - Restaging imaging is appropriate after local control surgery (complete or partial resection) is completed
- Metastatic site imaging:
  - Repeat imaging of all known metastatic sites using the same modality as during initial staging is appropriate whenever primary site imaging is necessary
- PET is not routinely utilized to assess treatment response in RMS, but is indicated in the following circumstances:
  - Response assessment prior to local control surgery or radiation therapy
  - Evaluation of residual mass visible on conventional imaging as part of end of therapy evaluation
  - Response assessment of disease visible on PET but not conventional imaging
  - Once PET has been documented to be negative for a given patient’s cancer or all PET-avid disease has been surgically resected, PET should not be used for continued disease monitoring or surveillance unless one of the exceptions in section **PEDONC-1: General Guidelines** applies. These requests will be forwarded for Medical Director review.
  - PET is generally not indicated during active treatment for recurrent pediatric cancer. In rare circumstances, PET may be appropriate when results are likely to result in a treatment change for the patient, including a change from active treatment to surveillance. These requests will be forwarded for Medical Director review.
Rhabdomyosarcoma Surveillance Imaging:

- All patients with localized RMS:
  - Primary tumor site should be imaged with either CT with contrast or MRI without and with contrast every 3 months for 1 year, then every 4 months for 2 years, then every 6 months for 1 year after completion of all therapy
  - CXR every 3 months for 1 year, then every 4 months for 2 years, then every 6 months for 1 year after completion of all therapy
    - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated for new or worsening clinical symptoms of chest disease or new findings on CXR

- All patients with metastatic RMS:
  - Primary tumor site should be imaged with either CT with contrast or MRI without and with contrast every 3 months for 1 year, then every 4 months for 2 years, then every 6 months for 1 year after completion of all therapy
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) and all known metastatic sites every 3 months for 1 year, then every 4 months for 2 years, then every 6 months for 1 year after completion of all therapy
  - Nuclear bone scan (See PEDONC-1.3: Modality General Considerations) should be used for surveillance of known bony metastases every 3 months for 1 year, then every 4 months for 2 years, then every 6 months for 1 year after completion of all therapy

- PET should not be used for surveillance imaging of RMS unless one of the following applies:
  - Conventional imaging (CT, MRI, US, plain film) reveals findings that are inconclusive or suspicious for recurrence and PET avidity will determine whether biopsy or continued observation is appropriate
    - Residual mass that has not changed in size since the last conventional imaging does not justify PET imaging
    - PET avidity in a residual mass at the end of planned therapy is not an indication for PET imaging during surveillance.
  - Rare circumstances where obvious clinical symptoms show strong evidence suggesting recurrence and PET would replace conventional imaging modalities. These requests will be forwarded for Medical Director review.

End of PEDONC-8.2
PEDONC-8.3: Non-Rhabdomyosarcoma Soft Tissue Sarcomas (NRSTS)

All soft tissue sarcomas other than RMS fall into this category.

NRSTS Initial Staging:

- Because soft tissue sarcomas can arise from any soft tissue, the presenting symptoms and primary tumor sites vary widely and strongly influence the appropriate imaging decisions.
  - Either CT with contrast or MRI without and with contrast is acceptable for primary site imaging of NRSTS arising in the abdomen or pelvis at the discretion of the treating oncologist.
  - CT with contrast is the preferred primary site imaging modality for NRSTS arising in the thoracic cavity (not the chest wall).
  - MRI without and with contrast is the preferred primary site imaging modality for NRSTS occurring in all other anatomic locations, including the chest wall.
- In addition, evaluation for lung metastases using CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated in the initial workup of all pediatric soft tissue sarcomas and should be completed prior to anesthesia exposure if possible.
- Other staging imaging should be deferred until a histologic diagnosis is made:
  - PET/CT (CPT® 78815) may be considered in the following:
    - Desmoplastic small round cell tumor
    - Prior to neoadjuvant chemotherapy
    - Evaluating inconclusive findings found on conventional imaging
    - Whole body PET/CT (CPT® 78816) may be approved if there is clinical suspicion of skull or distal lower extremity involvement
  - Nuclear bone scan (See PEDONC 1.3: Modality General Considerations) is used to evaluate for bony metastases but should be omitted if PET is performed.
  - CT Abdomen and Pelvis with contrast (CPT® 74177) is not routinely indicated in the initial metastatic staging of pediatric NRSTS, but can be approved in the following situations:
    - Evaluation of inconclusive PET findings
    - Primary site of abdomen or pelvis
    - Lower extremity primary sites
    - Desmoplastic small round cell tumor
  - MRI Brain (CPT® 70553) and Spine (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) without and with contrast is indicated for initial staging in the following pediatric NRSTS:
    - Primary site of paraspinal or paravertebral region
    - PET or nuclear bone scan-avid lesions in skull, neck, vertebrae
    - Any patient with neurologic signs or symptoms raising suspicion of CNS metastases
NRSTS Treatment Response:
Many patients with NRSTS will be treated with surgical resection alone, and these patients enter immediately into surveillance

- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) can be performed every 2 cycles during treatment and at the end of planned therapy

- Primary site imaging:
  - CT with contrast or MRI without and with contrast can be performed every 2 cycles during treatment and at the end of planned therapy
  - Restaging imaging is appropriate after local control surgery (complete or partial resection) is completed

- Metastatic site imaging:
  - Repeat imaging of all known metastatic sites using the same modality as during initial staging is appropriate whenever primary site imaging is necessary

- PET imaging is not routinely utilized to assess treatment response in NRSTS, but is indicated in the following circumstances if positive at initial diagnosis.
  - Response assessment prior to local control surgery or radiation therapy
  - Evaluation of residual mass visible on conventional imaging as part of end of therapy evaluation
  - Response assessment of disease visible on PET but not conventional imaging
  - Once PET has been documented to be negative for a given patient’s cancer or all PET-avid disease has been surgically resected, PET should not be used for continued disease monitoring or surveillance unless one of the exceptions in section PEDONC-1: General Guidelines applies. These requests will be forwarded for Medical Director review.
  - PET imaging is generally not indicated during active treatment for recurrent pediatric cancer. In rare circumstances, PET imaging may be appropriate when results are likely to result in a treatment change for the patient, including a change from active treatment to surveillance. These requests will be forwarded for Medical Director review.
**Surveillance Imaging:**

- **All patients with localized NRSTS:**
  - Primary site should be imaged with either CT with contrast or MRI without and with contrast every 6 months for 5 years after completion of all therapy
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 6 months for 5 years after completion of all therapy

- **All patients with metastatic NRSTS:**
  - Primary site should be imaged with either CT with contrast or MRI without and with contrast every 6 months for 5 years after completion of all therapy
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) and all known metastatic sites every 6 months for 5 years after completion of all therapy
  - Nuclear bone scan (See PEDONC 1.3: Modality General Considerations) should be used for surveillance of known bony metastases every 6 months for 5 years after completion of all therapy

- **Surveillance after recurrence:**
  - Surveillance imaging using CT Chest (CPT® 71260) and CT with contrast or MRI without and with contrast of the primary site following successful treatment for recurrent NRSTS can be approved every 3 months for 1 year after completing therapy for recurrence.
    - Surveillance imaging later than 12 months after completing therapy for recurrence should follow the standard timing listed in this surveillance section.

- **PET should not be used for surveillance imaging of NRSTS unless one of the following applies:**
  - Conventional imaging (CT, MRI, US, plain film) reveals findings that are inconclusive or suspicious for recurrence and PET avidity will determine whether biopsy or continued observation is appropriate
    - Residual mass that has not changed in size since the last conventional imaging does not justify PET
    - PET avidity in a residual mass at the end of planned therapy is not an indication for PET imaging during surveillance.
  - Rare circumstances where obvious clinical symptoms show strong evidence suggesting recurrence and PET would replace conventional imaging modalities
  - These requests will be forwarded for Medical Director review.
References – PEDONC-8

## PEDONC-9: Bone Tumors

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PEDONC-9.1: General Remarks

These guidelines include both benign and malignant lesions.

- Bone tumors occur in both adult and pediatric patients, but some are more common in one age group than the other. Unless specified below, patients who are < 18 years old should be imaged according to this guideline section. Exceptions include:
  - Osteogenic sarcoma patients of all ages should be imaged according to guidelines in **PEDONC-9.3: Osteogenic Sarcoma (OS)**
  - Ewing sarcoma and primitive neuroectodermal tumor patients of all ages should be imaged according to guidelines in **PEDONC-9.4: Ewing Sarcoma and Primitive Neuroectodermal Tumors (ESFT)**.
  - Chondrosarcoma patients of all ages should be imaged according to guidelines in **ONC-12.6: Bone Sarcomas**
  - Chordoma patients of all ages should be imaged according to guidelines in **ONC-12.6: Bone Sarcomas**
  - Giant cell tumor of bone and enchondroma patients of all ages should be imaged according to guidelines in **ONC-12.9: Benign Bone Tumors**
  - Other benign bone tumor patients of all ages should be imaged according to guidelines in **PEDONC-9.2: Benign Bone Tumors**

All bone tumors should be evaluated by plain x-ray prior to any advanced imaging.

*PET does not reliably distinguish between benign and malignant bone tumors and should not be performed prior to biopsy.*
PEDONC-9.2: Benign Bone Tumors

- Osteochondroma
  - Plain x-ray appearance is diagnostic for the majority of patients and advanced imaging is generally unnecessary
  - MRI without and with contrast can be approved after evaluation by the operating surgeon for preoperative planning
  - MRI without contrast OR without and with contrast, as requested, is appropriate for patients with osteochondroma when there is clinical concern for malignant transformation based on new or worsening pain symptoms or a change on a recent plain x-ray

- Osteoid osteoma
  - CT without contrast is often the primary study when osteoid osteoma is suspected based on clinical history and plain film findings
  - Bone scan SPECT (CPT® 78320) is indicated for suspected osteoid osteoma
  - Some patients will require both CT without contrast as well as MRI without and with contrast to make a definitive diagnosis

- Other benign tumors
  - Variety of diagnoses, including osteoid osteoma, osteoblastoma, aneurysmal bone cysts, fibrous dysplasia, chondroblastoma and others,
  - Plain x-ray appearance is diagnostic for many benign bone tumors and advanced imaging is generally unnecessary except for preoperative planning
  - MRI without and with contrast is the primary modality for advanced imaging of bone tumors, and can be approved to help narrow differential diagnoses and determine whether biopsy is indicated
    - For certain tumors, CT (contrast as requested) provides better visualization of specific bony details, and requests after evaluation by the operating surgeon for preoperative planning should generally be approved
  - Surveillance imaging, when indicated, should utilize plain x-ray
    - Some benign bone tumor types carry a risk of malignant degeneration over time, but routine advanced imaging surveillance has not been shown to improve outcomes for these patients
    - MRI without and with contrast can be approved to evaluate new findings on plain X-ray or new/worsening clinical symptoms not explained by a recent plain x-ray
  - There are no data to support the use of PET in the evaluation of benign bone tumors, and PET requests should not be approved without biopsy confirmation of a malignancy.
PEDONC-9.3: Osteogenic Sarcoma (OS)

Osteogenic Sarcoma Initial Staging:

- All bone tumors should be evaluated by plain x-ray prior to any advanced imaging.
- MRI without and with contrast is the preferred primary site imaging.
  - CT, contrast as requested, can be approved if there is a contraindication to MRI or if requested after evaluation by the operating surgeon to clarify inconclusive MRI findings for preoperative planning.
  - MRA and/or CTA may rarely be indicated for complicated surgical resections, and can be approved after evaluation by the operating surgeon to clarify inconclusive MRI findings for preoperative planning.
  - Requests for CT, MRA, or CTA should be forwarded for Medical Director review.
- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is superior to PET/CT for the detection of pulmonary metastases, and is indicated in the initial workup of all suspected malignant bone tumors and should be completed prior to anesthesia exposure if possible.
- Other staging imaging should be deferred until a histologic diagnosis is made, initially by biopsy, as definitive resection is usually performed after neoadjuvant chemotherapy.
  - Distant bony metastases are rare in OS, but cause a significant change in treatment approach.
  - Whole body PET/CT (CPT® 78816) is the preferred study for initial staging of OS after histologic diagnosis is established.
    - PET has superior sensitivity to bone scan (95% vs. 76%) but equivalent overall diagnostic accuracy (98% vs. 96%) for detection of bony metastases in pediatric OS.
    - Nuclear bone scan (See PEDONC-1.3: Modality General Considerations) may be substituted for PET imaging if PET not available.
    - If PET/CT is negative at initial diagnosis, bone scan (See PEDONC-1.3: Modality General Considerations) is preferred for asymptomatic surveillance for bony metastases at time points after local control surgery.
- CT Abdomen and Pelvis with contrast (CPT® 74177) is not routinely indicated in the initial metastatic staging of pediatric OS, but can be approved in the following situations:
  - Evaluation of inconclusive PET findings
  - Primary site of abdomen or pelvis.
Osteogenic Sarcoma Treatment Response:

Most OS patients undergo restaging after 10 to 12 weeks of neoadjuvant chemotherapy prior to local control surgery to confirm the absence of progressive disease prior to the extended break necessary for postoperative healing.

- Restaging at this time point should include:
  - MRI without and with contrast of primary site
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250)
  - Whole body PET/CT (CPT® 78816) or bone scan (See PEDONC-1.3: Modality General Considerations)

- Following local control surgery, the following imaging guidelines should be used until the end of planned chemotherapy:
  - MRI without and with contrast of primary site ~6 weeks after surgical procedure and at the end of planned chemotherapy
  - Plain x-rays of the primary site and chest every 2 months
  - CT Chest (with or without contrast, as requested):
    - Measurable pulmonary metastases: every 6 weeks and at the end of planned chemotherapy
    - No measurable pulmonary metastases: every 4 months and at the end of planned chemotherapy
  - Bone scan (See PEDONC-1.3: Modality General Considerations) every 4 months and at the end of planned chemotherapy
    - Whole body PET/CT can be used in place of bone scan, if positive for distant bone metastases at initial diagnosis

- Patients with metastatic disease do not routinely undergo local control surgery unless metastatic disease has resolved with chemotherapy.
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) can be performed every 2 cycles during treatment and at the end of planned chemotherapy
  - MRI without and with contrast of primary site can be performed every 2 cycles during treatment and at the end of planned chemotherapy
  - If previously positive for bony metastases, whole body PET/CT (CPT® 78816) or bone scan (See PEDONC-1.3: Modality General Considerations) every 2 cycles during treatment and at the end of planned chemotherapy
  - Imaging may be indicated more frequently around the time of surgical resection of primary or metastatic lesions to assess for resectability

- PET is generally not indicated during active treatment for recurrent pediatric cancer. In rare circumstances, PET imaging may be appropriate when results are likely to result in a treatment change for the patient, including a change from active treatment to surveillance. These requests will be forwarded for Medical Director review.
Osteogenic Sarcoma Surveillance Imaging:

- Appendicular bone primary tumor site:
  - Plain x-rays of the primary tumor site should be completed every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually for 2 years after completion of all therapy.
  - MRI is not routinely indicated for surveillance imaging of appendicular primary sites but should be approved for the following:
    - The patient does not have an endoprosthesis that will cause MRI or CT artifact
    - To clarify inconclusive findings on plain x-ray
    - To evaluate significant pain symptoms suggestive of primary site recurrence

- Axial bone primary tumor site:
  - MRI without and with contrast of the primary tumor site can be approved every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually for 2 years after completion of all therapy.

- Metastatic disease surveillance:
  - Patients with localized OS:
    - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 3 months for 1 year then every 4 months for 1 year after completion of all therapy.
    - Chest X-ray (CXR) should be used for pulmonary recurrence surveillance after 24 months, and CT Chest can be approved to clarify inconclusive CXR findings.
  - Patients with metastatic or recurrent OS:
    - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually for 2 years after completion of all therapy.
  - Nuclear bone scan (See PEDONC-1.3: Modality General Considerations) should be used for evaluation of distant bony metastases every 3 months for 1 year, then every 6 months for 2 years, then annually for 2 years after completion of all therapy.
  - PET/CT has no established role for asymptomatic surveillance of OS, but can be approved in the following circumstances:
    - Conventional imaging reveals findings that are inconclusive or suspicious for recurrence and PET avidity will determine whether biopsy or continued observation is appropriate.
    - Rare circumstances where obvious clinical symptoms show strong evidence suggesting recurrence and PET would replace conventional imaging modalities.
    - Restaging after biopsy-confirmed recurrence.
    - These requests will be forwarded for Medical Director review.

End of PEDONC-9.3
**PEDONC-9.4: Ewing Sarcoma and Primitive Neuroectodermal Tumors (ESFT)**

**ESFT Initial Staging:**

- All bone tumors should be evaluated by plain-x-ray prior to any advanced imaging.
- ESFT can also occur in the soft tissues, soft tissue masses without bony involvement that are ill-defined or non-discrete should be evaluated by limited ultrasound prior to any advanced imaging.
- MRI without and with contrast is the preferred primary site imaging.
  - CT, contrast as requested, can be approved if there is a contraindication to MRI or if requested after evaluation by the operating surgeon to clarify inconclusive MRI findings for preoperative planning.
  - MRI Chest without and with contrast is indicated for chest wall primary tumors, in addition to the CT Chest for pulmonary metastasis detection.
  - MRA and/or CTA may rarely be indicated for complicated surgical resections, and can be approved after evaluation by the operating surgeon to clarify inconclusive MRI findings for preoperative planning.
  - Requests for CT, MRA, or CTA should be forwarded for Medical Director review.
- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is superior to PET/CT for the detection of pulmonary metastases, and is indicated in the initial workup of all suspected malignant bone tumors and should be completed prior to anesthesia exposure if possible.
- Other staging imaging should be deferred until a histologic diagnosis is made, initially by biopsy, as definitive resection is performed after neoadjuvant chemotherapy.
  - Bone and bone marrow metastases can occur in ESFT, and cause a significant change in treatment approach. PET/CT can replace bone scan and bone marrow biopsy in ESFT patients and is indicated in the initial staging of all ESFT patients after histologic diagnosis is established.
    - Whole body PET/CT (CPT® 78816) is the preferred study for initial staging of ESFT.
    - Bone scan (See **PEDONC-1.3: Modality General Considerations**) may be substituted for PET imaging if PET not available.
    - If PET/CT is negative for bony metastases at initial diagnosis, bone scan (See **PEDONC-1.3: Modality General Considerations**) is preferred for asymptomatic surveillance at all-time points after completion of therapy.
- CT Abdomen and Pelvis with contrast (CPT® 74177) is not routinely indicated in the initial metastatic staging of pediatric ESFT, but can be approved in the following situations:
  - Evaluation of inconclusive PET findings
  - Primary site involving the abdomen or pelvis.
**ESFT Treatment Response:**

All ESFT patients undergo restaging after ~12 weeks of neoadjuvant chemotherapy prior to local control surgery to confirm the absence of progressive disease prior to the extended break necessary for postoperative healing.

- Restaging at this time point should include:
  - MRI without and with contrast of primary site
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250)
  - Whole body PET/CT (CPT® 78816) or bone scan (See PEDONC-1.3: Modality General Considerations)

- Following local control surgery, the following imaging guidelines should be used until the end of planned chemotherapy:
  - MRI without and with contrast of primary site 3 months after surgical procedure and at the end of planned chemotherapy
  - Plain x-rays of the primary site and chest immediately after local control then every 3 months
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250):
    - Measurable pulmonary metastases: every 6 weeks and at the end of planned chemotherapy
    - No measurable pulmonary metastases: every 3 months and at the end of planned chemotherapy
  - Whole body PET/CT (CPT® 78816) or bone scan (See PEDONC-1.3: Modality General Considerations) at the end of planned chemotherapy

- Patients with metastatic disease do not routinely undergo local control surgery unless metastatic disease has resolved with chemotherapy.
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) can be performed every 2 cycles during treatment and at the end of planned chemotherapy
  - MRI without and with contrast of primary site can be performed every 2 cycles during treatment and at the end of planned chemotherapy
  - If previously positive for bony metastases, whole body PET/CT (CPT® 78816) or bone scan (See PEDONC-1.3: Modality General Considerations) every 2 cycles during treatment and at the end of planned chemotherapy
  - Imaging may be indicated more frequently around the time of surgical resection of primary or metastatic lesions to assess for resectability

- PET is generally not indicated during active treatment for recurrent pediatric cancer. In rare circumstances, PET may be appropriate when results are likely to result in a treatment change for the patient, including a change from active treatment to surveillance. These requests will be forwarded for Medical Director review.
ESFT Surveillance Imaging:

Appendicular bone primary tumor site:
- Plain x-rays of the primary tumor site should be completed every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually for 2 years after completion of all therapy
  - MRI is not routinely indicated for surveillance imaging of these primary sites after completion of chemotherapy but should be approved for the following:
    - The patient does not have an endoprosthesis that causes MRI or CT artifact
    - To clarify inconclusive findings on plain x-ray
    - To evaluate significant pain symptoms suggestive of primary site recurrence

Axial bone or any soft tissue primary site:
- CT with contrast or MRI without and with contrast of the primary tumor site can be approved every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually for 2 years after completion of all therapy

Metastatic disease surveillance:
- Patients with localized ESFT:
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 3 months for 1 year then every 4 months for 1 year after completion of all therapy
    - Chest X-ray (CXR) should be used for pulmonary recurrence surveillance after 24 months, and CT Chest can be approved to clarify inconclusive CXR findings
- Patients with metastatic or recurrent ESFT:
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually for 2 years after completion of all therapy
- Nuclear bone scan (See PEDONC-1.3: Modality General Considerations) should be used for evaluation of distant bony metastases every 3 months for 1 year, then every 4 months for 1 year, then every 6 months for 1 year, then annually for 2 years after completion of all therapy
- PET/CT has no established role for asymptomatic surveillance of ESFT, but can be approved in the following circumstances:
  - Conventional imaging reveals findings that are inconclusive or suspicious for recurrence and PET avidity will determine whether biopsy or continued observation is appropriate
  - Rare circumstances where obvious clinical symptoms show strong evidence suggesting recurrence and PET would replace conventional imaging modalities
  - Restaging after biopsy-confirmed recurrence
  - These requests will be forwarded for Medical Director review.

End of PEDONC-9.4
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**PEDONC-10: Pediatric Germ Cell Tumors**

Malignant pediatric germ cell tumors commonly include one of four histologic subtypes (yolk sac tumor, choriocarcinoma, embryonal carcinoma, or mixed histology), but the overall treatment strategies are similar for all malignant germ cell tumors. Tumors can occur in testicular, ovarian or extragonadal primary locations.

- This section applies to primary germ cell tumors occurring outside the central nervous system in children who are ≤ 15 years old at the time of initial diagnosis.
  - For patients who are > 15 years old at diagnosis, the overall prognosis is inferior and these patients should be imaged according to adult guidelines in: **ONC-20: Testicular and Nonepithelial Ovarian (Germ Cell) Cancer**.
- Sex cord stromal tumors (granulosa cell, theca, sertoli, and leydig tumors) are rare in pediatrics and should be imaged according to adult guidelines in: **ONC-20: Testicular and Nonepithelial Ovarian (Germ Cell) Cancer**.
- For CNS germ cell tumors, use the imaging guidelines in: **PEDONC-4.7: CNS Germinomas and Non-Germinomatous Germ Cell Tumors (NGGCT)**.
**Pediatric GCT Initial Staging:**

- Ovarian, testicular, and abdominal extragonadal GCT should have ultrasound and tumor markers (AFP, β-hCG) as initial evaluation
  - Mediastinal primary tumors should be evaluated by CT Chest with contrast
  - Ovarian masses that are < 10 cm in size, have minimal or no visible solid component on ultrasound, and have normal tumor markers are almost universally benign teratomas or functional cysts and advanced imaging is not necessary unless ultrasound is insufficient for immediate preoperative planning.

- Once a primary mass suspected to be GCT is discovered, initial staging with CT Abdomen/Pelvis with contrast (CPT® 74177) is indicated prior to histologic confirmation
  - The degree of abdominal exploration and node sampling necessary for adequate staging is determined in part by imaging findings and is required for preoperative planning
  - Testicular primary tumors can defer abdominal imaging until after histologic confirmation at the discretion of the operating surgeon
  - MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) can be approved to clarify inconclusive CT findings or for patients with a known contraindication to CT contrast

- CT Chest with contrast (CPT® 71260) is indicated in the initial workup of all pediatric GCT and should be completed prior to anesthesia exposure if possible

- MRI Brain without and with contrast (CPT® 70553) can be approved for patients with symptoms suggesting CNS metastases

- Nuclear bone scan (See PEDONC-1.3: Modality General Considerations) should be used for initial evaluation of bony metastases in patients with systemic symptoms or bone pain

- There has been no published evidence to date supporting the routine use of PET/CT in the evaluation of pediatric GCT
  - Additionally, PET has been found to have similar efficacy to CT imaging in initial staging of adults with non-seminomatous GCT (the majority of pediatric GCT are non-seminomatous)
**Pediatric GCT Treatment Response:**

Patients with localized GCT are often cured with surgery alone and do not receive adjuvant therapy. These patients should be imaged using surveillance guidelines after surgery is completed.

Patients receiving adjuvant chemotherapy are usually treated with 4 to 6 cycles of combination chemotherapy.

- The primary method of response assessment is by tumor marker decrease
  - For patients with disease not completely resected at initial diagnosis, repeat imaging with CT Chest/Abdomen/Pelvis (CPT® 71260 and CPT® 74177) with contrast can be approved every 2 cycles (~every 6 weeks)
  - CT imaging may be indicated more frequently to assess for surgical resectability in patients who have received more than 4 cycles of chemotherapy
- CT Chest/Abdomen/Pelvis with contrast (CPT® 71260 and CPT® 74177) is indicated at the end of planned chemotherapy or following neoadjuvant chemotherapy for initially unresectable tumors
- Imaging of any metastatic sites should be approved at the end of planned therapy with the same modality used during initial staging
- PET as a marker of treatment response has been shown not to be predictive of patient outcomes in GCT and should not be approved
  - Suspicious lesions seen on conventional imaging should be biopsied to confirm active disease
  - Alternatively, a short-interval CT study can be approved if the relapse risk is determined to be low by the treating physician and biopsy would cause unnecessary morbidity for the patient
**Pediatric GCT Surveillance Imaging:**

The primary method of surveillance in pediatric GCT is frequent assessment of serum tumor markers

- CT Chest/Abdomen/Pelvis with contrast (CPT® 71260 and CPT® 74177) should be approved for any clinically significant rise in tumor markers or symptoms suggesting recurrent disease
- CT Abdomen/Pelvis with contrast (CPT® 74177) can be approved every 3 months for 1 year then every 6 months for 1 year after completion of all therapy for all patients
- For stage I patients treated with surgery only:
  - Chest X-ray (CXR) should be completed every 3 months for 1 year then every 6 months for 1 year after completion of all therapy, then annually until 5 years from the end of therapy
    - CT Chest is only indicated to evaluate abnormal CXR findings
- For stage II-IV patients:
  - CT Chest with contrast (CPT® 71260) should be completed every 3 months for 1 year then every 6 months for 1 year after completion of all therapy
  - Surveillance after 24 months should use CXR
- Patients with brain or bone metastases should have surveillance imaging on the same schedule as the primary site imaging with the same modality used during initial staging.
References – PEDONC-10

## PEDONC-11: Pediatric Liver Tumors

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**PEDONC-11.1: General Remarks**

**Note:** Some payors consider PET imaging to be experimental for the treatment of hepatobiliary tumors, and those coverage policies may supersede the recommendations for PET imaging in this section.

Pediatric liver tumors primarily include hepatoblastoma and hepatocellular carcinoma, but hepatic germ cell tumors and primary hepatic sarcomas occur with some frequency. Tumor markers are useful for initial evaluation as well as treatment response, particularly in hepatoblastoma.

- Primary hepatic germ cell tumors should follow imaging guidelines in: **PEDONC-10: Pediatric Germ Cell Tumors**.
- Primary hepatic sarcomas should follow imaging guidelines in: **PEDONC-8.3: Non-Rhabdomyosarcoma Soft Tissue Sarcomas**.
- Imaging requests relating to liver transplant surgery and surveillance should follow guidelines in section **AB-42: Transplant (Liver)**.

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End of PEDONC-11.1
PEDONC-11.2: Hepatoblastoma

Hepatoblastoma Initial Staging:
Most suspected liver tumors will have ultrasound and tumor markers (AFP, β-HCG, CEA) as initial evaluation.

- Ultrasound may be approved even after MRI or CT imaging in order to allow evaluation for tumor thrombus
- Once a primary liver mass is discovered, definitive imaging is indicated prior to histologic diagnosis, and may involve any of the following:
  - CT Abdomen/Pelvis with contrast (CPT® 74177)
  - Noncontrast imaging is not indicated due to the increased radiation exposure and limited additive benefit
  - MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197)
  - Some tumors may require both MRI and CT during initial evaluation
  - MRA (CPT® 74185) or CTA (CPT® 74175) Abdomen are often indicated to evaluate vascular invasion
- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated in the initial workup of all pediatric liver tumors and should be completed prior to anesthesia exposure if possible
- MRI Brain without and with contrast (CPT® 70553) can be approved only for patients with symptoms suggesting CNS metastases
- Bone scan (See PEDONC-1.3: Modality General Considerations) should be used for initial evaluation of bony metastases only in patients with systemic symptoms or bone pain
- There has been no published evidence to date supporting the routine use of PET/CT imaging in the evaluation of pediatric hepatoblastoma
  - PET/CT should only be considered in very rare circumstances for preoperative planning when MRI and CT scans are insufficient for surgical decision making.
  - PET/CT should not be approved in lieu of biopsy of suspicious lesions
  - These requests will be forwarded for Medical Director review.
Hepatoblastoma Treatment Response:

Patients with localized hepatoblastoma of pure fetal histology are often cured with surgery alone and do not receive adjuvant therapy. These patients should be imaged using surveillance guidelines after surgery is completed.

Patients receiving adjuvant chemotherapy are usually treated with 2 to 8 cycles of combination chemotherapy. Tumor marker decrease is important in response assessment but does not eliminate the need for advanced imaging in patients with unresected hepatoblastoma.

- For patients with disease not completely resected at initial diagnosis, the following can be approved every 2 cycles (~6 weeks) and at the end of planned therapy for all patients:
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250)
  - CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197)
    - While the majority of patients will require abdomen and pelvis imaging at all time points, the pelvis imaging may be omitted at the discretion of the ordering physician based on the patient’s specific clinical situation
    - MRA (CPT® 74185) or CTA (CPT® 74175) Abdomen are often indicated to evaluate vascular invasion
  - Imaging of any metastatic sites with the same modality used during initial staging
- Imaging may be indicated more frequently to assess for surgical resectability in patients who have received more than 4 cycles of chemotherapy.
- Abdominal ultrasound is indicated if tumor thrombus was detected at initial diagnosis
  - If no tumor thrombus was present, continued ultrasound evaluations are not indicated without a specific reason documented in the clinical records
- PET/CT should only be considered in very rare circumstances for preoperative planning when MRI and CT scans are insufficient for surgical decision making.
  - PET/CT should not be approved in lieu of biopsy of suspicious lesions.
  - These requests will be forwarded for Medical Director review.
Hepatoblastoma Surveillance Imaging:

The primary method of surveillance in hepatoblastoma is frequent assessment of serum tumor markers (primarily AFP).

- No specific imaging is indicated for surveillance in patients with an AFP of > 100 ng/ml at diagnosis or recurrence.
  - CT Chest and Abdomen with contrast (CPT® 71260 and CPT® 74160) can be approved for any clinically significant rise in tumor markers or symptoms suggesting recurrent disease.
- For patients with AFP ≤ 100 ng/ml at diagnosis or recurrence, the following imaging is appropriate:
  - CT Abdomen with contrast (CPT® 74160) should be completed every 3 months for 2 years then every 4 months for 2 years after completion of all therapy.
  - Chest X-ray or CT Chest with contrast (CPT® 71260) should be completed every 3 months for 2 years then every 4 months for 2 years after completion of all therapy.
  - Patients with brain or bone metastases should have surveillance imaging on the same schedule as the primary site imaging with the same modality used during initial staging.
- PET/CT has no documented role in the surveillance evaluation of pediatric hepatoblastoma.
**PEDONC-11.3: Pediatric Hepatocellular Carcinoma**

**Pediatric HCC Initial Staging:**

Most suspected liver tumors will have ultrasound and tumor markers (AFP, β-HCG, CEA) as initial evaluation.

- Ultrasound may be approved even after MRI or CT imaging in order to allow evaluation for tumor thrombus.
- Once a primary liver mass is discovered, definitive imaging is indicated prior to histologic diagnosis, and may involve any of the following:
  - CT Abdomen/Pelvis with contrast (CPT® 74177)
  - MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197)
  - Some tumors may require both MRI and CT during initial evaluation
  - MRA (CPT® 74185) or CTA (CPT® 74175) Abdomen are often indicated to evaluate vascular invasion
- CT Chest with (CPT® 71260) or without contrast (CPT® 71250) is indicated in the initial workup of all pediatric liver tumors and should be completed prior to anesthesia exposure if possible
- MRI Brain without and with contrast (CPT® 70553) can be approved only for patients with symptoms suggesting CNS metastases
- Nuclear bone scan (See PEDONC-1.3: Modality General Considerations) should be used for initial evaluation of bony metastases only in patients with systemic symptoms or bone pain
- PET/CT should only be considered in very rare circumstances for preoperative planning when MRI and CT are insufficient for surgical decision making.
  - PET/CT should not be approved in lieu of biopsy of suspicious lesions
  - These requests require Medical Director review.
**Pediatric HCC Treatment Response:**

The majority of hepatocellular carcinoma patients are treated with surgery alone and do not receive adjuvant therapy. These patients should be imaged using surveillance guidelines after surgery is completed.

- For patients with disease not completely resected at initial diagnosis, the following can be approved every 2 cycles (~6 weeks) and at the end of planned therapy for all patients:
  - CT Chest with (CPT® 71260) or without contrast (CPT® 71250)
  - CT Abdomen/Pelvis with contrast (CPT® 74177) or MRI Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197)
    - While the majority of patients will require abdomen and pelvis imaging at all time points, the pelvis imaging may be omitted at the discretion of the ordering physician based on the patient’s specific clinical situation
    - MRA (CPT® 74185) or CTA (CPT® 74175) Abdomen are often indicated to evaluate vascular invasion
  - Imaging of any metastatic sites with the same modality used during initial staging

- Abdominal ultrasound is indicated if tumor thrombus was detected at initial diagnosis
- If no tumor thrombus was present, continued ultrasound evaluations are not indicated without a specific reason documented in the clinical records

- PET/CT should only be considered in very rare circumstances for preoperative planning when MRI and CT scans are insufficient for surgical decision making.
- PET/CT should not be approved in lieu of biopsy of suspicious lesions
- These requests will be forwarded for Medical Director review.

**Pediatric HCC Surveillance Imaging:**

- CT Abdomen with contrast (CPT® 74160) can be completed every 3 months for 1 year then every 6 months for 1 year, then annually for 3 years after completion of all therapy
- Chest X-ray or CT Chest with contrast (CPT® 71260) should be every 3 months for 1 year then every 6 months for 1 year, then annually for 3 years after completion of all therapy
- Patients with brain or bone metastases should have surveillance imaging on the same schedule as the primary site imaging with the same modality used during initial staging.
- PET/CT has no documented role in the surveillance evaluation of pediatric hepatocellular carcinoma
References – PEDONC-11


PEDONC-12: Retinoblastoma

PEDONC-12.1: General Remarks 144
PEDONC-12.2: Retinoblastoma Imaging 145
PEDONC-12.1: General Remarks

Retinoblastoma is primarily a disease of the infant and young child, and presents with leukocoria (loss of red reflex).

Detailed evaluation by a physician with significant training and/or experience in retinoblastoma (most commonly a pediatric ophthalmologist or pediatric oncologist) is indicated prior to considering advanced imaging.

Retinoblastoma can be unilateral, bilateral, or trilateral (involving the pineal gland). Extraocular spread of retinoblastoma is rare and generally confined to the brain.
PEDONC-12.2: Retinoblastoma Imaging

Retinoblastoma Initial Staging

- MRI Orbits (CPT® 70543) and Brain (CPT® 70553) without and with contrast can be approved in the initial workup of all patients with retinoblastoma
  - Brain imaging may be omitted or deferred at the discretion of the treating ophthalmologist or oncologist
- Spinal MRI without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) may be approved if there is evidence of CNS metastasis on:
  - Ophthalmologic exam
  - MRI Brain
  - Lumbar CSF cytology
- CT should generally be avoided in retinoblastoma patients under one year of age or with family history of retinoblastoma due to substantially increased risks for secondary malignancy
  - CT of Chest (CPT® 71260) and MRI of Abdomen and Pelvis without and with contrast (CPT® 74183 and CPT® 72197) can be approved for patients with clinical symptoms to suggest metastatic disease
- Orbital CT (contrast as requested) and orbital ultrasound can be approved if ordered by the treating ophthalmologist for a specified indication
- Nuclear bone scan (See PEDONC-1.3: Modality General Considerations) is the preferred imaging modality for patients with systemic bone pain suggestive of bony metastases
- PET has no documented role in the evaluation of retinoblastoma

Retinoblastoma Treatment Response:

- MRI Orbits (CPT® 70543) and/or Brain (CPT® 70553) can be approved every 2 cycles (~ every 6 weeks) and at the end of planned therapy
- For patients with metastatic disease, imaging of known positive areas using the same modality at initial staging can be approved every 2 cycles (~6 to 8 weeks) and at the end of planned therapy
**Retinoblastoma Surveillance:**

- The primary method of surveillance in retinoblastoma is examination under anesthesia (EUA), although some older children can be sufficiently evaluated by exam without anesthesia (EWA).
  - Surveillance using advanced imaging is generally not indicated for unilateral retinoblastoma after enucleation or exenteration, but can be approved for evaluation of specific clinical concerns.
  - Patients undergoing ocular salvage treatment approaches can have MRI Orbits (CPT® 70543) and Brain (CPT® 70553) approved every 6 months for 2 years following completion of therapy.
- Patients with bilateral retinoblastoma or germline mutation in RB1 are at increased risk for subsequent pineoblastoma, so MRI Brain without and with contrast (CPT® 70553) can be approved every 6 months for 5 years for the time of diagnosis with retinoblastoma.
  - Routine MRI follow up for pineal disease is not currently supported by evidence in unilateral retinoblastoma patients without germline RB1 mutations.

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**References – PEDONC-12**

PEDONC-13: Pediatric Nasopharyngeal Carcinoma

PEDONC-13.1: General Remarks 148
PEDONC-13.2: Pediatric NPC Imaging 148
PEDONC-13.1: General Remarks

Pediatric nasopharyngeal carcinoma (NPC) is rare in comparison to adult NPC but is responsible for up to 50% of nasopharyngeal cancers in children and has higher rates of aggressive type III EBV-associated histology than adult NPC.

Standard upfront treatment in pediatric NPC consists of 3 to 4 cycles of neoadjuvant chemotherapy followed by definitive chemoradiotherapy. Rare patients with lower stage disease may be treated with radiotherapy alone.

PEDONC-13.2: Pediatric NPC Imaging

Pediatric NPC Initial Staging:

Quantitative EBV DNA PCR should be measured at initial diagnosis, as it can serve as an effective tumor marker if elevated at initial diagnosis.

- MRI Brain without and with contrast (CPT® 70553) and MRI Neck without and with contrast (CPT® 70543) is indicated in the initial staging of all pediatric NPC patients
  - CT Head without and with contrast (CPT® 70470), CT Maxillofacial without and with contrast (CPT® 70488) and/or CT Neck with contrast (CPT® 70491) can be approved for patients with documented contraindication to MRI imaging (avoidance of sedation should not be the sole reason)
  - Skull base invasion is common in pediatric NPC and has a dramatic impact on prognosis, and is more easily recognized on MRI imaging
- CT Chest with contrast (CPT® 71260) is indicated in initial staging of all patients
- Whole body PET/CT (CPT® 78816) is approvable after histologic confirmation of NPC to evaluate for distant bony metastases
  - Bone scan (See PEDONC-1.3: Modality General Considerations) can be used for patients when PET/CT is unavailable
**Pediatric NPC Treatment Response:**

- MRI Brain without and with contrast (CPT® 70553) and MRI Neck without and with contrast (CPT® 70543) are indicated for response assessment at the following time points:
  - Following completion of neoadjuvant chemotherapy
  - Following completion of chemoradiotherapy
- CT Chest with contrast (CPT® 71260) and whole body PET/CT (CPT® 78816) or bone scan (See PEDONC-1.3: Modality General Considerations) are indicated at the following time points:
  - Following completion of neoadjuvant chemotherapy only if positive at initial diagnosis
  - Following completion of chemoradiotherapy
- PET is generally not indicated during active treatment for recurrent pediatric cancer. In rare circumstances, PET may be appropriate when results are likely to result in a treatment change for the patient, including a change from active treatment to surveillance. These requests will be forwarded for Medical Director review.

**Pediatric NPC Surveillance:**

- MRI Brain without and with contrast (CPT® 70553) and MRI Neck without and with contrast (CPT® 70543) are indicated every 3 months for 1 year, then every 6 months for 2 years after completion of all planned therapy
- CT Chest with contrast (CPT® 71260) is indicated every 3 months for 1 year, then every 6 months for 2 years after completion of all planned therapy
- Whole body PET/CT (CPT® 78816) or bone scan (See PEDONC-1.3: Modality General Considerations) are not indicated for routine surveillance in asymptomatic patients but can be approved in the following situations:
  - Clarification of specified inconclusive findings seen on conventional imaging (should not replace biopsy)
  - Restaging to identify sites of disease when EBV PCR levels are abnormally high and conventional imaging is negative
  - Restaging after histologically confirmed recurrence of NPC
  - These requests will be forwarded for Medical Director review.

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End of PEDONC-13.2
References – PEDONC-13


# PEDONC-14: Pediatric Adrenocortical Carcinoma

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PEDONC-14.1: General Remarks
Pediatric Adrenocortical Carcinoma (ACC) is rare, with fewer than 25 cases diagnosed each year. Most patients are diagnosed because of virilizing symptoms or detection on screening imaging recommended for specified cancer predisposition syndromes. See: PEDONC-2: Cancer Predisposition Syndromes & Screening Strategies

PEDONC-14.2: Pediatric ACC Imaging

**Pediatric ACC Initial Staging:**
- CT Abdomen without and with contrast (CPT® 74170) or MRI Abdomen without and with contrast (CPT® 74183) is indicated in the initial staging of all pediatric ACC patients
- CT Chest with contrast (CPT® 71260) is indicated in initial staging of all patients
- Nuclear bone scan (See PEDONC-1.3: Modality General Considerations) is indicated to evaluate for bony metastases in all patients at initial diagnosis
- PET has no documented role in the evaluation and treatment of pediatric ACC.

**Pediatric ACC Treatment Response:**
The majority of ACC patients are treated with surgery alone and do not receive adjuvant therapy. These patients should be imaged using surveillance guidelines after surgery is completed.
- For patients treated with chemotherapy, CT Abdomen without and with contrast (CPT® 74170) or MRI Abdomen without and with contrast (CPT®74183) is indicated for response assessment every 2 cycles (~6 weeks) during chemotherapy and following completion of all planned chemotherapy
- CT Chest with contrast (CPT® 71260) is indicated every 2 cycles (~6 weeks) during chemotherapy and following completion of all planned chemotherapy
- Nuclear bone scan (See PEDONC-1.3: Modality General Considerations) is indicated every 2 cycles (~6 weeks) during chemotherapy only if positive for distant metastases at initial diagnosis, and following completion of chemotherapy

**Pediatric ACC Surveillance:**
- CT Abdomen without and with contrast (CPT® 74170) or MRI Abdomen without and with contrast (CPT® 74183) is indicated every 3 months for 2 years, then every 6 months for 3 years after completion of all planned therapy
- Surveillance CT Chest is not indicated for patients with localized disease at diagnosis
- For patients with metastatic ACC, CT Chest with contrast (CPT® 71260) is indicated every 3 months for 2 years, then every 6 months for 3 years after completion of all planned therapy

End of PEDONC-14.2
References – PEDONC-14


PEDONC-15: Pediatric Melanoma and Other Skin Cancers

Pediatric melanoma is historically rare, but has a steadily rising incidence. Staging is assigned using the American Joint Committee on Cancer (AJCC) staging for adult melanoma.

Non-melanoma skin cancers are extremely rare in pediatric patients and established age-specific guidelines for management of these tumors do not exist.

Imaging guidelines and treatment approaches are consistent with those used for adults with melanoma and other skin cancers, and these patients should follow the imaging guidelines in section ONC-5: Melanomas and Other Skin Cancers.

References – PEDONC-15

The majority of pediatric salivary gland tumors arise in the parotid gland. Approximately 10 to 15% of tumors arise in the submandibular, sublingual, or minor salivary glands. Roughly 75% of pediatric salivary gland tumors are benign, most commonly pleomorphic adenoma.

The most common malignant tumors occurring in the salivary glands are mucoepidermoid carcinoma, adenoid cystic carcinoma, acinic cell carcinoma, undifferentiated carcinoma, and rarely adenocarcinoma.

American Joint Committee on Cancer (AJCC) staging is used for pediatric as well as adult salivary gland tumors.

Imaging guidelines for malignant pediatric salivary gland tumors are consistent with those used for adults with salivary gland tumors, and these patients should follow the imaging guidelines in section ONC-4: Salivary Gland Cancers.

References – PEDONC-16
PEDONC-17: Pediatric Breast Masses

Less than 1% of pediatric breast lesions are malignant, and advanced imaging is generally not recommended without histological confirmation of malignancy.

- Mammography has limited utility in pediatric breast mass evaluation due to the high mammographic breast density in this age group, and the risk of the radiation exposure outweighs the benefit of this modality.
- BI-RADS classification may overstate the risk of malignancy or need for biopsy in pediatric patients.
- Ultrasound (CPT® 76641 and CPT® 76642) is the primary modality used for evaluation of pediatric breast masses.
- MRI has very limited utility in evaluation of pediatric breast masses prior to biopsy, but may be indicated in rare cases for surgical planning when ultrasound is non-diagnostic.
  - All advanced imaging requests for pediatric breast masses should be forwarded for Medical Director review.

References – PEDONC-17

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**PEDONC-18.1: General Remarks**

The majority of histiocytic disorders occurring in the pediatric population are either Langerhans Cell Histiocytosis (LCH) or Hemophagocytic Lymphohistiocytosis (HLH).

The Non-Langerhans cell histiocytoses encompass a variety of diseases, and have limited imaging considerations except as specified later in this section.
**PEDONC-18.2: Langerhans Cell Histiocytosis (LCH)**

Includes a heterogeneous group of disorders formerly known by other names, including histiocytosis X, eosinophilic granuloma, Letterer-Siwe Disease, Hand-Schuller-Christian Disease, and diffuse reticuloendotheliosis

Most common sites of involvement are skin, bones, liver, lung, and pituitary, though other sites are possible.

**LCH Initial Imaging Studies:**

- **For all patients:**
  - Chest X-ray (CXR)
  - Abdominal ultrasound (CPT® 76700)
  - Skeletal survey
    - PET should not be used to replace skeletal survey in LCH
- **MRI Brain without and with contrast (CPT® 70553) for any of the following:**
  - Headaches or visual or neurologic disturbances
  - Polyuria/polydipsia or other endocrine abnormalities
  - Skull or craniofacial (including jaw) bone involvement
  - Otorrhea or hearing loss (CT Temporal Bone may be substituted if requested)
  - Other signs or symptoms suggesting intracranial involvement, including neurodegeneration syndrome
- **CT Chest with (CPT® 71260) or without contrast (CPT® 71250) for any of the following:**
  - Abnormal CXR
  - Symptoms of pulmonary involvement and normal CXR
- **MRI Abdomen without and with contrast (CPT® 74183) for any of the following:**
  - Elevated liver function tests (usually > 5x upper limit of normal)
  - Abnormalities seen on abdominal ultrasound
  - CT Abdomen with contrast (CPT® 74160) can be substituted if requested by ordering physician to avoid general anesthesia
- **MRI Spine without and with contrast (Cervical-CPT® 72156, Thoracic-CPT® 72157, Lumbar-CPT® 72158) for any of the following:**
  - Vertebral lesions seen on skeletal survey
  - Clinical symptoms (including back pain) suggesting spinal involvement and negative skeletal survey
- **Whole body PET/CT (CPT® 78816) for any of the following:**
  - Multifocal bone involvement seen on skeletal survey
  - Bone pain and negative skeletal survey
  - Other clinical symptoms suggesting multisite disease
**LCH Treatment Response:**

Patients with localized or single site disease are often treated only with local therapies or observed, and should be imaged according to surveillance guidelines.

- Patients receiving systemic therapy will usually undergo treatment for ~12 months. Treatment response is assessed using any modalities showing disease at initial diagnosis after ~6 weeks of treatment.
  - Those with persistent measurable disease will usually be evaluated again after week 12 of therapy
    - Once PET/CT shows no remaining FDG-avid lesions, additional PET imaging is not indicated
    - As a general rule, both PET/CT and CT with contrast or MRI without and with contrast should not be approved for simultaneous treatment response evaluation without specific documentation showing that both are necessary
- Following the initial phase, patients can have treatment response evaluation every ~3 months while receiving active treatment.
  - Shorter interval imaging can be approved for documented signs or symptoms concerning for disease progression
- All patients should have the following studies at the end of planned therapy:
  - Chest X-ray (CXR)
  - Abdominal ultrasound (CPT® 76700)
  - Skeletal survey
  - Repeat of all additional imaging studies positive at initial workup (except PET)
- PET is generally not indicated during active treatment for recurrent pediatric cancer. In rare circumstances, PET may be appropriate when results are likely to result in a treatment change for the patient, including a change from active treatment to surveillance. These requests will be forwarded for Medical Director review.
LCH Surveillance Imaging:

Surveillance imaging is determined by areas of disease involvement.

- Bone involvement
  - Plain x-ray of involved bony areas at 6 weeks, then at 3 and 6 months after completion of therapy
  - Additional films are not necessary unless symptoms suggest new or recurrent disease
  - PET is not indicated for surveillance, but can be considered to evaluate patients with recurrent disease
  - Skull or craniofacial (including jaw) bone involvement at diagnosis are at higher risk for CNS recurrence, and should be imaged according to CNS involvement section below

- Pulmonary involvement
  - CXR every 6 months after completion of therapy
    - CT Chest with (CPT® 71260) or without contrast (CPT® 71250) can be approved for new abnormalities on CXR or new pulmonary symptoms with a negative CXR

- CNS involvement
  - CNS LCH has a particularly high rate of refractory and recurrent disease, and requires longer imaging surveillance
  - MRI Brain without and with contrast (CPT® 70553) is indicated for patients with previously documented measurable intracranial lesions at 6 weeks, 3 months, and 6 months after completion of all therapy.
    - If negative at that time, continued surveillance is indicated at 1, 2, 4, 7, and 10 years after completion of all planned therapy
    - If residual measurable intracranial lesions are present at 6 months, imaging can be repeated every 3 months until negative or unchanged on two consecutive studies, at which time the schedule in the previous bullet should begin
  - MRI Brain without and with contrast (CPT® 70553) is indicated for patients with documented hypothalamic-pituitary dysfunction at 1, 2, 4, 7, and 10 years after completion of all planned therapy
  - Intraspinal lesions are rare, but should be imaged according to the same guidelines as brain imaging using MRI without and with contrast of all involved spine levels

- Liver involvement
  - Persistent liver involvement is rare, and imaging after completion of LCH therapy will be highly individualized depending on degree of liver dysfunction and plans for supportive therapy or liver transplant
  - Most patients with liver involvement will receive surveillance Abdominal ultrasound (CPT® 76700) every 6 months
PEDONC-18.3: Hemophagocytic Lymphohistiocytosis (HLH)

Advanced imaging requests for HLH should be forwarded for Medical Director review. There are no standard imaging studies required for the diagnosis and initial evaluation of HLH. Advanced imaging studies may be necessary to assess organ dysfunction as HLH commonly affects the liver, spleen, and bone marrow, and less commonly the kidneys, lungs, and brain.

- Common studies that may be indicated in the initial evaluation of HLH include:
  - Abdominal ultrasound (CPT® 76700)
  - CT Abdomen and/or Pelvis (contrast as requested)
  - MRI Abdomen (CPT® 74183) and/or Pelvis (CPT® 72197) without and with contrast
  - CXR
  - CT Chest with contrast (CPT® 71260)
  - MRI Brain without and with contrast (CPT® 70553)

It is not required to perform ultrasound or plain film in a stepwise fashion if CT or MRI is planned as patients with HLH can deteriorate rapidly.

- There is no established standard role for PET in the diagnosis or treatment response evaluation of HLH
  - Secondary HLH is very difficult to treat if the primary cause is not concurrently treated
  - In these cases, if conventional imaging has been completed and is unrevealing, whole body PET/CT (CPT® 78816) can be considered for the purpose of identifying a site for tissue diagnosis of a primary source of infection or malignancy
  - If a malignancy is identified as the inciting factor for HLH, additional imaging decisions for that malignancy should be based on the appropriate diagnosis-specific guidelines

End of PEDONC-18.3
PEDONC-18.4: Non-Langerhans Cell Histiocytoses

Includes diagnoses such as juvenile xanthogranuloma (JXG), sinus histiocytosis with lymphadenopathy (Rosai-Dorfman Disease, RDD), and Erdheim-Chester Disease (ECD).

In general, these are localized cutaneous or nodal disease without need for regular advanced imaging, but important exceptions are listed in this section.

**Juvenile Xanthogranuloma (JXG):**

- Generally involves only skin or cervical nodes, and involutes spontaneously, imaging of involved nodal areas may be appropriate using CT with contrast of appropriate area
- Systemic JXG is associated with multi-organ involvement and imaging studies may include:
  - MRI Brain (CPT® 70553) and/or Orbits (CPT® 70543) without and with contrast
  - CT Neck (CPT® 70491), Chest (CPT® 71260), and/or Abdomen (CPT® 74160) with contrast
- There is no established role for PET in the diagnosis or treatment of JXG

**Rosai-Dorfman Disease (RDD):**

Characterized by bulky adenopathy (usually cervical) with frequent systemic involvement

Appropriate imaging studies may include:

- MRI Brain (CPT® 70553) and/or Orbits (CPT® 70543) without and with contrast
- Nuclear bone scan (See PEDONC-1.3: Modality General Considerations)
- CT Neck (CPT® 70491), Chest (CPT® 71260) and/or Abdomen/Pelvis (CPT® 74177) with contrast
- There is no established role for PET in the diagnosis or treatment of RDD, but whole body PET/CT (CPT® 78816) may be approved if PET/CT will provide critical information for major treatment decision making that cannot be obtained using conventional imaging or biopsy.
  - Because of the paucity of evidence for PET in RDD, PET/CT should not be used to replace tissue confirmation for any clinical scenario in RDD.
  - These requests will be forwarded for Medical Director review.
- There is no established role for routine surveillance imaging of asymptomatic patients after treatment for RDD, but CT with contrast can be approved for evaluation of new or worsening clinical symptoms suggesting recurrent disease
**Erdheim-Chester Disease (ECD):**
An aggressive histiocytic disorder with overall poor prognosis that is characterized by long bone involvement with frequent spread to multiple organs

**ECD Initial Imaging Studies:**
Appropriate imaging studies at initial diagnosis may include:
- MRI Brain (CPT® 70553) and/or Orbits (CPT® 70543) without and with contrast
- Nuclear bone scan (See PEDONC-1.3: Modality General Considerations)
- Whole body PET/CT (CPT® 78816)
- CT Neck (CPT® 70491), Chest (CPT® 71260) and/or Abdomen/Pelvis (CPT® 74177) with contrast
- CTA or MRA of Chest (CPT® 72175 or CPT® 71555) or Abdomen (CPT® 74175 or CPT® 74185) to evaluate vascular tree involvement
- Cardiac MRI without and with contrast (CPT® 75561)

**ECD Treatment Response:**
- Most patients will receive systemic therapy. Treatment response imaging can be approved every 3 months during active treatment using any modalities showing disease at initial diagnosis, including PET/CT.
  - Once PET/CT shows no remaining FDG-avid lesions, additional PET imaging is not indicated unless conventional imaging studies are inconclusive and acute treatment decisions will be made based on PET results. These requests will be forwarded for Medical Director review.

**ECD Surveillance Imaging:**
- Surveillance imaging can be approved every 3 months for the first year after completion of treatment, then every 6 months using any modalities showing disease at initial diagnosis.
- PET/CT is not supported for routine surveillance of ECD, but can be approved if conventional imaging is inconclusive for suspected recurrence. These requests will be forwarded for Medical Director review.
References – PEDONC-18


### PEDONC-19: Long Term Pediatric Cancer Survivors

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**PEDONC-19.1: General Remarks**

This section applies to patients who have passed the end of the surveillance imaging period for their specific cancer, or 5 years after completion of therapy, whichever occurs first.

As these are long term survivors, many patients falling under this guideline section will have reached adult age. However, these guidelines relate specifically to late effects of childhood cancer treatment and should be applied to all long term childhood cancer survivors regardless of current age.

The children’s Oncology group has published comprehensive guidelines for the management of long-term childhood cancer survivors, and these are available at: [http://www.survivorshipguidelines.org](http://www.survivorshipguidelines.org).

A summary of cancer treatment should be available for all patients in this category and should generally include, at minimum:

- Type of cancer and stage
- Dates of diagnosis, recurrence, cancer-related surgeries, beginning and end dates of chemotherapy, radiotherapy, and/or stem cell transplant
- Protocol number used for treatment and cumulative chemotherapy drug dose exposures
- Cumulative radiation dose, fraction number, modality, and field exposure

Annual detailed history and complete physical examination is a critical component of cancer survivorship care and along with laboratory testing serves as the primary method of screening for the majority of late effects.

- Advanced imaging for asymptomatic screening is not routinely indicated except as specified in this section.
**PEDONC-19.2: Cardiotoxicity and Echocardiography**

Exposure to cardiotoxic anthracycline chemotherapy agents is common in pediatric Oncology due to the high success rate of this drug class in the treatment of pediatric cancers. Screening echocardiography (CPT® 93306, CPT® 93307, or CPT® 93308) for life is indicated after exposure to anthracycline chemotherapy or cardiac exposure to radiotherapy.

**Drugs include the following:**
- Doxorubicin
- Daunorubicin
- Idarubicin
- Epirubicin
- Mitoxantrone

Cardiac risk is due to the age of the patient at the time of administration and the cumulative drug exposure expressed as doxorubicin equivalent mg/m².

- **Patients age < 1 year** at time of first exposure:
  - Echocardiography *every year* for any cardiac radiotherapy exposure or ≥ 200 mg/m² cumulative doxorubicin equivalent exposure.
  - Echocardiography *every 2 years* for < 200 mg/m² cumulative doxorubicin equivalent exposure and no cardiac radiotherapy exposure.

- **Patients ages 1-4 years** at time of first exposure:
  - Echocardiography *every year* for any cardiac radiotherapy exposure or ≥ 300 mg/m² cumulative doxorubicin equivalent exposure
  - Echocardiography *every 2 years* for 100 to 300 mg/m² cumulative doxorubicin equivalent exposure and no cardiac radiotherapy exposure
  - Echocardiography *every 5 years* for < 100 mg/m² cumulative doxorubicin equivalent exposure and no cardiac radiotherapy exposure

- **Patients age ≥ 5 years** at time of first exposure:
  - Echocardiography *every year* for ≥ 300 mg/m² cumulative doxorubicin equivalent exposure regardless of cardiac radiotherapy exposure
  - Echocardiography *every 2 years* for 200 to 300 mg/m² cumulative doxorubicin equivalent exposure and no cardiac radiotherapy exposure
  - Echocardiography *every 2 years* for < 300 mg/m² cumulative doxorubicin equivalent exposure and cardiac radiotherapy exposure
  - Echocardiography *every 5 years* for < 200 mg/m² cumulative doxorubicin equivalent exposure and no cardiac radiotherapy exposure

- **Patients of any age with abnormal ventricular function:**
  - Echocardiography *every year*

Stress echocardiography is not indicated as a screening study for anthracyclines cardiotoxicity in the absence of coronary artery disease symptoms. See **CD-1.4: Stress Testing with Imaging – Indications** for imaging guidelines.
PEDONC-19.3: Second Malignant Neoplasms (SMN)

SMN—Breast Cancer

Clinical breast exam every 6 months supplemented with:

- Annual Breast MRI (CPT® 77059) and annual mammogram is recommended beginning at age 25 or 8 years after completion of radiotherapy (whichever occurs later) for patients receiving a cumulative radiation exposure of ≥ 20 Gy in the following fields for any pediatric cancer type except Wilms tumor:
  - Chest (thorax)
  - Whole lung
  - Mediastinal
  - Axilla
  - Mini-mantle, mantle, or extended mantle
  - Total (TLI) or subtotal (SLTI) lymphoid irradiation
  - Total body irradiation (TBI)

- Annual breast MRI (CPT® 77059) and annual mammogram is recommended beginning at age 25 or 8 years after completion of radiotherapy (whichever occurs later) for patients receiving ≥ 12 Gy of whole lung radiation for treatment of Wilms tumor

SMN – CNS Tumors

These are associated with radiation exposure to the Brain and with neurofibromatosis.

- Routine surveillance of completely asymptomatic patients with normal neurologic exams is not supported by evidence
- MRI Brain without and with contrast (CPT® 70553) should be approved if requested for any patient with history of Brain radiotherapy and new neurologic symptoms including simple headache
- MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast should be approved if requested for any patient with history of spine radiotherapy and new neurologic symptoms including change in quality of pain
  - MRI Spine can be performed with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) if being performed immediately following a contrast-enhanced MRI Brain
- For patients with history of brain radiotherapy and persistent neurologic symptoms, annual MRI Brain without and with contrast (CPT® 70553) can be approved
- For patients with history of spine radiotherapy and persistent neurologic symptoms, annual MRI Cervical (CPT® 72156), Thoracic (CPT® 72157), and Lumbar spine (CPT® 72158) without and with contrast can be approved
  - MRI Spine can be performed with contrast only (Cervical-CPT® 72142, Thoracic-CPT® 72147, Lumbar-CPT® 72149) if being performed immediately following a contrast-enhanced MRI Brain


**SMN—Colorectal Cancer**

Colonoscopy is recommended every 5 years beginning at age 35 or 10 years after radiation exposure (whichever is later) for patients with ≥ 30 Gy radiation exposure to the following fields:

- Thoracic, Lumbar, Sacral, or Whole Spine
- Extended mantle
- Hepatic, Renal, Spleen, RUQ Or LUQ
- Paraortic or Flank/Hemiabdomen
- Whole Abdomen
- Inverted Y
- Pelvic
- Vaginal
- Prostate or Bladder
- Iliac, Inguinal, Or Femoral
- Total (TLI) or Subtotal (SLTI) Lymphoid Irradiation
- Total Body Irradiation (TBI)

Colonoscopy is also recommended every 5 years beginning at age 35 or 10 years after radiation exposure (whichever is later) for patients with:

- Personal history of ulcerative colitis, GI malignancy, adenomatous polyps, or hepatoblastoma
- Familial polyposis
- Family history of colorectal cancer or polyps in a first degree (parent or sibling) relative

While the American Cancer Society recently added computed tomographic colonography (CTC) (AKA “Virtual Colonoscopy”) as an acceptable option for colorectal cancer screening of average-risk adults, the National Comprehensive Cancer Network and United States Preventive Services Task Force concluded that data was too premature to warrant its use in screening. **Colonoscopy remains the preferred screening modality for survivors at highest risk of colorectal cancer.**
PEDONC-19.4: Osteonecrosis in Long Term Cancer Survivors

Osteonecrosis is associated with chemotherapy and radiation exposure during treatment for ALL, NHL, and allogeneic HSCT in pediatrics. Osteonecrosis occurs primarily in hips, knees, and ankles. Osteoradionecrosis of the jaw can occur in patients receiving radiotherapy to the mandible or maxilla; those receiving ≥ 40 Gy are at highest risk. Although unusual, it can also occur in any bone without symptoms. It is rare in other disease types.

- Plain films of symptomatic areas are indicated prior to advanced imaging.
- Routine bone density screening using DEXA or Quantitative CT screening has not been well normalized in the pediatric population, but imaging can be approved for those with symptoms to suggest bone density issues
  - DEXA or Quantitative CT screening is generally not recommended until age 18 unless a specific intervention will be planned based on the imaging results.
- Serial advanced imaging is not indicated in osteonecrosis without specific documentation regarding how the advanced imaging will change current patient management
  - When advanced imaging is necessary for acute management decisions, MRI without contrast of the affected joint(s) can be approved.
  - Surveillance imaging of asymptomatic patients to detect osteonecrosis has not been shown to impact patient outcomes, and it is not standard to alter treatment based on imaging findings alone without symptoms.
    - Follow up MRI of incidentally discovered osteonecrosis findings in asymptomatic patients has not been shown to impact patient outcomes and is not necessary
- See PEDONC-3.2: Acute Lymphoblastic Leukemia (ALL) for information on imaging osteonecrosis in ALL patients during active treatment.

End of PEDONC-19.4
References – PEDONC-19
# Pediatric Pelvis Imaging Guidelines

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<td>CT Guidance for Placement of Radiation Therapy Fields</td>
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<td>Duplex scan of arterial inflow and venous outflow of abdominal, pelvic,</td>
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## PEDPV-1: General Guidelines

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**PEDPV-1.1: Pediatric Pelvis Imaging Age Considerations**

Many conditions affecting the pelvis in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients who are < 18 years old should be imaged according to the Pediatric Pelvis Imaging Guidelines and patients who are ≥ 18 years should be imaged according to the **Adult Pelvis Imaging Guidelines**, except where directed otherwise by a specific guideline section.

**PEDPV-1.2: Pediatric Pelvis Imaging Appropriate Clinical Evaluation**

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, and appropriate laboratory studies should be performed prior to considering the use of an advanced imaging (CT, MR, Nuclear Medicine) procedure. An exception can be made if the patient is undergoing guideline-supported, scheduled follow-up imaging evaluation.

- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the pelvis is not supported. Advanced imaging of the pelvis should only be approved in patients who have documented active clinical signs or symptoms of disease involving the pelvis.

- Unless otherwise stated in a specific guideline section, repeat imaging studies of the pelvis are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.

**PEDPV-1.3: Pediatric Pelvis Imaging Modality General Considerations**

- Ultrasound
  - Ultrasound should be the initial imaging in most pelvic conditions to rule out those situations that do not require additional advanced imaging.
  - For those patients who do require advanced imaging after ultrasound, ultrasound can be very beneficial in selecting the proper modality, body area, image sequences, and contrast level that will provide the most definitive information for the patient.
  - CPT® codes vary by body area and presence or absence of Doppler imaging and are included in the table at the beginning of this guideline.
  - Transabdominal ultrasound is appropriate in all pediatric patients.
  - Transvaginal (TV) ultrasound is appropriate in pediatric patients who are sexually active or use a tampon and consent to the study. Ultrasound (complete CPT® 76856 or, limited CPT® 76857) should substitute for TV in pediatric patients or non-sexually active adult females.
MR

- MRI of the pelvis is generally performed without and with contrast (CPT® 72197) unless the patient has a documented contraindication to gadolinium or otherwise stated in a specific guideline section.
- Due to the length of time for image acquisition and the need for the patient to lie still, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
  - MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use since the patient already has intravenous access for anesthesia.
  - Recent evidence based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast.
  - The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.
  - If requesting clinicians indicate that a non-contrast study is being requested with specific concern for gadolinium retention, the exam can be approved.
  - If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session.
- The presence of surgical hardware or implanted devices may preclude MRI.
- The selection of best examination may require coordination between the provider and the imaging service.

CT

- CT of the pelvis typically extends from the iliac crest to the upper margin of the sacroiliac joints, and CT of the abdomen and pelvis extends from the dome of the diaphragm through the ischial tuberosities.
  - In general, CT of the pelvis is appropriate when evaluating solid pelvic organs.
  - In general, CT of the Abdomen and pelvis is appropriate when evaluating inflammatory or infections processes, hematuria, or conditions which appear to involve both the abdomen and the pelvis.
  - In some cases, especially in follow-up of a known finding, it may be appropriate to limit the exam to the region of concern to reduce radiation exposure.
- The contrast level in pediatric CT imaging is specific to the clinical indication, as listed in the specific guideline sections.
CT of the pelvis or abdomen and pelvis may be indicated for further evaluation of abnormalities suggested on prior US or MRI Procedures.
- CT may be appropriate without prior MR or US, as indicated in specific sections of these guidelines.
- CT should not be used to replace MRI in an attempt to avoid sedation unless listed as a recommended study in a specific guideline section.
- The selection of best examination may require coordination between the provider and the imaging service.

Nuclear Medicine
- Nuclear medicine studies are rarely used in imaging of the pediatric pelvis, but are indicated in rare circumstances, including the following:
  - Lymph system mapping (CPT® 78195) is indicated for lower extremity lymphedema with recent negative Doppler ultrasound, or a history of Milroy’s disease or prior pelvic lymph node dissection.

The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

References
Abnormal uterine bleeding imaging indications in pediatric patients are very similar to those for adult patients. See PV-2: Abnormal Uterine Bleeding for imaging guidelines.

The causes of vaginal bleeding in children differ from those in adolescents. Vaginal bleeding after the first week or so of life but before menarche is always abnormal and warrants evaluation. Common conditions before normal menarche include vaginal foreign bodies, infections, precocious puberty, and estrogen exposure. After menarche, pregnancy and excessive menstrual bleeding (dysfunction) must be considered.

Pediatric-specific imaging considerations include the following:
- Transabdominal ultrasound is appropriate in all pediatric patients.
- Transvaginal (TV) ultrasound is appropriate in pediatric patients who are sexually active or use a tampon and consent to the study. Transvaginal ultrasound is generally not appropriate in pediatric patients or in patients who have never been sexually active.
- MRI of the pelvis without contrast or without and with contrast (CPT® 72195 or CPT® 72197) is indicated if ultrasound is inconclusive.

Reference
**PEDPV-3: Pelvic Inflammatory Disease (PID)**

- Pelvic inflammatory disease imaging indications in pediatric patients are very similar to those for adult patients. See PV-7: Pelvic Inflammatory Disease (PID) for imaging guidelines.

- Pediatric-specific imaging considerations include the following:
  - Transabdominal ultrasound is appropriate in all pediatric patients.
  - Transvaginal (TV) ultrasound is appropriate in pediatric patients who are sexually active or use a tampon and consent to the study. Transvaginal ultrasound is generally not appropriate in patients who are pre-pubescent or victims of abuse.
  - MRI of the pelvis without contrast (CPT® 72195) or without and with contrast (CPT® 72197) is indicated if US is inconclusive.
  - CT Pelvis with contrast (CPT® 72193) is indicated if MRI is not readily available.

**Reference**

PEDPV-4: Amenorrhea

- Girls with primary amenorrhea and any of the following should be evaluated initially with pelvic ultrasound (CPT® 76856 or CPT® 76857):
  - Amenorrhea is usually primary and refers to absence of menstrual periods by age 16.
    - Normal pubertal development and negative pregnancy test.
    - Transabdominal ultrasound is appropriate in all pediatric patients.
      - Transvaginal (TV) ultrasound is appropriate in pediatric patients who are sexually active or use a tampon and consent to the study. Transvaginal ultrasound (CPT® 76830) can also be approved if requested for better view of genitourinary anomalies in sexually active females.
    - Delayed puberty with follicle-stimulating hormone (FSH) or luteinizing hormone (LH) that is elevated for the patient’s age and Tanner stage.

- MRI Pelvis without contrast or without and with contrast (CPT® 72195 or CPT® 72197) +/- Abdomen (CPT® 74181 or CPT® 74183) without and with contrast are indicated for the following:
  - Evaluation of congenital anomalies of the uterus and/or urinary system identified on abdominal and pelvic ultrasound (CPT® 76700 and CPT® 76856) in order to better define complex anatomy.
  - Preoperative planning in girls with distention of the vagina by fluid (hydrocolpos) or blood (hematocolpos) due to congenital vaginal obstruction.

References
PEDPV-5: Endometriosis

- Endometriosis imaging indications in pediatric patients are very similar to those for adult patients. See PV-6: Endometriosis for imaging guidelines.

- Pediatric-specific imaging considerations include:
  - Transabdominal ultrasound is appropriate in all pediatric patients.
  - Transvaginal (TV) ultrasound is appropriate in pediatric patients who are sexually active or use a tampon and consent to the study. Transvaginal ultrasound is generally not appropriate in patients who are pre-pubescent or have never been sexually active.

Reference
Suspected adnexal mass imaging indications in pediatric patients are very similar to those for adult patients. See **PV-5: Adnexal Mass/Ovarian Cysts** for imaging guidelines. Ultrasound is the first study indicated for evaluation of a suspected adnexal mass.

Pediatric-specific imaging considerations include the following:

- Transabdominal ultrasound is appropriate in all pediatric patients.
- Transvaginal (TV) Ultrasound is appropriate in pediatric patients who are sexually active or use a tampon and consent to the study. Transvaginal ultrasound is generally not appropriate in patients who are pre-pubescent or have never been sexually active.
- Adnexal masses with a solid component in patients, age ≥ 15 years, should be imaged according to guidelines in **PEDONC-10: Pediatric Germ Cell Tumors**.

**Reference**

PEDPV-7: Pelvic Pain/Dyspareunia, Female

Pelvic Pain/Dyspareunia imaging indications in pediatric patients are identical to those for adult patients. See PV-11: Pelvic Pain/Dyspareunia, Female for imaging guidelines.

Reference
PEDPV-8: Polycystic Ovary Syndrome

Polycystic ovary syndrome imaging indications in pediatric patients are identical to those for adult patients. See PV-8: Polycystic Ovary Syndrome for imaging guidelines.

Reference
PEDPV-9: Periurethral Cysts and Urethral Diverticula

- Periurethral cysts and urethral diverticula imaging indications in pediatric patients are identical to those for adult patients. See PV-13: Periurethral Cysts and Urethral Diverticula for imaging guidelines.
PEDPV-10: Fetal MRI

- Fetal MRI indications in pediatric patients are identical to those for adult patients. See PV-15: Fetal MRI for imaging guidelines.
PEDPV-11: Undescended Testis

- Boys with a history of cryptorchidism (undescended testis) have a several-fold risk increase of testicular cancer. It is important to diagnose and treat this condition either by bringing the undescended testis into the scrotum, or resecting the testis.

- Pediatric-specific imaging considerations include the following:
  - Suspected undescended testis is an indication for referral to a surgical subspecialist who should make the decision on necessary imaging studies.
  - The following imaging is indicated for boys with suspected undescended testis based on a recent detailed physical exam.
    - Scrotal ultrasound (CPT® 76870) if testis not palpable in the scrotal sac and there is concern for retractile or inguinal testis,
      - If ultrasound is inconclusive, either of the following may be approved:
        - MRI Abdomen (CPT® 74183) and Pelvis (CPT® 72197) without and with contrast, however MRI has a high false negative rate.
        - CT Abdomen/Pelvis with contrast (CPT® 74177).

References
PEDPV-12: Scrotal Pathology

- Scrotal pathology imaging indications in pediatric patients are very similar to those for adult patients. See PV-20: Scrotal Pathology for imaging guidelines.

- Pediatric-specific imaging considerations include the following:
  - Scrotal US (CPT® 76870) with Doppler (CPT® 93975 or CPT® 93976) is indicated for concerns of testicular torsion.
  - MRI is not typically used for the acute scrotum due to the limited availability of equipment and the long examination time involved. However, MRI of the pelvis without (CPT® 72195) or without and with contrast (CPT® 72197) is indicated if torsion is unlikely on ultrasound and no surgical exploration is planned.
  - Since the acceptance of Doppler US as the primary imaging for evaluation of acute scrotum, scintigraphy is not indicated. The unavailability of nuclear medicine imaging in many practices and its use of ionizing radiation, its poor anatomical details, and the time required for imaging are other limiting factors.

References
PEDPV-13: Penis-Soft Tissue Mass

- Penile soft tissue masses are very rare in pediatric patients, and imaging indications are identical to those for adult patients. See PV-18: Penis – Soft Tissue Mass for imaging guidelines.
Incontinence imaging indications in pediatric patients are very similar to those for adult patients. See PV-22: Incontinence/Pelvic Organ Prolapse for imaging guidelines.

Most often incontinence in children is not due to a medical condition. Several uncommon disorders that can lead to urinary incontinence include a spinal cord defect such as spina bifida, ureteral duplication with ectopic insertion, and overactive bladder or dysfunctional voiding.

No imaging is needed if primary enuresis is suspected; however, imaging evaluation may be warranted if ureteral duplication or overactive bladder or dysfunctional voiding is suspected. The physician should obtain a full medical history and urinalysis before imaging is done.

Radiopharmaceutical urinary bladder residual study (CPT® 78730) is indicated for suspicion of urinary retention and a recent non-diagnostic ultrasound.

Pediatric-specific imaging considerations include the following:

- MRI of the pelvis without and with contrast (CPT® 72197) is indicated if ultrasound is inconclusive or spinal abnormality is suspected.
- CT Pelvis with contrast (CPT® 72193) is approvable if MRI is not readily available.

References
PEDPV-15: Patent Urachus

- Ultrasound of the pelvis (CPT® 76856) is indicated as the initial evaluation for patent urachus.
  - Any of the following are indicated if the ultrasound is inconclusive or insufficient for preoperative planning:
    - MRI Pelvis without contrast (CPT® 72195)
    - MRI Pelvis without and with contrast (CPT® 72197)
    - CT Pelvis with contrast (CPT® 72193)
- Repeat imaging of asymptomatic patients is not generally necessary, but is indicated for the following:
  - New or worsening symptoms
  - Preoperative planning

**Practice Note**
The urachus is a “tube” connecting the fetal bladder to the umbilical cord. It is usually obliterated during fetal growth, but if it remains patent, there can be a complete or partial connection between the bladder and the umbilicus.

Ultrasound has an accuracy greater than 90%.

**References**
# Pediatric Peripheral Nerve Disorders (PND)

## Imaging Guidelines

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PEDPN-1.1: Age Considerations

Many conditions affecting the peripheral nervous system in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

› Patients who are < 18 years old should be imaged according to the Pediatric Peripheral Nerve Disorders Imaging Guidelines, and patients who are ≥ 18 years old should be imaged according to the Adult Peripheral Nerve Disorders Imaging Guidelines, except where directed otherwise by a specific guideline section.

PEDPN-1.2: Appropriate Clinical Evaluation

› A recent (within 60 days) evaluation including a detailed history, physical examination with a thorough neurologic examination, and appropriate laboratory studies should be performed prior to considering advanced imaging (CT, MR, Nuclear Medicine), unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation.

› Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the peripheral nervous system is not supported. Advanced imaging of the peripheral nervous system should only be approved in patients who have documented active clinical signs or symptoms of disease involving the peripheral nervous system.

› Unless otherwise stated in a specific guideline section, repeat imaging studies of the peripheral nervous system are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.

PEDPN-1.3: Modality General Considerations

› MRI
  ♦ MRI without and with contrast is the preferred modality for pediatric peripheral nerve imaging unless otherwise stated in a specific guideline section.
  ♦ Due to the length of time for image acquisition and the need for, the patient to lie still, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
    ▪ MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use since the patient already has intravenous access for anesthesia.
    ■ Recent evidence based literature demonstrates the potential for gadolinium deposition in various organs including the brain after the use of MRI contrast.
    ■ The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is
not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.

- If requesting clinicians indicate that a non-contrast study is being requested with specific concern for gadolinium retention, the exam can be approved.
- If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session.

- **CT**
  - CT is rarely used in the evaluation of pediatric peripheral nerve disorders. See specific guideline sections for indications.

- **Ultrasound**
  - Ultrasound is rarely used in the evaluation of pediatric peripheral nerve disorders. See specific guideline sections for indications.

- **Nuclear Medicine**
  - Nuclear medicine studies are not generally indicated in the evaluation of peripheral nerve disorders. See [PEDPN-2: Neurofibromatosis](#) for specific imaging guidelines regarding PET/CT in evaluation of peripheral nerve tumors.

- The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

### References

# PEDPN-2: Neurofibromatosis

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**PEDPN-2: Neurofibromatosis – General Information**

This guideline section includes imaging indications for patients with neurofibromatosis and known benign lesions. For cancer screening guidelines, See **PEDONC-2.3: Neurofibromatosis 1 and 2 (NF1 and NF2)**. For guidelines related to known malignancies in patients with NF1, see the appropriate imaging guideline for the specific cancer type.

**PEDPN-2.1: Neurofibromatosis 1**

- Most cutaneous neurofibromas and deep plexiform neurofibromas do not cause symptoms, and routine surveillance imaging of these lesions has not been shown to improve outcomes.
  - The decision to obtain testing such as imaging studies depends upon the history and physical findings. Clinical evaluation appears to be more useful to detect complications than are screening investigations in asymptomatic patients.
  - The Genetics Committee of the American Academy of Pediatrics have published diagnostic and health supervision guidelines for children with NF1. Surveillance includes:
    - annual physical examination
    - annual ophthalmologic examination in children
    - regular developmental assessment of children
    - MRI for follow-up of clinically suspected tumors and other.

- MRI without and with contrast of a known body area containing a neurofibroma is indicated for any of the following:
  - Every 3 months for treatment response in patients receiving active treatment
  - New or worsening clinical symptoms suggesting progression
  - Preoperative planning

- NF1 patients are more susceptible to damaging effects of ionizing radiation, and CT imaging should only be used for patients who have an absolute contraindication to MRI.

- PET imaging is not supported for PN surveillance in asymptomatic patients at this time as the positive predictive value is only 60 to 65% even in symptomatic patients.

- MRI imaging without and with contrast is appropriate for any clinical symptoms suggestive of change in a known PN in a patient with NF1.

- Although PET imaging has a positive predictive value of only 61 to 63% in NF1 patients with suspected transformation to MPNST, the negative predictive value is high (96 to 99%).
  - PET imaging is indicated for evaluating NF1 patients with clinical symptoms concerning for malignant transformation of a known PN when all of the following conditions exist:
    - Recent MRI is inconclusive regarding transformation or progression.
    - Negative PET will result in a decision to avoid biopsy in a difficult or morbid location.
  - Inconclusive PET findings should lead to biopsy of the concerning lesion.
Repeat PET studies are not indicated due to the poor positive predictive value in this setting.
CT imaging or three-dimensional CT reconstructions may be necessary when surgical treatment of bony lesions is being planned.

PEDPN-2.2: Neurofibromatosis 2

- MRI Brain without and with contrast (CPT® 70553) is indicated for patients with known vestibular schwannomas in the following circumstances:
  - Annual imaging for progression in unresected tumors
  - New or worsening clinical symptoms, including hearing loss
  - Preoperative planning

- Patients with NF2 and known meningioma should be imaged according to guidelines in OCN-2.8: Meningiomas (Intracranial and Intraspinal).

- Patients with NF2 and known ependymoma should be imaged according to guidelines in PEDONC-4.8: Ependymoma.

References


Disorders of the brachial plexus can generally be identified and distinguished from lesions in other locations by clinical, electromyography and nerve conduction (EMG/NCV) examination. If the diagnosis remains unclear, advanced imaging can be helpful as a preoperative study to evaluate the anatomy of brachial plexus lesions which should have already been defined by clinical examination.

- MRI is the preferred modality for imaging the brachial plexus. The goal of imaging is to visualize the entire course of the neural network from the preganglionic to the postganglionic segments.
  - CT is not often useful and should not be used as a substitute for MRI.
  - Unilateral brachial plexus studies should be ordered as MRI upper extremity other than joint without contrast (CPT® 73218) or without and with contrast (CPT® 73220).
  - Bilateral brachial plexus studies should be ordered as MRI Chest without contrast (CPT® 71550) or without and with contrast (CPT® 71552). For upper trunk lesions, MRI Neck without contrast (CPT® 70540) is indicated.
  - It is rare for more than one CPT® code to be necessary to adequately image the brachial plexus area of interest. These requests should be forwarded for medical director review.
  - MRI of the shoulder without contrast (CPT® 73221) or without and with contrast (CPT® 73223) is indicated in infants with brachial plexopathy due to birth trauma if requested for preoperative planning. These patients often have glenohumeral dysplasia and require shoulder surgery.
  - Ultrasound also may be indicated in infants with brachial plexus injury to show the glenoid dysplasia and associated shoulder subluxation.
  - If there is clinical suspicion for cervical nerve root avulsion, MRI Cervical Spine without contrast (CPT® 72141) is indicated.
  - In patients with a known malignancy or post-treatment syndrome, whole body PET/CT (CPT® 78816) may be approved if there is a contraindication to MRI.

References
Gaucher disease is a group of autosomal recessive inborn errors of metabolism characterized by lack of the enzyme acid ß-glucuronidase with destructive ceramide storage in various tissues. Gaucher disease is a treatable disorder (enzyme replacement) in which the liver, spleen, and bone marrow/bones are the most affected organs.

- Three types of Gaucher disease are recognized:
  - **Type I** (non-neuropathic form or adult form): progressive hepatomegaly, splenomegaly, anemia and thrombocytopenia, and marked skeletal involvement; lungs and kidneys may also be involved, but central nervous system is spared
  - **Type II** (acute neuropathic form or infantile form): severe progressive neurological involvement with death by 1 to 2 years of age; hepatomegaly, splenomegaly, is also present (usually evident by 6 months of age)
  - **Type III**: type I with neurological involvement

- MRI without contrast of the lumbar spine (CPT® 72148) and bilateral femurs (CPT® 73718) is indicated to evaluate bone marrow involvement at initial diagnosis.
  - Repeat imaging is indicated every 12 months, to assess treatment response for patients on enzyme replacement therapy or disease progression for patients in surveillance.

- MRI Abdomen without contrast (CPT® 74181) is indicated to assess liver and spleen involvement at initial diagnosis.
  - Repeat imaging is indicated every 12 months, to assess treatment response for patients on enzyme replacement therapy or disease progression for patients in surveillance.

- Pulmonary involvement is less common, but CT Chest without contrast (CPT® 71250) is indicated for patients with new or worsening pulmonary symptoms.
  - For patients with documented pulmonary involvement, repeat imaging is indicated every 12 months, to assess treatment response for patients on enzyme replacement therapy or disease progression for patients in surveillance.

- PET/CT imaging is considered investigational in the evaluation of Gaucher disease. 
  $\text{^{18}F-FDG}$ does not reliably detect Gaucher disease in the marrow, and other isotopes are not yet FDA-approved for clinical use.

**References**


### Pediatric Peripheral Vascular Disease (PVD) Imaging Guidelines

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## Procedure Codes Associated with PVD Imaging

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PEDPVD-1.1: Age Considerations

Many conditions affecting the peripheral vascular system in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients who are < 18 years old should be imaged according to the Pediatric peripheral vascular disease imaging guidelines, and patients who are ≥ 18 years old should be imaged according to the Adult peripheral vascular disease imaging guidelines, except where directed otherwise by a specific guideline section.

PEDPVD-1.2: Imaging Appropriate Clinical Evaluation

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, and appropriate laboratory studies should be performed prior to considering advanced imaging (CT, MR, Nuclear Medicine), unless the patient is undergoing guideline-supported scheduled imaging evaluation.

- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the peripheral vascular system is not supported. Advanced imaging of the peripheral vascular system should only be approved in patients who have documented active clinical signs or symptoms of disease involving the peripheral vascular system.

- Unless otherwise stated in a specific guideline section, repeat imaging studies of the peripheral vascular system are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.

PEDPVD-1.3: Modality General Considerations

- MRI
  - MRI is generally performed without and with contrast unless the patient has a documented contraindication to gadolinium or otherwise stated in a specific guideline section.
  - Due to the length of time for image acquisition and the need for, the patient to lie still, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
    - MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use since the patient already has intravenous access for anesthesia.
    - Recent evidence-based literature demonstrates the potential for gadolinium deposition in various organs including the brain after the use of MRI contrast.
The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.

If requesting clinicians indicate that a non-contrast study is being requested with specific concern for gadolinium retention, the exam can be approved

- If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session.
- The presence of surgical hardware or implanted devices may preclude MRI.
- The selection of best examination may require coordination between the provider and the imaging service.

CT
- CT or CTA may be appropriate for further evaluation of abnormalities suggested on prior US or MRI Procedures.
- CT may be appropriate without prior MR or US, especially in the following (non-exhaustive list of) settings:
  - Lymphatic malformations
  - Vascular abnormalities including vasculitis, thrombosis, narrowing, aneurysm, dissection, and varices.
  - For preoperative planning or assessment of post-operative complications.
- In some cases, especially in follow-up of a known finding, it may be appropriate to limit the exam to the region of concern to reduce radiation exposure.
- CT should not be used to replace MRI in an attempt to avoid sedation unless listed as a recommended study in a specific guideline section.
- The selection of best examination may require coordination between the provider and the imaging service.

Ultrasound
- Ultrasound can be helpful in evaluating arterial, venous, and lymphatic malformations.
- Ultrasound can be limited by the imaging window and the patient body type.
- CPT® codes vary by body area and presence or absence of Doppler imaging and are included in the table at the beginning of this guideline.

Nuclear Medicine
- Nuclear medicine studies are rarely used in the evaluation of peripheral vascular disorders, but are indicated in the following circumstances:
  - Lymphoscintigraphy (CPT® 78195) is indicated for evaluation of lower extremity lymphedema when a recent Doppler ultrasound is negative for valvular insufficiency.
Vascular flow imaging (CPT® 78445) is an obsolete study that has been replaced by MRA, CTA, or Duplex ultrasonography, and is not supported for any indication at this time.

Venous thrombosis imaging (CPT® 78456, CPT® 78457, and CPT® 75458) are obsolete studies that have been replaced by MRA, CTA, or Duplex ultrasonography, and are not supported for any indication at this time.

Radiopharmaceutical nuclear medicine studies (CPT® 78805, CPT® 78806, or CPT® 78807 can be approved for evaluation of the following:
- Mycotic aneurysms
- Vascular graft infection
- Infection of central venous catheter or other indwelling device

The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

References


**PEDPVD-2: Vascular Anomalies**

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**PEDPVD-2.1: General Information**

Vascular and lymphatic malformations encompass a broad variety of conditions and have very heterogeneous natural history and treatment approaches. Lesions can be divided into low flow lesions (lymphatic, capillary and venous malformations), and high flow lesions (arteriovenous malformations and fistulas).

- Patients with aggressive lesions being treated with systemic therapy can have imaging (see specific sections for details regarding modality and contrast level) approved for treatment response every 3 months during active treatment.
- Annual surveillance imaging of known vascular or lymphatic malformations can be approved for body areas where growth could cause significant organ dysfunction or functional impairment.

**PEDPVD-2.2: Lymphatic Malformations**

Lymphatic malformations are composed of dilated lymphatic channels filled with proteinaceous fluid and do not connect to normal lymphatic channels. They are typically soft, non-pulsatile masses with normal overlying skin.

- Ultrasound is indicated as an initial examination for superficial lesions.
  - Large lesion characterization may be limited by ultrasound imaging window.
  - Ultrasound is also limited in evaluating malformation relationship to airway or bony structures.
- MRI without contrast or without and with contrast of the affected body part is indicated for:
  - Lymphatic malformations involving deep tissues
  - Malformations too large to be completely imaged with ultrasound
  - Inconclusive ultrasound findings
  - Preoperative planning
- CT is of limited value in evaluating lymphatic malformations
  - CT with contrast of the affected body part can be approved for lesions with acute enlargement and concerns for compression when MRI is contraindicated.
PEDPVD-2.3: Venous Malformations

Venous malformations are slow-flow lesions characterized by dilated venous spaces and a normal arterial component. They are soft, compressible, non-pulsatile lesions that are usually blue to deep purple in color. Lesions can range from very small to large infiltrating ones. Some may change size with Valsalva.

Venous malformations are usually isolated, but they may be seen in multiple syndromes including Klippel-Trenaunay (KT) syndrome, Blue Rubber Bleb Nevus syndrome (BRBN), Maffucci syndrome, Proteus syndrome, Bannayan-Riley-Ruvalcaba syndrome, Parkes-Weber syndrome and congenital lipomatous overgrowth, vascular malformations, epidermal nevi and scoliosis/skeletal/spinal anomalies (CLOVES) syndrome.

- Ultrasound with Doppler is indicated as an initial examination for superficial lesions.
  - Large lesion characterization may be limited by ultrasound imaging window.
  - Ultrasound is also limited in evaluating malformation relationship to airway or bony structures.

- MRI without contrast or without and with contrast of the affected body part can be approved for venous malformations for preoperative assessment to evaluate the extent of malformation and their relationship to normal structures.

- MRA or CTA has a limited role in evaluating most venous malformations, but may be approved (contrast as requested of the affected body part) if MRI or CT are equivocal and the results will impact acute management decisions.

- CT can also be used to characterize venous malformations and their relationship to normal structures but is generally not as accurate as MRI.
  - CT with contrast of the affected body part can be approved when MRI is inconclusive or contraindicated

PEDPVD-2.4: Capillary Malformations

- Capillary malformations also known as port wine stains are characterized by a collection of small vascular channels in the dermis and generally do not require imaging because the diagnosis is made clinically. However, MR imaging may be required to evaluate occult underlying neurologic structures, since these malformations are associated with encephalocele, spinal dysraphism, or Sturge-Weber syndrome.
PEDPVD-2.5: Arteriovenous Malformations (AVMs) and Fistulas

Arteriovenous malformations are characterized by a network of multiple abnormal vascular channels interposed between enlarged feeding arteries and draining veins. The arteriovenous fistula has a single communication interposed between a feeding artery and a draining vein. The normal capillary bed is absent in both lesions. Both lesions may have an aggressive clinical course and are characterized by a reddish pulsatile mass which has a thrill or bruit. Though often recognized at birth, these lesions may grow and present near adolescence.

- Ultrasound with Doppler is indicated as an initial examination for superficial lesions.
  - Large lesion characterization may be limited by ultrasound imaging window.
  - Ultrasound is also limited in evaluating AVM relationship to airway or bony structures.
- MRI without contrast or without and with contrast of the affected body part is also indicated for evaluation of AVMs, and is useful in evaluating the extent of AVMs and their relationship to normal structures.
- MRA (contrast as requested) of the affected body part can be approved for evaluation and surveillance of known AVMs.
- It is unusual for both MRI and MRA to be necessary for routine treatment response or surveillance imaging of AVMs, but both may be approved for preoperative planning.
- CT and CTA can also be used to characterize AVMs and their relationship to normal structures, but is generally not better than MRI and has associated radiation risks.
  - CT with contrast and/or CTA (contrast as requested) of the affected body part can be approved when MRI and/or MRA is inconclusive or contraindicated.

PEDPVD-2.6: Vascular Tumors

Vascular tumors include a variety of benign, borderline, and malignant tumors, which have variable clinical courses, including Epithelioid hemangioma, Kaposiform hemangioendothelioma, Kaposi sarcoma, Epithelioid hemangioendothelioma and Angiosarcoma of soft tissue.

- Ultrasound with Doppler is indicated as an initial examination for vascular tumors.
  - Large lesion characterization may be limited by ultrasound imaging window.
  - Ultrasound is also limited in evaluating malformation relationship to airway or bony structures.
- MRI without contrast or without and with contrast of the affected body part is also indicated for evaluation of vascular tumors, and is useful in evaluating the extent of arteriovenous malformations and their relationship to normal structures, as well as response to therapy.
- MRA (contrast as requested) of the affected body part can be approved for evaluation and surveillance of known vascular tumors.
It is unusual for both MRI and MRA to be necessary for routine treatment response or surveillance imaging of vascular tumors, but both may be approved for preoperative planning.

CT and CTA can also be used to characterize vascular tumors and their relationship to normal structures, but is generally not better than MRI and has associated radiation risks.

- CT with contrast and/or CTA (contrast as requested) of the affected body part can be approved when MRI and/or MRA is inconclusive or contraindicated.
References


PEDPVD-3: Vasculitis

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**PEDPVD-3.1: General Information**

Systemic vasculitis is much less common in children than in adults, although the diagnostic pathways and treatment options are similar.

- PET/CT is considered investigational for management of pediatric vasculitis at this time.
  - There are limited data suggesting PET may have similar accuracy to MRA in the initial diagnosis of Takayasu arteritis but is not helpful in assessing treatment response and has not been shown to improve patient outcomes to date.

**PEDPVD-3.2: Large Vessel Vasculitis**

Takayasu arteritis is the predominant large vessel vasculitis occurring in children.

- Any of the following is indicated for evaluation of Takayasu arteritis:
  - MRA of the affected body area(s) (contrast as requested)
  - CTA of the affected body area(s) (contrast as requested)
  - Ultrasound with Doppler of the affected body area(s)
  - Patients with aggressive disease being treated with systemic therapy can have imaging (see specific sections for details regarding modality and contrast level) approved for treatment response every 3 months during active treatment.

- Annual surveillance imaging of known involved body areas can be approved to detect progressive vascular damage that may require intervention.

**PEDPVD-3.3: Medium Vessel Vasculitis**

Polyarteritis nodosa and Kawasaki Disease are the primary medium vessel vasculitides occurring in children. See [PEDCD-6: Kawasaki Disease](#) for imaging guidelines for that disease.

- Any of the following is indicated for evaluation of polyarteritis nodosa:
  - MRA of the affected body area(s) (contrast as requested)
  - CTA of the affected body area(s) (contrast as requested)
  - Ultrasound with Doppler of the affected body area(s)

- Patients with aggressive disease being treated with systemic therapy can have imaging (see specific sections for details regarding modality and contrast level) approved for treatment response every 3 months during active treatment.

- Annual surveillance imaging of known involved body areas can be approved to detect progressive vascular damage that may require intervention.

**PEDPVD-3.4: Small Vessel Vasculitis**

- Advanced imaging is not sensitive enough to detect changes in small vessels, and is not indicated for primary assessment of any small vessel vasculitis.

- End-organ damage occurs with several of the small vessel vasculitides, and the following advanced imaging is indicated:
• Granulomatosis with polyangiitis (GPA, formerly known as Wegener’s granulomatosis)
  ▪ CT Sinuses (CPT®70486)
  ▪ CT Chest without contrast (CPT®71250) or with contrast (CPT®71260)
• Eosinophilic granulomatosis with polyangiitis (EGPA, formerly known as Churg-Strauss Syndrome)
  ▪ CT Chest without contrast (CPT®71250) or with contrast (CPT®71260)
• Immune complex associated small-vessel vasculitis [immunoglobulin A–associated vasculitis (IgAV)]
  ▪ Doppler ultrasound of the affected body part (most commonly abdomen)
• These imaging studies are indicated in the following circumstances:
  ▪ New or worsening clinical symptoms affecting the body area requested.
  ▪ Assessment of response to medical therapy when a change in treatment regimen is being considered.
  ▪ Annual imaging to evaluate the extent of disease.

References
### PEDPVD-4: Disorders of the Aorta and Visceral Arteries

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**PEDPVD-4.1: Thoracic Aortic Disease**

- MRA (CPT® 71555) or CTA (CPT® 71275) Chest can be used for screening and follow-up of thoracic aortic abnormalities in patients with Loeys-Dietz syndrome, Marfan syndrome, coarctation of the aorta, Takayasu arteritis, neurofibromatosis, William syndrome, Ehler Danlos syndrome, congenital rubella syndrome, or Kawasaki syndrome.

- Screening MRAs (preferred) or CTAs from the head through the pelvis may be performed one time in patients diagnosed with Loeys-Dietz syndrome. Follow-up imaging of discovered aneurysms may be appropriate no more frequently than annually as requested by a specialist.

**PEDPVD-4.2: Aortic Congenital Vascular Malformations**

- Cardiac MRI without contrast (CPT® 75557) or without and with contrast (CPT® 75561), MRA Chest (CPT® 71555), CT Chest with contrast (CPT® 71260), or CTA Chest (CPT® 71275) may be indicated for evaluation.

- Vascular rings may impact both the esophagus and trachea. See **PEDNECK-7: Esophagus** and/or **PEDNECK-8: Trachea** for additional guidelines.

**PEDPVD-4.3: Visceral Artery Aneurysms**

- Visceral artery imaging indications in pediatric patients are identical to those for adult patients. See **PVD-6: Aortic Disorders and Renal Vascular Disorders and Visceral Artery Aneurysms** for imaging guidelines.

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## PEDSP-1: General Guidelines

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**PEDSP-1.1: Pediatric Spine Imaging Age Considerations**

Many conditions affecting the spine in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to patient age, comorbidities, and differences in disease natural history between children and adults.

- Patients who are < 18 years old should be imaged according to the Pediatric Spine Imaging Guidelines, and patients who are ≥ 18 years old should be imaged according to the Adult Spine Imaging Guidelines, except where directed otherwise by a specific guideline section.

**PEDSP-1.2: Pediatric Spine Imaging Appropriate Clinical Evaluation**

- A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination with a thorough neurologic examination, appropriate laboratory studies, and basic imaging such as plain radiography or ultrasound should be performed prior to considering advanced imaging (CT, MR, Nuclear Medicine), unless the patient is undergoing guideline-supported scheduled follow-up imaging evaluation.

- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic patients for disorders involving the spine is not supported. Advanced imaging of the spine should only be approved in patients who have documented active clinical signs or symptoms of disease involving the spine.

- Unless otherwise stated in a specific guideline section, repeat imaging studies of the spine are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect patient management or treatment decisions.

**PEDSP-1.3: Pediatric Spine Imaging Modality General Considerations**

- **MRI**
  - MRI is the preferred modality for imaging the pediatric spine unless otherwise stated in a specific guideline section.
  - Due to the length of time for image acquisition and the need for the patient to lie still, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this patient population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
    - MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use since the patient already has intravenous access for anesthesia. Recent evidence based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast.
The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.

- If requesting clinicians indicate that a non-contrast study is being requested due to concerns regarding the use of gadolinium, the exam can be approved.
- If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same anesthesia session.

CT

- CT is generally inferior to MRI for imaging the pediatric spine, but has specific indications in which it is the preferred modality listed in specific sections of these guidelines.
  - CT should not be used to replace MRI in an attempt to avoid sedation unless it is listed as a recommended study in a specific guideline section.
- Myelogram with post-myelogram CT imaging is rarely indicated in children except in certain limited indications (usually requested after specialist consultation), including:
  - Evaluation of spine in patients with fixation hardware which limits utility of MRI.
  - Severe congenital scoliosis with inconclusive MRI.
  - Evaluation of nerve root avulsion in patients with a brachial plexus injury and inconclusive MRI.
  - Evaluation of paraspinal cyst to assess continuity with the subarachnoid space.
  - Coding note: CT of appropriate spinal level with or without contrast may be appropriate. If the radiologist performs the myelogram the exam should be coded with contrast. If a clinician performs the myelogram the exam should be coded without contrast.

Ultrasound

- Spinal canal ultrasound (CPT® 76800) describes the ultrasonic evaluation of the spinal cord (canal and contents) and should not be reported multiple times for imaging of different areas of the spinal canal.
- Do not use CPT® 76800 for intraoperative spinal canal ultrasound as CPT® 76998 (intraoperative ultrasonic guidance) is the appropriate code in this circumstance.
- Spinal canal ultrasound (CPT® 76800) is generally limited to infants up to 6 months of age because of the bone mass surrounding the spinal cord limits evaluation of the intraspinal contents in older infants.
  - **Exception:** the persisting acoustic window in children with posterior spinal defects of spinal dysraphism enables spinal canal ultrasound to be performed at any age (see: PEDSP-4: Spinal Dysraphism).
  - In general, additional imaging studies of the spine are not indicated in asymptomatic patients with normal spinal ultrasound findings.
Nuclear Medicine

Nuclear medicine studies are rarely used in the evaluation of the spine, but are indicated in the following circumstances:

- Bone scan (CPT® 78315 or CPT® 78320) is indicated for evaluation of suspected loosening of orthopedic prostheses when recent plain x-ray is nondiagnostic, or if MRI for evaluation of back pain is inconclusive.

The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

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PEDSP-2.1: Introduction

- Currently, only about 20% of back pain in children over age 5 is from a discoverable cause. Scoliosis, spondylitic disorders, Scheuermann disease, tumor, and trauma are the most common causes.
- Back pain in children under age 5 is uncommon and often reflects underlying serious disease when present.
- Disc herniations are rare in children, but become more frequent as activity increases during adolescence.

PEDSP-2.2: Back and Neck Pain in Children Age 5 and Under

- A recent (within 60 days) evaluation including a detailed history, physical examination with thorough neurologic examination and documentation of any specific radicular features, and plain radiography should be performed prior to considering advanced imaging.
- Advanced imaging is appropriate in all patients in this age group except those with mild and transient back pain.
  - MRI of the symptomatic spinal region should be approved
    - Patients in this age group will require sedation to complete MRI imaging. See PEDSP-1.3: Pediatric Spine Imaging Modality General Considerations for contrast and body area considerations.
  - CT without contrast of the symptomatic spinal region may be approved when:
    - Plain x-rays suggest an isolated vertebral bone abnormality without any concern for spinal canal or cord abnormalities (which is rare in this age group).
    - A recent MRI does not provide sufficient detail of the bony anatomy to allow for acute patient care decision making.
  - Bone scan is indicated for evaluation of suspected spinal fracture when x-ray is negative using any of the following CPT® code combinations:
    - CPT® 78300, CPT® 78305, or CPT® 78306 as a single study
    - CPT® 78315 or CPT® 78320 can be approved as a single study when stress fracture is suspected.
  - Bone scan is indicated for evaluation of suspected spondylolysis, or if recent spine MRI is inconclusive using any of the following CPT code combinations: SPECT bone scans are especially sensitive for detecting spondylolysis, revealing areas of bone turnover; and the findings are generally positive for a prolonged period.
    - CPT® codes: CPT® 78300, CPT® 78305, CPT® 78306, CPT® 78315, or CPT® 78320 as a single study
    - CPT® 78305 and CPT® 78320 concurrently
    - CPT® 78306 and CPT® 78320 concurrently
PEDSP-2.3: Back and Neck Pain in Children Age 6 and Over
Radicular back and neck pain is common in adult patients but is uncommon in adolescents and rare in children.

➢ A recent (within 60 days) evaluation including a detailed history, physical examination with thorough neurologic examination and documentation of any specific radicular features, should be performed prior to considering advanced imaging.

➢ Advanced imaging should be approved following a recent x-ray when one or more of the following pediatric “red flags” are present:
  ▶ Accompanying systemic symptoms (fever, weight loss, etc.)
  ▶ Functional disability (daily limitation in normal activities because of pain)
  ▶ Pain which is extremely severe or worse at night
  ▶ Early morning stiffness
  ▶ Pain which worsens despite an attempt at symptomatic treatment
  ▶ Neurological symptoms or abnormal neurological examination findings
  ▶ An established diagnosis of cancer other than leukemia
  ▶ Abnormal x-rays
  ▶ Spinal imaging for patients having undergone spinal surgery
  ▶ Associated bowel or bladder dysfunction

➢ In the absence of any “red flags”, a 4 week trial of provider-supervised conservative treatment should be attempted before advanced imaging can be approved.
  ▶ It can be assumed that children who are being evaluated by a pediatric spine surgeon have failed a reasonable trial of conservative treatment under the care of the primary care provider as this is by far the most common reason for such referrals.

➢ X-rays of the involved regions should be obtained prior to advanced imaging in patients with “red flag” findings, or who remain symptomatic after a 4 week trial of provider-supervised conservative treatment.

➢ MRI without contrast of the symptomatic spinal region is the preferred study for the evaluation of pediatric spine pain, and should be approved unless one of the following conditions applies, in which case MRI without and with contrast should be approved:
  ▶ Fever (100° F or higher)
  ▶ Clinical suspicion of infection (discitis, osteomyelitis, paraspinous or epidural abscess)
  ▶ Physical examination or plain x-ray suggests a mass lesion
  ▶ New or worsening pain in a patient with an established diagnosis of cancer

➢ CT without contrast of the symptomatic spinal region may be approved when:
  ▶ The request is for re-evaluation of a known vertebral bony disorder.
  ▶ Plain x-rays show spondylotic changes or suggest an isolated vertebral bone abnormality without any concern for spinal canal or cord abnormalities (which is rare in this age group).
  ▶ A recent MRI does not provide sufficient detail of the bony anatomy to allow for acute patient care decision making.
Bone scan is indicated for evaluation of suspected spinal fracture when x-ray is negative, or if recent MRI is inconclusive using any of the following CPT® code combinations:
- CPT® codes: CPT® 78300, CPT® 78305, or CPT® 78306 as a single study
- CPT® 78315 or CPT® 78320 can be approved as a single study when stress fracture is suspected.

PEDSP-2.4: Spondylolysis
Most cases of childhood spondylolysis are believed to be caused by repeated microtrauma, resulting in stress fracture of the pars interarticularis. Heredity is also believed to be a factor in some cases. It is the most common cause of low back pain in children older than age 10.

Activity modification, NSAID treatment, physical therapy, and/or immobilization with various braces are the initial treatments for symptomatic patients.

Surgical treatment is only recommended for patients with disabling symptoms that have not responded to non-surgical care.

A recent (within 60 days) evaluation including a detailed history, physical examination with thorough neurologic examination and documentation of any specific radicular features, and plain radiography should be performed prior to considering advanced imaging.

Spondylolysis is best recognized on plain x-rays, and advanced imaging is generally not indicated.
- If additional imaging is needed because of radiological uncertainty or associated spondylolisthesis, 99mTc-MDP SPECT bone scan (CPT® 78320) is indicated to identify stress reaction in early spondylolysis cases which are radiographically occult. Bone scan has been demonstrated to be superior to MRI in detecting active spondylolysis.
  - SPECT bone scans are especially sensitive for detecting spondylolysis, revealing areas of bone turnover; and the findings are generally positive for a prolonged period.
- MRI without contrast of the symptomatic spinal level is indicated to evaluate for stress reaction in bone and visualizing nerve roots, if bone scan is negative, symptoms have continued despite a recent 4 week course of conservative care, or there is a documented need for preoperative planning.
- CT without contrast of the symptomatic spinal level is indicated to provide detailed evaluation of bony anatomy, if bone scan is negative or there is a documented need for preoperative planning. CT scans have been considered the criterion standard for characterizing fractures and for detailing bone morphology and anatomy.
PEDSP-2.5: Spine Pain Due to Infectious Causes
Entities include discitis and vertebral osteomyelitis, and typically present with sudden onset of back pain, fever, and elevated white blood cell count, occurring most commonly in prepubescent children.

- A detailed history and physical examination with thorough neurologic examination and plain x-rays should be performed initially.

Initial Imaging Studies
- MRI without and with contrast of the symptomatic spinal level is very sensitive at detecting early changes and can be approved when discitis or osteomyelitis is suspected. Nuclear medicine imaging also can be positive as soon as 1 to 2 days after the onset of symptoms.
- Any of the following studies are indicated for initial evaluation of suspected osteomyelitis:
  - Bone scan (one of CPT® codes: CPT® 78300, CPT® 78305, CPT® 78306, or CPT® 78315)
  - Nuclear Bone Marrow imaging (one of CPT® codes: CPT® 78102, CPT® 78103, or CPT® 78104)
  - Radiopharmaceutical inflammatory imaging (one of CPT® codes: CPT® 78805, CPT® 78806, or CPT® 78807)

Follow-Up Imaging Studies
- Follow-up plain x-rays may show disc space narrowing and bony changes of osteomyelitis.
- MRI without and with contrast of the symptomatic spinal level or CT with contrast (including myelography) may be useful in follow-up for evaluating bony changes of osteomyelitis or concern for epidural abscess.
- Any of the following studies are indicated for evaluation of response to treatment in established osteomyelitis:
  - Bone scan (one of CPT® codes: CPT® 78300, CPT® 78305, CPT® 78306, or CPT® 78315)
  - Nuclear Bone Marrow imaging (one of CPT® codes: CPT® 78102, CPT® 78103, or CPT® 78104)
  - Radiopharmaceutical inflammatory imaging (one of CPT® codes: CPT® 78805, CPT® 78806, or CPT® 78807)
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The term “kyphosis” refers to a curve convex posteriorly. Kyphosis generally affects the thoracic spine.

The term “lordosis” refers to a curve convex anteriorly.

The term “scoliosis” refers to a lateral curvature.

**PEDSP-3.1: Juvenile Thoracic Kyphosis (Scheuermann Disease)**

- This condition is also known as Scheuermann Kyphosis, and these patients generally present with chronic and recurrent back pain.

- A recent (within 60 days) evaluation including a detailed history, physical examination with thorough neurologic examination and documentation of any specific radicular features, and plain radiography should be performed prior to considering advanced imaging.

- X-rays will typically show anterior wedging in three or more adjacent vertebral bodies.
  - Lower thoracic kyphosis from developmental vertebral wedging with thoracic kyphosis totaling over 15° to 20° should be identified by plain x-rays before considering advanced imaging.
  - MRI is not an effective diagnostic modality for this condition since the incidence of false positive vertebral changes in normal patients is high.

- MRI without contrast of the thoracic spine (CPT® 72146) can be approved preoperatively to rule out any associated spinal cord problems.

- MRI without contrast of the lumbar spine CPT® 72148) can be approved preoperatively to rule out any associated spinal cord conditions when there is clinical or radiographic evidence of lumbar abnormalities.

**PEDSP-3.2: Scoliosis**

Scoliosis is an abnormal lateral curve of the thoracic or thoraco-lumbar spine in the frontal plane. A small lateral curve is not uncommon and generally does not require further investigation.

- Using the Cobb technique for measuring these curves, a curve of under 10° is normal, a curve from 10 to 20° is mildly abnormal, a curve over 20° is significantly abnormal, and a curve > 40° is severely abnormal.

- Most patients with significant scoliosis have some element of kyphosis as well.
  - There are many ways of classifying scoliosis. These guidelines will classify scoliosis as congenital, idiopathic, and neuromuscular scoliosis.

- A recent (within 60 days) evaluation including a detailed history, physical examination with thorough neurologic examination and documentation of any specific radicular features, detailed examination of the spine in different body positions, and plain radiography should be performed prior to considering advanced imaging.
Standing posteroanterior (PA) and lateral x-rays of the spine are the initial imaging studies and are used for follow-up. If anteroposterior (AP) x-rays are to be performed, breast shields should be used to reduce breast radiation exposure.

Spine surgical specialists sometimes appropriately request both MRI and CT together for preoperative planning of scoliosis surgery.

- In addition, MR and CT are useful to identify an underlying cause of scoliosis, such as congenital and developmental anomalies.
- Concurrent requests for both MRI and CT will be forwarded for Medical Director Review.
- Postoperative spine MR or CT may be appropriate when recent postoperative x-rays are inconclusive for managing patient treatment.
  - Patients with severe scoliosis may have compromised lung development. Chest CT with contrast (CPT 71260) or without contrast (CPT 71250) may be obtained in the perioperative period as well as 2 and 5 years postoperatively to access lung growth.

**Congenital Scoliosis**
Cases are recognized in infancy or early childhood. Most cases arise from anomalies of vertebral development, and many are associated with anomalies of the genitourinary system or of other organs.

- In infants, spinal ultrasound (CPT® 76800) can be approved after initial imaging with plain x-rays.
- MRI of the cervical (CPT® 72156), thoracic (CPT® 72157), and lumbar (CPT® 72158) spine without and with contrast is indicated to search for underlying anomalies.
- Brain MRI without and with contrast can be approved if the clinical evaluation or preliminary imaging studies suggest an associated intracranial anomaly.
- Renal ultrasound (CPT® 76770 or CPT® 76775) should be performed, since nearly one-third of patients also have genitourinary anomalies.
- CT, MRI, or nuclear medicine studies of the genitourinary tract may be necessary if the ultrasound is abnormal. These requests should be forwarded for Medical Director Review.
**Idiopathic Scoliosis**
Idiopathic scoliosis is the most common form of pediatric scoliosis, and typically has its onset in late childhood or adolescence.

- The following clinical features are associated with an increased risk of underlying vertebral or spinal cord abnormality:
  - Associated back pain
  - Neurological abnormalities on examination or neurological symptoms.
  - Left sided curve (concave to right)
  - Double curves or high thoracic curves
  - Spinal x-ray abnormalities other than the curve itself (widened spinal canal, dysplastic changes in spine or ribs, etc.)
  - Midline spinal cutaneous markers (esp. sacral) such as dermal tracts, tufts of hair, skin tags, etc.
  - Abnormal number or size of café au lait spots (neurofibromatosis)—these requests should be forwarded for Medical Director Review.

- MRI without contrast of the symptomatic spinal region is the preferred study for the evaluation of scoliosis and should be approved when any of the above clinical features is present.

- There is uncertainty regarding the clinical value of MRI in the routine evaluation or preoperative work-up of patients with typical idiopathic scoliosis (with none of the above clinical features present).
  - Noncontrast MRI or CT of the cervical, thoracic, and/or lumbar spine can be approved in these patients when they are being actively evaluated for corrective surgery.

**Neuromuscular Scoliosis**
Scoliosis can result from many disorders of the nervous system. In some conditions, including (but not limited to) cerebral palsy, muscular dystrophy, and spinal muscular atrophy, associated scoliosis may develop over time.

The appropriate spinal level, modality, and contrast level of advanced imaging will depend on the nature of the underlying disease.

- MRI without contrast or without and with contrast or CT without contrast of the cervical, thoracic, and/or lumbar spine can be approved in these patients when they are actively being evaluated for spinal deformity corrective surgery.

- MRI without contrast or without and with contrast or CT without contrast of the symptomatic spinal region can be approved in patents with painful neuromuscular scoliosis

- Bone scans (one of CPT® codes: CPT® 78300, CPT® 78305, CPT® 78306, or CPT® 78315) are useful to evaluate cases of painful scoliosis and to identify tumors or infections. They are more sensitive than plain radiography.
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**PEDSP-4.1: Introduction**

The term spinal dysraphism refers to a group of disorders characterized by incomplete or absent fusion of posterior midline structures, including neural, mesenchymal and cutaneous structures. Based on clinical classification, dysraphic are grouped into two categories: (a) *open dysraphism* (spina bifida aperta) which are non-skin-covered, open neural tube defects (myelomeningocele) and (b) *closed or occult spinal dysraphism*. The latter group includes skin-covered defects associated with a subcutaneous mass.

A complete abdominal ultrasound (CPT® 76700) or retroperitoneal ultrasound (CPT® 76770) can be approved as an initial evaluation for patients with newly diagnosed neurogenic bladder, myelomeningocele (open spinal dysraphism), hydronephrosis, or spina bifida.

A complete retroperitoneal ultrasound (CPT® 76770) can be approved every 6 to 12 months for follow-up/surveillance for any of the above conditions.

**PEDSP-4.2: Cutaneous Lesions of the Back**

The spinal cord arises from an infolding of the skin of the back, so certain lesions of the overlying skin are associated with an underlying spinal deformity, which include:

- high risk dimples (greater than 5 mm in diameter and more than 2.5 cm above the anus)
- skin tags or tails
- hairy patches
- sinus tracts

Screening MRI or Ultrasound is not necessary in the following clinical conditions, which are not significantly associated with spinal dysraphism:

- “Simple dimple” which is defined as a midline soft tissue depression ≤ 2.5 cm above the anus (regardless of size or depth).
- Deviated gluteal fold which is defined as any abnormal gluteal fold (including bifid or split gluteal cleft) without an underlying mass.
- Coccygeal pits and pilonidal cysts at or below the level of the intergluteal fold.
- Strawberry nevi
- Non-specific darkened areas of skin over the sacrum (such as dermal melanosis) unless there are associated midline cutaneous abnormalities.

Screening with advanced imaging is recommended in the following clinical conditions which are associated with an increased risk of underlying spinal dysraphism:

- Dermal sinuses overlying the lumbar, thoracic, or cervical spine, and sacral dermal sinuses.
  - Spinal ultrasound (CPT® 76800) may be approved for initial evaluation in infants up to 6 months of age.
  - MRI of the involved spinal level without and with contrast should be approved if the ultrasound shows abnormalities other than a cutaneous dermal cleft.
MRI of the involved spinal level without and with contrast may be approved for initial evaluation in patients older than 6 months of age.

Follow-up of a normal screening imaging study is not appropriate.

The appropriate spinal level, modality, and contrast level of follow-up advanced imaging will depend on the nature of the underlying disease, usually requested after specialist consultation.

- Subcutaneous midline masses at any level, caudal extensions, midline skin tags, abnormal patches of hair over the spine, and complex midline birthmarks above the upper sacral region:
  - Spinal ultrasound (CPT® 76800) may be approved for initial evaluation in infants up to 6 months of age, but if a mass is present it is appropriate to proceed directly to MRI of the involved spinal level without and with contrast.
  - MRI of the involved spinal level without and with contrast may be approved for initial evaluation in patients older than 6 months of age.
  - Follow-up of a normal screening imaging study is not appropriate.
  - The appropriate spinal level, modality, and contrast level of follow-up advanced imaging will depend on the nature of the underlying disease, usually requested after specialist consultation.

- Congenital anorectal abnormalities are often associated with dysraphism
  - Lumbar spine MRI without and with contrast (CPT® 72158) should be approved when these are present.
  - Follow-up of a normal screening imaging study is not appropriate.
  - The appropriate spinal level, modality, and contrast level of follow-up advanced imaging will depend on the nature of the underlying disease, usually requested after specialist consultation.

- Café au lait spots are a marker for type 1 neurofibromatosis
  - See imaging indications in PEDONC-2.3: Neurofibromatosis 1 and 2 (NF1 and NF2)

- Toe walking, when associated with upper motor neuron signs including hyperreflexia, spasticity, and positive Babinski sign

**PEDSP-4.3: Spina Bifida Occulta or Closed Spinal Dysraphism**

These guidelines apply to adult as well as pediatric patients.

- Unless additional abnormalities described above are present, routine advanced imaging is not indicated.
  - Cutaneous lesions below the gluteal crease are often pilonidal sinuses and need no further evaluation.
  - Tracts, pits, or lesions above the gluteal fold should be evaluated further for underlying spinal pathology using MRI of the involved spinal level without contrast or without and with contrast.
PEDSP-4.4: Open Dysraphism

- Clinically significant dysraphism includes findings ranging from complex vertebral anomalies to meningomyelocele.
  - MRI of the involved spinal level without contrast or without and with contrast is appropriate.
  - MRI of the cervical, thoracic, and lumbar spine without contrast or without and with contrast may be approved in patients with open neural tube defects, or when ordered for preoperative planning.
  - MRI Brain or CT Head without contrast of the brain may be approved in cases with associated hydrocephalus, signs of cerebral involvement, or the presence of multiple hydromyelia (which suggests hydrocephalus).
  - MRI of the pelvis without contrast or without and with contrast may be approved if there are clinical signs of pelvic malformation or anorectal anomaly.
  - The appropriate spinal level, modality, and contrast level of follow-up advanced imaging will depend on the nature of the underlying disease, usually requested after specialist consultation.

References

**PEDSP-5: Tethered Cord**

**Normal position of spinal cord**
The conus medullaris in newborns should terminate at L2-3 or higher. After 3 months of age, the conus should lie at or above the L2 level. The spinal cord normally ends in the conus medullaris, which is positioned at L1-2 in normal infants and children.

**Tethered cord**
If the conus terminates below L2-3, the cord may be tethered by an abnormal structure. Abnormalities can be found in both lumbosacral and thoracic regions and are often associated with spinal lipomas in either region. Tethering is certain when the cord terminates at or below L4 and there is other supporting evidence of tethering such as limited spinal cord pulsatility, posterior positioning in the spinal canal, thick filum terminale, intraspinous mass, or lipoma.

**Imaging Studies to Evaluate Tethered Cord**
- Spinal ultrasound (CPT® 76800) may be approved for initial evaluation in infants up to 6 months of age.
  - If the conus terminates below the L2-L3 disk space in a term infant the diagnosis of tethered cord is likely. Of note, however, in premature infants, the conus medullaris may be located at the mid L3-level if there is uncertainty as to whether cord termination is low, repeat spinal ultrasound can be performed in 4 to 6 weeks, since a normal cord will have "moved" higher within the spinal canal by this time.
- MRI of the lumbar spine without or without and with contrast may be approved for initial evaluation in patients older than 6 months of age.
  - If a tethered cord is found, follow-up MRI studies to complete imaging of the entire spine (cervical, thoracic, and lumbar) without and with contrast should be approved to rule out associated spinal cord deformities such as syringomyelia. See **PEDSP-4: Spinal Dysraphism** for additional information.
  - For patients requiring general anesthesia to complete MRI, MRI without and with contrast of the cervical (CPT® 72156), thoracic (CPT® 72157), and lumbar (CPT® 72158) spine can be approved for initial evaluation.
  - The appropriate spinal level, modality, and contrast level of follow-up advanced imaging will depend on the nature of the underlying disease, usually requested after specialist consultation.
References
PEDSP-6: Myelopathy

- Myelopathy imaging indications in pediatric patients are similar to those for adult patients. See SP-7: Myelopathy for imaging guidelines.
### PEDSP-7: Other Congenital and Pediatric Spine Disorders

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**PEDSP-7.1: Achondroplasia**
The diagnosis of achondroplasia is made clinically. Achondroplasia patients are at risk for hydrocephalus as well as myelopathy from spinal stenosis with increasing age.

- A recent (within 60 days) evaluation including a detailed history, physical examination with thorough neurologic examination and documentation of any specific radicular features, and plain radiography should be performed prior to considering advanced imaging.
- MRI without contrast of the symptomatic spinal region can be approved when new or worsening clinical symptoms suggest achondroplasia-related spinal stenosis.
- Brain MRI without contrast (CPT® 70551) or Head CT without contrast (CPT® 70450) can be approved when new or worsening clinical symptoms suggest hydrocephalus.

**PEDSP-7.2: Inflammatory Spondylitis**
Except as listed below, imaging considerations in pediatric and adult patients are identical for this condition, and these patients should be imaged according to SP-10.2: Inflammatory Spondylitis.

For pediatric patients with juvenile idiopathic arthritis:

- MRI without and with contrast is appropriate.
- An initial x-ray is not necessary prior to MRI in these patients.
- SPECT bone scan (CPT® 78320) is indicated for evaluation of facet arthropathy in patients with ankylosing spondylitis, osteoarthritis, or rheumatoid arthritis.

**PEDSP-7.3: Atlantoaxial Instability in trisomy 21 (Down Syndrome)**
The diagnosis of atlantoaxial instability is a recognized complication of trisomy 21, and patients are routinely screened with lateral x-rays of the cervical spine.

- MRI of the cervical spine without contrast (CPT® 72141) or without and with contrast (CPT® 72156) can be approved in patients where the lateral cervical spine x-ray demonstrates a pre dens interval of ≥ 5 mm, and a neural canal width of ≤ 14 mm.
- MRI of the cervical spine without contrast (CPT® 72141) or without and with contrast (CPT® 72156) can also be approved when new or worsening clinical symptoms suggest myelopathy in a trisomy 21 patient.

**PEDSP-7.4: Basilar Impression**
See PEDHD-9.4: Basilar Impression for imaging guidelines.

**PEDSP-7.5: Chiari Malformation**
See PEDHD-9: Chiari and Skull Base Malformations
PEDSP-7.6: Klippel-Feil Anomaly (congenital fusion of cervical vertebrae)
This is generally an incidental finding. A detailed history and physical examination with thorough neurologic examination, and plain x-rays should be performed initially. Klippel-Feil can occur in conjunction with platybasia and/or Chiari malformation.

➤ Plain x-rays of the cervical spine are sufficient to establish the diagnosis. Advanced imaging is indicated if there are acute or worsening neurologic symptoms (including pain), or if multiple levels are involved.

➤ Either MRI cervical spine without contrast (CPT® 72141) or CT cervical spine without contrast (CPT® 72125) can be approved for these indications.

PEDSP-7.7: Marfan Syndrome
Marfan syndrome patients are at risk for scoliosis (See PEDSP-3.2) and dural ectasias. Dural ectasias are usually asymptomatic but can be associated with other spinal lesions.

➤ A recent (within 60 days) evaluation including a detailed history, physical examination with thorough neurologic examination and documentation of any specific radicular features, and plain radiography should be performed prior to considering advanced imaging.

➤ MRI without contrast of the symptomatic spinal region can be approved when:
  * New or worsening clinical symptoms suggest a complicated dural ectasia
  * The patient is under active consideration for surgery

PEDSP-7.8: Neurofibromatosis
See PEDONC-2.3: Neurofibromatosis 1 and 2 (NF1 and NF2) in the Pediatric Oncology Imaging Guidelines for screening recommendations in neurofibromatosis

See PEDPN-2: Neurofibromatosis for imaging considerations in neurofibromatosis patients with known plexiform neurofibromas

See PEDONC-8.3: Non-Rhabdomyosarcoma Soft Tissue Sarcomas for imaging in patients with neurofibromatosis and malignant peripheral nerve sheath tumors.

PEDSP-7.9: Von Hippel-Lindau Syndrome (VHL)
See: PEDONC-2.10: Von Hippel-Lindau Syndrome (VHL) in the Pediatric Oncology Imaging Guidelines for screening recommendations in VHL patients.

➤ MRI without and with contrast of the affected spinal level can be approved for patients with known spinal hemangioblastomas in the following conditions:
  * Annually for asymptomatic patients with unresected spinal hemangioblastoma(s)
  * Preoperative planning for resection of a hemangioblastoma
  * New or worsening symptoms suggesting progression of a known hemangioblastoma
References