METAL TESTING

Policy Number: CMP - 039
Effective Date: January 1, 2018

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INSTRUCTIONS FOR USE

This Medical Policy provides assistance in interpreting UnitedHealthcare benefit plans. When deciding coverage, the enrollee specific document must be referenced. The terms of an enrollee's document (e.g., Certificate of Coverage (COC) or Summary Plan Description (SPD)) may differ greatly. In the event of a conflict, the enrollee’s specific benefit document supersedes this Medical Policy. All reviewers must first identify enrollee eligibility, any federal or state regulatory requirements and the plan benefit coverage prior to use of this Medical Policy. Other Policies and Coverage Determination Guidelines may apply. UnitedHealthcare reserves the right, in its sole discretion, to modify its Policies and Guidelines as necessary. This Medical Policy is provided for informational purposes. It does not constitute medical advice.

UnitedHealthcare may also use tools developed by third parties, such as the MCG™ Care Guidelines, to assist us in administering health benefits. The MCG™ Care Guidelines are intended to be used in connection with the independent professional medical judgment of a qualified health care provider and do not constitute the practice of medicine or medical advice.

BACKGROUND

The U.S. Occupational Safety and Health Administration (OSHA) regulates the use and monitoring of thirty-five toxic metals because of potential occupational (or residential) exposure.1 People who may be exposed to metals in the workplace are usually monitored periodically. Of these 35 metals, 23 of them are the heavy elements or “heavy metals” and include: antimony, arsenic, bismuth, cadmium, cerium, chromium, cobalt, copper, gallium, gold, iron, lead, manganese, mercury, nickel, platinum, silver, tellurium, thallium, tin, uranium, vanadium, and zinc.1-3

Small amounts of certain heavy metals (e.g., iron, copper, manganese, and zinc) are common in our environment and diet and are actually nutritionally essential. These elements are naturally found in food, fruits, vegetables, and commercially available as supplements.3-4 Additionally, some of these heavy metals have medical, industrial,
or residential applications. However, large amounts of any of these metals may cause acute or chronic toxicity (poisoning) and for some heavy metals, toxic levels can be just above the natural background concentrations.  

Food, water, air, or absorption through the skin are common routes for exposure. For adults, industrial exposure accounts for a common route of exposure for adults while ingestion is the most common exposure route for children. Other less common routes of exposure include radiological procedures, inappropriate dosing or monitoring during intravenous nutrition, exposure to a broken thermometer, or from a suicide or homicide attempt.

Heavy metal toxicity can result in damaged or reduced mental and central nervous function, lower energy levels, and damage to blood composition, lungs, kidneys, liver, and other vital organs. Heavy metal toxicity is an uncommon medical problem in the United States, but when it does occur, it is a medically significant condition. As acute heavy metal toxicity is usually associated with a known exposure or ingestion, the symptoms are recognizable as they are usually severe, rapid in onset, and include cramping, nausea, and vomiting; pain; sweating; headaches; difficulty breathing; impaired cognitive, motor, and language skills; mania; and convulsions. Toxicity from chronic exposure can result in symptoms including impaired cognitive, motor, and language skills; learning difficulties; nervousness and emotional instability; and insomnia, nausea, lethargy, and feeling ill.

The Agency for Toxic Substances and Disease Registry (ATSDR) (a part of the U.S. Department of Health and Human Services) was established to perform functions concerning adverse human health effects through exposure to hazardous substances. In partnership with the U.S. Environmental Protection Agency, the ATSDR has compiled a priority list of the top hazardous substances. The heavy metals arsenic, lead, mercury, and cadmium appear on this list.

Specific Metals of Concern

Aluminum - Aluminum is the third most prevalent element in the earth’s crust. Aluminum is not a heavy metal, but environmental exposure is frequent. Serum aluminum testing should be considered for patients who have been on dialysis with evidence suggesting aluminum toxicity as these patients may accumulate aluminum readily from medications and dialysate. Other groups that may be exposed to toxic levels of aluminum include infants on parenteral fluids, particularly parenteral nutrition, adults in parenteral nutrition patients, and burn patients receiving intravenous albumin. Aluminum toxicity should be considered in patients with chronic industrial exposure history and in patients with prolonged exposure to or excessive doses of such medications as antacids, salicylates, antilipemics, antiatherosclerosis medications, and antipruritics.

Target organs for aluminum are the central nervous system, kidney, and digestive system. Conditions associated with aluminum toxicity include encephalopathy (stuttering, gait disturbance, myoclonic jerks, seizures, coma, abnormal EEG); osteomalacia or aplastic bone disease (associated with painful spontaneous fractures, tumorous calcinosis); proximal myopathy; increased left ventricular mass and decreased myocardial function; and/or microcytic anemia. Other signs and symptoms of aluminum toxicity include memory loss, learning difficulty, loss of coordination, disorientation, mental confusion, colic, heartburn, flatulence, and headaches.

Arsenic - The most common cause of acute heavy metal poisoning in adults is arsenic. Arsenic is also on the ATSDR’s list of top hazardous substances. Arsenic exposure generally occurs in the workplace, near hazardous waste sites, or in areas with high natural levels. Arsenic is often released into the environment through smelting
or other manufacturing processes. It can also be found in pesticides, paints, rat poisons, fungicides, and wood preservatives.

Arsenic toxicity targets organs including the blood, kidneys, central nervous, digestive, and skin systems.\textsuperscript{6,10} Acute arsenic poisoning may result in symptoms including sore throat from breathing, red skin at contact point, or severe abdominal pain, vomiting, diarrhea (often within 1 hour after ingestion), anorexia, fever, mucosal irritation, and arrhythmia. Serum and whole blood and/or urine arsenic testing should be considered for patients with unexplained peripheral neuropathies, industrial exposure to arsenic, histories of arsenic pesticide exposure, unexplained encephalopathies, unexplained weight loss, chronic glomerulonephritis, bone marrow hypoplasia, or melanosis of skin, unexplained chronic diarrhea, persistent abdominal pain, or nausea and vomiting.

\textit{Cadmium} - Cadmium is also on the ATSDR list and is a byproduct of the mining and smelting of lead and zinc.\textsuperscript{10} Cadmium is used in nickel-cadmium batteries, PVC plastics, paint pigments, and commercial fertilizers. Target organs for cadmium toxicity are the liver, placenta, kidneys, lungs, brain, and bones.\textsuperscript{6,10}

Serum and whole blood and/or urine cadmium testing should be considered for patients with an exposure to cadmium with evidence of pulmonary disease or unexplained renal failure. Acute cadmium exposure produces symptoms including nausea, vomiting, abdominal pain, and breathing difficulties. Chronic exposure to cadmium can result in chronic obstructive lung disease, renal disease, and fragile bones. Chronic exposure to cadmium may produce symptoms that include alopecia, anemia, arthritis, learning disorders, migraines, growth impairment, emphysema, osteoporosis, loss of taste and smell, poor appetite, and cardiovascular disease.

\textit{Lead} - Lead is also on the ATSDR’s hazardous substances list and accounts for the majority of pediatric heavy metal poisoning cases.\textsuperscript{6} Lead was used in many pipes, drains, and soldering materials. In addition, many older homes were painted with lead paint. Nowadays, the majority of lead is used for industrial uses.

Lead targets the bones, brain, blood, kidneys, and thyroid gland.\textsuperscript{6,10} Acute exposure generally occurs in occupational settings and may demonstrate symptoms including abdominal pain, convulsions, hypertension, renal dysfunction, loss of appetite, fatigue, sleeplessness, hallucinations, headache, numbness, arthritis, and vertigo. In addition to the symptoms found in acute lead exposure, symptoms of chronic lead exposure could be allergies, arthritis, autism, colic, hyperactivity, mood swings, nausea, numbness, lack of concentration, seizures, and weight loss. Blood (serum and whole) and/or urine lead testing should be considered for patients if there is documented industrial exposure to lead, documented avocation exposure to lead, retained bullet fragments at or near joints, a blue gum line, a history of moonshine abuse, unexplained peripheral neuropathies, evidence of lead contaminated drinking water, paint stripping, lead lines on bones on radiographs, or basophilic stippling of red blood cells.

\textit{Mercury} - Mercury is also included on the ATSDR’s list and is a naturally generated element from the earth’s crust degassing.\textsuperscript{10} Significant producers of mercury include mining operations, chloralkali plants, and paper industries.\textsuperscript{12} Mercury also continues to be used in thermometers, thermostat, dental fillings, algaeicides, vaccines.

Mercury targets the brain and kidneys.\textsuperscript{6,10} Acute mercury exposure may result in symptoms including cough, sore throat, and shortness of breath; metallic taste in the mouth, abdominal pain, nausea, vomiting and diarrhea; headaches, weakness, visual disturbances, tachycardia, and hypertension. Chronic mercury exposure may result in permanent damage to the central nervous system and kidneys.\textsuperscript{13} As mercury can also cross the placenta, the developing fetus is particularly at risk for medical problems from toxic levels in the mother.
**Other Metals of Concern**

**Antimony** - Serum and/or urine antimony testing should be considered for patients with documented treatment in the past with anti-leishmaniasis agents or with documented chronic antimony industrial exposure history.

**Barium** - Serum and or/urine barium testing should be considered for patients with pulmonary disease with industrial exposure to barium or unexplained flaccid paralysis.

**Beryllium** - Serum and/or urine beryllium testing should be considered for patients with pulmonary disease with industrial exposure to beryllium.

**Bismuth** - Serum and/or urine bismuth testing should be considered for patients with bismuth lines on their gums, methemoglobinemia, unexplained pathological fractures, or a history of bismuth medicine abuse.

**Chromium** - Serum chromium testing should be considered for patients with an industrial exposure to chromium with evidence of pulmonary disease.

**Cobalt** - Serum cobalt testing should be considered for patients with an industrial exposure to cobalt with evidence of pulmonary disease.

**Copper** - Serum copper testing should be considered for patients with an industrial exposure to copper with evidence of pulmonary disease, or for beneficiaries with Wilson’s Disease, unexplained cardiomyopathy, unexplained renal failure, polycythemia.

**Lithium** - Serum and/or urine lithium testing should be considered for patients on lithium medications.

**Manganese** - Serum manganese testing should be considered for patients with documented industrial exposure to manganese.

**Mercury** - Serum, whole blood, and/or urine mercury testing should be considered for patients with documented industrial exposure to mercury, with a blue line in their mouth, those with a history of laxative abuse, with a history of pesticide exposure, mercury spillage with vacuuming of the liquid metal, unexplained renal failure, or a history of skin lightening treatments.

**Molybdenum** - Serum molybdenum testing should be considered for patients with documented industrial exposure to molybdenum.

**Nickel** - Serum and/or urine nickel testing should be considered for patients with documented industrial exposure to nickel, unexplained renal failure, and unexplained pulmonary disease.

**Selenium** - Serum and/or urine selenium testing should be considered for patients with documented industrial exposure to selenium or on chronic renal dialysis.

**Thallium** - Serum thallium testing should be considered for patients with documented industrial exposure to thallium and unexplained ataxia.
**Tin** - Serum tin testing should be considered for patients with documented industrial exposure to tin.

**Titanium** - Serum titanium testing should be considered for patients with documented industrial exposure to titanium.

**Zinc** - Serum zinc and/or urine testing should be considered for patients with documented industrial exposure to zinc, on chronic renal dialysis, with malabsorption syndromes and Crohn’s disease.

**POLICY**

For the CPT code(s) in the attached files, the patient should have the corresponding diagnosis (ICD-10-CM) code(s).

*ICD-10 Diagnosis Codes (Proven)*

CMP-039 Metal Testing ICD10_v2.3
REFERENCES


## POLICY HISTORY/REVISION HISTORY

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<td>Updated ICD10 codes as per CMS recommendations. Removed ICD9 code file.</td>
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<td>- Mercury/Chemical exposure -Mercury: V82.5,</td>
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<td>- nutritional deficiencies -Zinc: 269.3</td>
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<td>- Lead/Chemical exposure-Lead: R78.71, Mercury/Chemical exposure- Mercury: Z13.88,</td>
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<td>- nutritional deficiencies -Zinc: E58, E59, E60, E61.0, E61.1, E61.2, E61.3, E61.4, E61.5, E61.6</td>
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