

Clinical Performance Guideline
Neonatal Resource Services
Discharge Planning

Medical Necessity Guideline

Purpose: To provide a guideline for discharge planning of infants from the hospital.

Target Client Population: The target population includes all infants admitted to the NICU. This guideline pertains primarily for those infants who are admitted at ≤ 32 weeks' gestation who have a complicated hospital course in the NICU requiring focused follow-up after discharge.

<p>Background</p>	<p>A process for NICU discharge planning is critical to ensuring that the infant will receive appropriate care following discharge. Discharge readiness is reached when an infant maintains temperature in an open crib, is breathing in room air, nipple feeds (bottle and/or breast) and is not losing weight. These transition points (such as weaning to room air, transition to open crib, achieving full oral intake, etc.) can be identified by a multidisciplinary neonatal team. (Mills, 2006; Sims, 2006) Discharge planning should be initiated upon admission of the infant to the NICU and include parent/caregiver involvement to the maximum extent possible. (Purdy, 2015) Caregiver engagement facilitates involvement in the care of their infant in the NICU, promotes earlier discharge from the NICU, decreases the incidence of parental depression and decreases the possibility of re-admission after discharge. Predictive modeling may offer opportunities to assess and address non-medical risk factors prior to escalating to a delay in discharge. (Temple, 2015) More complicated discharges of infants on ongoing respiratory or feeding support require specific follow-up plans.</p>
<p>Treatment Criteria</p>	<p><u>Clinical evidence in the medical literature supports the following:</u></p> <p>The infant can be considered ready for discharge when the following developmental milestones have been achieved:</p> <ul style="list-style-type: none"> • Demonstrated physiologic stability and competencies (including but not limited to oral feeding, thermoregulation and respiratory control) regardless of weight or PMA. (AAP, 2008; Benitz, 2015) • Adequate weight gain: The infant has a rate of weight gain that is considered to be adequate for the infant's specific clinical situation. Continued weight monitoring can be done on an outpatient basis. • Acceptable weight loss from birth: Following birth, formula-fed late preterm and term infants may lose up to 7% of their birth weight and exclusive breastfed infants may lose up to 12% of their birth weight following delivery. (Flaherman, 2015; Miller, 2015) Unless there is evidence of dehydration, newborn infants with weight loss can be followed as an outpatient. Late preterm or term infants do not need to exhibit weight gain before discharge but should meet all other physiologic criteria. • The American Academy of Pediatrics supports 24 hours of full oral feedings as adequate intake for late preterm (≥ 34 weeks gestation) and full term infants. (Engle, 2007) Up to 48 hours of full oral feedings is reasonable for infants born < 34 weeks gestation. Select infants, based on their specific feeding history, may warrant an additional hospital observation period prior to discharge. Gastrostomy tube placement or home gavage feedings may be considered for

select infants who are not likely to achieve full oral feedings within a reasonable time frame. (Sturm, 2005)

- If all other discharge criteria are met, discharge can occur twenty-four hours after discontinuation of parenteral fluids.
- Hypoglycemia is described as a level <45 mg/dL from 24-48 hours of life. Most infants should demonstrate glucose levels >60-70 mg/dL by 72 hours of life. Twenty-four hours of glucose stability on home feeding regimen is adequate for discharge. (Adamkin, 2017; Thornton, 2015; Adamkin, 2016)
- The American Academy of Pediatrics supports 12 hours of stable body temperature in an open crib as adequate for late preterm infants (≥ 34 weeks gestation). (Engle, 2007) Up to 48 hours of stable body temperature in an open crib is reasonable for infants born < 34 weeks gestation. Select infants, based on their specific thermoregulation history, may warrant an additional hospital observation period prior to discharge.
- It is reasonable to observe a term infant for up to 24 hours and a preterm infant for up to 48 hours after discontinuation of oxygen. An observation period of up to 48 hours after cessation of diuretics would also be considered judicious. For those infants deemed medically stable for discharge, inability to actively wean off oxygen and/or diuretic therapy should prompt for discharge home with appropriate support.
- Brief bradycardia episodes that self-resolve or are associated only with feeds should not be reason to delay discharge. (Eichenwald, 2016)
- In accordance with the NRS Apnea and Bradycardia Clinical Guideline, an apnea “countdown” of 5 days for preterm infants is a reasonable period to demonstrate cardio-respiratory stability before a safe hospital discharge. However, for infants born at ≤ 30 weeks’ gestation a 7-day countdown may be more appropriate. There may be select infants born at less than 26 weeks gestation that warrant a longer observation period prior to discharge based on their individual frequency and severity of events. (Lorch, 2011; Eichenwald, 2016)
- A rebound bilirubin level following discontinuation of phototherapy should be scheduled as an outpatient test and should not delay discharge. A follow-up bilirubin level is recommended within 24 hours after discharge in infants with hemolytic disease treated with phototherapy or when phototherapy is discontinued prior to the fourth day of life. (AAP, 2004)
- Pre-discharge MRI screening in term equivalent or preterm infants is not recommended but should be based on medical necessity. (Ho, 2015)
- A cohort study suggests tracheostomy tube placement in a preterm population at near-term equivalent may be associated with improved neurodevelopmental outcomes; emphasizing the importance of timely plan of care discussions between providers and caregivers. (DeMauro, 2014)
- Discharge planning for a complex infant with medical needs should begin early and continue concurrently to identify the infant’s needs.
- Proactive identification of infants with persistent nipple feeding difficulties and poor oral skills should prompt for review of feeding regime with early intervention by speech therapy (ASHA, 20014). Continued delays in

progression to complete nipple feeding should prompt caregiver discussions with regards to longer term tube support and/or need for surgery.

- A speech-language pathology evaluation should be performed on any infant at-risk for a communication, cognition, feeding or swallowing disorder with subsequent intervention as necessary. (ASHA, 2004)
- Concurrent parental/caregiver teaching in parallel with progression of care are key to mitigate the need for additional training at the end of the hospital stay.

The following specific tasks should be performed in a timely manner and should not cause a delay of discharge in the absence of a specific skilled nursing requirement:

- Car seat observation to test for apnea, bradycardia and oxygen desaturation in preterm and low birth weight infants. A failed test should be repeated within 24 hours after ensuring proper positioning. If this test also results in failure, repeat in 24 hours. Parental demonstration of proper positioning, minimizing the duration of time an infant spends in a semi-upright position and direct observation by an adult in the backseat of the car are recommended. (Davis, 2015) It is the current standard in the U.S. to perform a car seat study. Other pediatric societies may not consider it to be beneficial. A list of car seats suitable for smaller infants can be found at: <https://www.healthychildren.org/English/safety-prevention/on-the-go/Pages/Car-Safety-Seats-Product-Listing.aspx>
- Newborn Screening. Repeat newborn screen testing result(s) in an asymptomatic infant can be followed on an outpatient basis.
- Hearing Screening. This should be scheduled as an outpatient if unable to complete prior to discharge. (AAP, 2007) Referral for repeat testing should be made for those infants who fail initial hearing screening in the NICU with audiology follow-up as indicated.
- Ophthalmology Examination for retinopathy of prematurity (ROP) based on the risk for ROP. Appropriate follow-up should be in place for the infant discharged prior to incomplete retinal development or incomplete healing-regression following ROP intervention. (Fierson, 2013) Responsibility for examination and follow-up of infants at risk for ROP must be carefully defined by the staff and consultants of each NICU.
- Critical congenital heart disease screening (This screening is applicable to infants who would be discharged from the hospital during their first week of life.)
- Assessment of hematologic status if deemed medically necessary. Scheduled dosing of erythropoietin can be continued on an outpatient basis and is not an indication to prolong hospital stay.
- Circumcision (if applicable). Any excessive bleeding that has ceased is not an indication to delay timely discharge of the hemodynamically stable infant on the day of circumcision.
- Immunization administration that conforms to the PMA of the neonate including palivizumab for appropriate infants during respiratory syncytial virus season. Recommended immunizations should be administered at least 2 days prior to discharge except for live attenuated immunizations where viral shedding may be a concern.

	<ul style="list-style-type: none"> • Adjustment to the suitable enteral caloric density prior to discharge and caregiver(s) demonstrating the ability to prepare non-ready-to-feed preparations. (Kleinman, 2013) Powders are not utilized in the hospital setting because of the risk of contamination, but can be used at home. Close monitoring of weight trend and modification of milk recipe and/or caloric density can be continued on an outpatient basis by the primary care provider. Neonatal dietitian support is available at regional NICUs. • Transition from human milk-based human milk fortifier to bovine milk product should occur at 32-34 weeks PMA due to the decreased risk of developing necrotizing enterocolitis. No inpatient monitoring period is required for transitioning from human milk-based human milk fortifier to human milk. • Elective rooming-in process should be completed while the infant requires continued hospital stay for medical reasons. Concurrent parental/caregiver engagement with care processes throughout the NICU stay can mitigate the need for rooming-in and potential delay in discharge. • Scheduling of necessary medical follow-up for routine care or unresolved and/or ongoing medical issues. This task should include identification of the primary care provider, medical specialists/subspecialists, psychosocial support personnel and health care facilities that may be needed following discharge. Particular attention should be paid to those infants and families who may be at even higher risk for post discharge mortality. (DeJesus, 2012) • Discussion of infant safety precautions including sleep positioning, prevention of infection, use of car seats, home environment, and sun protection. • Ordering of durable medical equipment and supplies needed for discharge. There should be no smoking in the car or around the infant. • Making advance arrangements, including any necessary precertifications, for private duty nursing or other home care services (when applicable). <p>Evaluation of the home environment, potential discharge needs and caregiver ability including necessary psychological assessments, and review by licensed social service personnel or like disciplines is recommended. Discharge planning should begin early in hospital course, and include the identification and training of the primary, secondary and if needed alternative caregiver and durable medical equipment needs of the infant. Families with limited support and/ or resources warrant additional scrutiny during discharge planning process. (Brandon, 2009).</p>
<p>Clinical Evidence</p>	<p><u>Car Seat</u></p> <ul style="list-style-type: none"> • Davis (2015) provided an overview of the evidence on the utility of the infant car seat challenge (ICSC) for predicting the risk of cardiopulmonary events. Due to the limited evidence, it is unclear whether this test can accurately identify at-risk infants. The author indicated that additional studies are needed. However, based on the risk for desaturations, emphasis was placed on minimizing the duration of time an infant spends in a semiupright position and direct observation of the infant while in the car seat was recommended. • Bull & Engle, in collaboration with the Committee on Injury, Violence, and Poison Prevention and the Committee on Fetus and Newborn, provided guidelines in 2009 on car seat safety for preterm and low birth weight infants.

They emphasize the proper selection of car seats and car beds for these infants and recommend a 90-120 minute (or the duration of the infant's trip home if longer) pre-discharge period of observation in a car seat to assess for cardiovascular events. They feel this observation could minimize the risk of adverse events.

- A retrospective, cross-sectional study by Mandell et al (2017) evaluated risk factors for failure of the follow-up Infant Car Seat Challenge (ICSC). The charts of 436 infants who had been discharged in a car bed due to failure of ICSC were examined. The results of the follow-up ICSC that was performed in the outpatient setting were assessed to determine if any predictors of failure could be identified. The infants who did not pass the follow-up ICSC were identified as having significantly lower weights, younger postmenstrual ages (PMA), a history of a cardiac condition and respiratory illness.

Pre-discharge MRI Screening

- As part of the "Choosing Wisely" campaign Ho et al (2015) identified five tests and procedures in newborn medicine that contributed to health care waste. One of these items addressed the use of routine brain MRI screening in preterm infants. The authors noted there is a paucity of evidence that routine brain MRI screening at discharge or term-equivalent age improves long-term outcomes in the preterm population.

Hypoglycemia

- Thornton et al (2015) authored a report from the Pediatric Endocrine Society on persistent hypoglycemia in neonates, infants and children. Stabilization of glucose levels should occur for the first 24-48 hours of life. In neonates suspected to be at high-risk for a persistent hypoglycemic disorder, evaluation should be performed when the infant is ≥ 48 hours of age and therefore passed the period of transitional glucose regulation. Infants with a known risk of genetic or other persistent form of hypoglycemia should be examined by an endocrine specialist prior to discharge from the nursery.
- Adamkin and Polin (2016) provided a commentary on the guideline from the Pediatric Endocrine Society (PES) regarding the evaluation and management of hypoglycemia in neonates, infants and children. A comparison between the PES guideline and the 2011 American Academy of Pediatrics' (AAP) guideline was provided. The AAP guideline identifies a lower blood glucose threshold range (25-30 mg/dL) at 1-2 hours of life which may be used in at-risk asymptomatic infants to direct interventions. The authors feel the PES-indicated initial glucose threshold levels of 55-65 mg/dL, comparable to hypoglycemia thresholds in older children and adults, could result in excessive screening and treatment of asymptomatic infants. Based on available clinical and neurodevelopmental outcomes data, there is a paucity of evidence that lower glucose concentrations result in adverse outcomes.
- Adamkin (2017) provided an overview of the screening and management of postnatal glucose homeostasis in asymptomatic infants. Per AAP recommendations, the lowest acceptable glucose level after the first feedings is 25 mg/dL and during the first four hours of life or during transition after birth actionable levels are between 25 and 40 mg/dL. From 4-24 hours of age, the lowest acceptable level is noted as 35 mg/dL with the actionable range indicated at 35-45 mg/dL. The AAP guidelines do not address acceptable glucose levels at 24-48 hours of life but the author recommends >45 mg/dL

during this time period. For those infants with borderline glucose levels or those who require treatment for low levels, a delay in discharge should be considered until they maintain consistent glucose levels >70 mg/dL.

Discharge Decision-Making

- A document from the American Academy of Pediatrics authored by Benitz et al (2015) outlined discharge criteria for healthy term newborns. Seventeen items comprised the minimum discharge criteria for a term infant (defined as between 37-0/7 and 41-6/7 weeks' gestation) following an uncomplicated course of pregnancy, labor, and delivery were detailed. The authors indicated the decision to discharge should be a joint determination between the mother, her obstetrical care provider and other health care staff involved in care of the maternal-infant dyad. The length of hospitalization should include consideration of the health of the mother and infant, maternal ability and confidence to provide infant cares, sufficient home support systems and adequate access to follow-up care.
- The goal of a retrospective study by Temple et al (2015) was to create a predictive model identifying infants who were near discharge so nonmedical factors would not result in delay. This model utilized real-time data from daily progress notes. Four subpopulations were developed: prematurity, cardiac disease, gastrointestinal surgical disease and neurosurgical disease (spina bifida, hydrocephalus, microcephalus and congenital anomalies). Neurosurgical disease was the only population that consistently underperformed using the model. The remaining three populations performed similarly with improved prediction as the date to discharge became smaller and more clinical information was included. The most predictive features were feeding metrics, gestational age and weight. The metrics involving infused medications, caffeine use, apnea and bradycardia, and oxygen use did not have a significant impact on the model's predictive power.
- In 2008 the American Academy of Pediatrics updated their Hospital Discharge of the High-Risk Neonate policy statement. This document provides recommendations regarding infant readiness and timing of discharge, caregiver education, follow-up care, and the discharge planning process.
- An AAP clinical report by Engle et al (2007) addressed the developmental immaturity of late-preterm infants, defined as 34^{0/7} through 36^{6/7} weeks' gestation. Recommendations for the minimum discharge criteria of this patient population included 24 hours of successful breast or bottle feeding and stable vital signs, including an axillary temperature of 36.5-37.4°C in an open crib, for 12 hours prior to discharge.
- A retrospective analysis by Brandon et al (2009) evaluated the effect of maternal health insurance status on the outcomes of premature neonates. The authors concluded infants with Medicaid managed care were weaned to an open crib at a later date and had a longer length of hospital stay than infants with private health insurance. Differences in NICU discharge processes were also identified between these two infant cohorts with more private insurance infants discharged home on oxygen and apnea monitors.

Caregiver Support and Education

- Purdy et al (2015) provided recommendations on reducing parental stress in the discharge planning process. Emotional support should be provided with

trained personnel to identify families at economic, social and psychological risk. To ensure success in breastfeeding a pre- and post-discharge plan, access to breast pumps and familial support should be provided. Education for the infant caregivers is essential for a seamless transition of the infant to the home setting. Competence in all infant cares should be demonstrated prior to discharge. A clearly written discharge plan outlining pre-scheduled appointments and provider contact information should be provided to the family. Post-discharge home visits can provide additional lactation support and allow for evaluation of the home environment.

- Craig et al (2015) provided recommendations for family-centered developmental care (FCDC) in the NICU. The FCDC model incorporates the family in the medical decision-making and supportive care of their infant in order to minimize the negative effects of the NICU stay on the parent-infant relationship. Parents/caregivers are considered part of the medical team and participate in all rounds and reports with unfettered access to the infant's medical records. There is an emphasis on parental participation to maximize the amount of developmentally appropriate care that can be provided to their infant. Preparations for discharge should begin at the time of NICU admission with a focus on parental education, support and opportunities to develop care competencies. The authors stressed the importance of NICU policies to support FCDC for each infant.

Apnea and Bradycardia

- A clinical report from the American Academy of Pediatrics authored by Eichenwald et al (2016) reviewed the evidence on the definition, epidemiology and treatment of apnea of prematurity. A significant variation in apnea monitoring practices among NICUs has been observed throughout the country. Based on an observational study by Henderson-Smart it was noted that the proportion of infants with apnea decreases significantly with increasing gestational age, particularly beyond 30 weeks' gestation. Implementation of policies and procedures for documenting and monitoring cardiorespiratory events would promote consistency in discharge timing. Discharge readiness would include an event-free period of time which may require individualization based on the infant's gestational age at birth and characteristics of the recorded events.
- Lorch et al (2011) evaluated apnea and bradycardia events in preterm infants. This retrospective cohort study of infants born at ≤ 34 weeks' gestation found that there was a 95% success rate reached with a 7 day apnea or bradycardia free interval. Infants with a gestational age of ≤ 30 weeks' gestation had a 5% to 15% lower success rate than infants with a gestational age more than 30 weeks. The authors concluded that the risk of recurrence for apnea or bradycardia differed depending on the gestational age of the infant and the postmenstrual age of the last apnea or bradycardia event.

Tracheostomy

- A retrospective cohort study by DeMauro et al (2014) evaluated patient outcomes after tracheostomy in very preterm infants. Included in this study were 304 infants <30 weeks' gestation who underwent tracheostomy. The impact of tracheostomy timing (before and after 120 days of life) on patient outcomes was also assessed. The incidence of death or neurodevelopmental impairment was identified as lower in the infants who received tracheostomies

before 120 days of life as compared to those who underwent this procedure after 120 days of life.

Immunizations

- A prospective observational study by Furck et al (2010) evaluated adverse events following immunizations in infants born at <1500 grams. They found apnea appeared more frequently in infants who were younger at the time of immunization but concluded vaccination of premature infants whose birth weight was <1500 grams was safe.

Congenital Heart Disease Screening

- Kempter et al (2011) outlines recommendations for critical congenital heart disease (CCHD) screening developed by a work-group comprised of members selected by the Secretary's Advisory Committee on Heritable Disorders in Newborns and Children, the American Academy of Pediatrics, the American College of Cardiology Foundation, and the American Heart Association. This work-group found sufficient evidence to recommend CCHD screening in well-infant and intermediate care nurseries.
- In 2012, the American Academy of Pediatrics (AAP) published a policy statement which endorsed the September 2011 HHS Secretary's recommendation for CCHD screening. This statement is directed at screening of healthy newborn infants at least 24 hours of age or as late as possible if early discharge is planned. Screening would be performed via pulse oximetry reading of the right hand and one foot. Passing results would include a reading of $\geq 95\%$ in either extremity with a $\leq 3\%$ absolute difference between the upper and lower extremity.

Hyperbilirubinemia

- Bhutani et al (2013) evaluated the combined use of total serum bilirubin (TSB) and clinical risk factors of healthy infants ≥ 35 weeks' gestation to determine whether this assessment could more accurately identify infants who would need subsequent phototherapy. They concluded pre-discharge TSB (adjusted for postnatal age) and clinical risk factor assessment is the best evaluation for predicting subsequent phototherapy use and this strategy could improve the outcomes of healthy infants discharged early.
- The AAP Subcommittee on Hyperbilirubinemia (2004) developed guidelines on the prevention and management of hyperbilirubinemia in newborn infants ≥ 35 weeks' gestation. Recommendations included timing of bilirubin levels following cessation of phototherapy and follow-up management based on the risk for hyperbilirubinemia.

Ophthalmology Screening

- A clinical statement developed by the American Academy of Pediatrics Section on Ophthalmology, American Academy of Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus and American Association of Certified Orthoptists (Fierson, 2013) updated a prior 2006 statement on screening of preterm neonates for retinopathy of prematurity (ROP). These recommendations address when the initial and follow-up ROP screening exam(s) should be performed based on the infant's postmenstrual age and also the severity of comorbid conditions.

Hearing Screening

- The American Academy of Pediatrics (AAP) Joint Committee on Infant Hearing (2007) provided guidelines on hearing screening for infants in the NICU. This position statement recommends hearing screening in the NICU be performed using auditory brainstem response (ABR) technology for infants who were admitted for > 5 days. Automated ABR testing can identify possible neural hearing loss so appropriate audiology referral can be completed after discharge.

Feeding

- The AAP Committee on Nutrition (Kleinman, 2013) provided policies and recommendations related to infant feeding. These recommendations included information on the preparation of infant formula for enteral feedings formulated to meet the nutritional needs of the preterm infant.
- Sturm (2005) described the implementation of a home gavage program for preterm infants. Infants were able to be discharged an average of 10-12 days earlier than those who were required to attain full oral feeds. In 52 infants participating in this program, there were no readmissions related to the gavage feeding.
- The American Speech-Language-Hearing Association (ASHA) issued an official statement on speech-language pathology services provided to infants and families in the NICU environment (2004). This document outlines the knowledge and skills necessary for assessment and intervention of infants requiring services for communication, cognition, feeding and/or swallowing disorders.

Weight Loss

- Flaherman et al (2015) analyzed weight loss in 108,907 exclusively breastfed infants. The data demonstrated substantially different weight loss based on the type of delivery. This difference continued to be detected for a period of time following birth. The authors also concluded that weight loss in excess of 10% of birth weight commonly occurred in the early postnatal period.
- Miller et al (2015) developed weight loss nomograms for formula fed late preterm and term newborns. Based on data obtained from 14 Kaiser Permanente Northern California hospitals between 2009 and 2013. A total of 7,075 infants were included in this analysis, 4,525 who were delivered vaginally and 2,550 who were delivered via cesarean section. The authors identified a median weight loss of 2.9% at 48 hours of age in the vaginally delivered infants and median weight losses of 3.7% and 3.5% at 48 and 72 hours respectively following cesarean delivery. It was uncommon for an infant to demonstrate >7% weight loss following vaginal delivery and >8% weight loss following cesarean delivery.

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Revision History

The following are approved changes incorporated into the revision numbers indicated below.

Revision	Date	Description of Change
V1.0	05/16/2013	New clinical guideline (MB)
V2.0	05/01/2014	Job aid revised into medical necessity clinical guideline. (CE)
V2.0	09/08/2014	Will replace JA2229740 on 01/01/2015. (CE)
V3.0	06/03/2015	Annual review with update by RS. (CE)
V4.0	05/05/2016	Annual review with revisions by RS. Information on hypoglycemia, pre-discharge MRI, tracheostomy, gastrostomy tube placement, erythropoietin use and exclusive human milk-based diet added. (CE)
V5.0	05/05/2017	Annual review with revisions by AJ. 72-hour glucose level was revised. Information on brief bradycardia episodes, discharge planning for complex infant and speech-language intervention was added. (CE)
V6.0	05/04/2018	Annual review by AJ. A directive that there should be no smoking in the car or around the infant was added. Approved by MTAC 06/07/2018. (CE)