

Clinical Policy: NICU Apnea Bradycardia Guidelines

Reference Number: CP.MP.82

Last Review Date: 05/20

[Revision Log](#)

See [Important Reminder](#) at the end of this policy for important regulatory and legal information.

Description

The purpose of this guideline is to assist with continuing care, discharge planning, and the transition to outpatient and home care of babies affected by ongoing neonatal apnea and bradycardia events. It will also serve as a guideline for the approval of continued stay for neonatal admissions. The recommendations below are based primarily off meta-analyses and practice patterns, as there are few controlled trials in this area.

Guidelines

Infants **may** be considered ready for discharge from inpatient care for cardiorespiratory events or caffeine administration when meeting the guidelines in I, as applicable.

- I. Discharge from inpatient care for significant cardiorespiratory events**, all of the following:
 - A. Infant demonstrates maturity of respiratory control and one of the following:
 1. Infant has had no **clinically significant** cardiorespiratory events (apnea and bradycardia) for 5 days prior to discharge, all of the following:
 - a. No apnea \geq 20 seconds;
 - b. No apnea < 20 seconds with bradycardia of < 80 beats per minute (may consider using a heart rate decrease > 33.3% below baseline for older, more mature infants or those with a lower baseline heart rate);
 - c. No apnea < 20 seconds with valid, prolonged oxygen desaturations < 85% (excludes transient oxygen desaturation < 85% unless requiring supplemental oxygen to resolve);
 - d. No bradycardia < 70 beats per minute (unrelated to feedings);
 - e. No events requiring stimulation, artificial ventilation (bagging or intubation), or supplemental oxygen support to restore normal breathing, heart rate, and oxygenation;
 2. Significant events (as defined in I.A.1) continue to near-term or longer and all of the following:
 - a. Cardiorespiratory events appear, after evaluation for potential causes of apnea, to be associated with gastro-esophageal reflux;
 - b. Appropriate anti-reflux measures appear to resolve bradycardia or apnea (note: 5 days of observation may not be required in this case);
 3. The infant is having non-clinically significant, self-limited apnea spells (without color change or severe bradycardia) and all of the following:
 - a. Does not require stimulation to breathe again;
 - b. Will be discharged to home with a cardiorespiratory monitor;
 - c. Parents or caregivers have attended infant CPR training;

CLINICAL POLICY**NICU Apnea Bradycardia Discharge Guidelines**

- B. If nasal cannula airflow is introduced to address apnea/bradycardia events, the infant should be free of clinically significant events for 5 days on the same level of support contemplated for the child's discharge;
- C. Infant has not received caffeine citrate for at least 7 days prior to planned discharge;
- D. Infant has no other condition(s) requiring inpatient care;
- E. An assessment of cardiorespiratory stability in a car seat is recommended prior to discharge for infants born at < 37 weeks gestation or with other risk factors for respiratory compromise (e.g. neuromuscular, orthopedic problems);
- F. Parents or caregivers are encouraged to attend an infant CPR class.

Note: Cardiorespiratory events associated with feeding are not uncommon in premature infants due to incoordination of sucking, swallowing and breathing. The significance of these events needs to be assessed individually (e.g., severity of bradycardia, degree of desaturation, intervention(s) required, etc.). Episodes associated with oral feedings may not be the same as episodes recorded while sleeping. Parents should be instructed in the technique of identifying feeding problems and correcting them.

Note: Caffeine has a relatively long half-life and levels may be therapeutic in preterm infants for as long as 7 days or more after discontinuation. It is appropriate to observe an infant for 7 days after the withdrawal of caffeine, but since the discontinuation often occurs well before discharge, a "caffeine countdown" should not typically prolong the date of discharge.^{1-4, 6}

Background

Apnea of prematurity is a common condition of premature infants, often closely associated with bradycardia. The condition often results in prolonged lengths of stay in the neonatal intensive care units, as well as considerable parental anxiety. There is little objective evidence to recommend one.

The Committee on Fetus and Newborn has defined apnea of prematurity as a cessation of breathing that lasts for at least 20 seconds or is of shorter duration but accompanied by bradycardia, cyanosis or pallor in an infant younger than 37 weeks' gestational age. The majority of preterm infants often cease to have apnea by 37 weeks' post-conceptual age, however infants born at 24 to 28 weeks gestation have frequently been found to have apnea that persists longer, often to 44 weeks post-conceptual age.

Episodes of bradycardia may be associated with oral feedings and also with apnea events that occur while sleeping. Bradycardia associated with feeding that resolves with interruption of feeding is generally not regarded as a reason to delay discharge. Pathologic bradycardia (not associated with feeding) may be treated with pharmacologic or non-pharmacologic therapy. Non-pharmacologic measures include supplemental oxygen, artificial ventilation and physical stimulation.

When considering pharmacologic treatment, the most common agent used today is caffeine citrate. Loading doses of 20mg/kg have been used based on current references. Because of the relatively long half-life of caffeine citrate, as much as 87 hours in infants of < 33 weeks' gestation, caffeine citrate has been ideal for once a day dosing in most babies. Also, because of

CLINICAL POLICY

NICU Apnea Bradycardia Discharge Guidelines

the relatively large therapeutic index, the drug has been found to be relatively safe. Maintenance dosing begins 24 hours after the loading dose at 5-8 mg/kg daily. If there is no clinical improvement in the number of significant events, then a caffeine level may be obtained. The therapeutic trough serum concentration is 5 to 25 mg/L.⁶

Cardiorespiratory monitoring is indicated when an infant has an ongoing medical condition that increases risk for apnea, airway obstruction, or hypoxemia. Such conditions include, but are not limited to, the following:

- Pharmacological treatment of respiratory immaturity or continued apnea at term or near-term gestation (apnea of prematurity or apnea of infancy)
- Chronic lung disease (eg, bronchopulmonary dysplasia), especially those requiring supplemental oxygen, positive airway pressure, or mechanical ventilatory support
- Congenital myasthenic syndromes
- Tracheostomy or other airway abnormalities.

Reviews, Revisions, and Approvals	Date	Approval Date
Policy created Specialist review – Neonatal Pulmonologist	06/13	06/13
Added under <i>I</i> that infants <28 weeks gestation might need a longer event-free period prior to discharge. <i>I.E.</i> added heart rate. Added under <i>III</i> that parents should be encouraged to room overnight with infant before discharge. Removed “continuous nasogastric feeding” under <i>III</i> as cardiorespiratory monitoring would only detect late complications of aspiration. Minor wording changes made throughout policy for clarity. Specialist reviewed.	06/16	06/16
References reviewed and updated. Changed wording in <i>I</i> for clarity. Added statement to description that guidelines are based on practice patterns and meta-analyses, due to lack of controlled trials.	06/17	06/17
Revised statement in section I, clarifying “possibly longer” to “up to 7 days”. Changed < 28 weeks gestation to < 32 weeks gestation. References reviewed and updated. Replaced in background, “A target level of 10-20ug/ml is sought.” with “The therapeutic trough serum concentration is 5 to 25 mg/L” as per UpToDate. Clarified statement under II. Caffeine that discontinuation of caffeine “often” occurs before discharge. Specialist reviewed- Neonatologist	05/18	05/18
Restructured guidelines and specified that these are “guidelines.” In discharge criteria for significant events and on home respiratory monitoring, added that the infant has no other conditions requiring inpatient care. Reworded sections headings and organized information accordingly. Changed all instances of “parents” to “parents or caregivers.” Combined caffeine criteria section into the “discharge for significant cardiorespiratory events” section.	1/19	

CLINICAL POLICY
NICU Apnea Bradycardia Discharge Guidelines



Reviews, Revisions, and Approvals	Date	Approval Date
Removed option in I.A. for preterm infants to be free of clinically significant events for 7 days vs. 5. Moved section III on home cardiorespiratory monitoring to background, except for requirement that caregiver attends CPR class, which was moved to criteria in I.3. Reviewed by pediatric pulmonologist, pediatrician, and neonatologist.	05/19	05/19
References reviewed and updated	05/20	05/20

References

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4. Eichenwald EC and Committee on Fetus and Newborn. Apnea of prematurity. *Pediatrics*, originally published online December 1, 2015; DOI: 10.1542/peds.2015-3757
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Important Reminder

This clinical policy has been developed by appropriately experienced and licensed health care professionals based on a review and consideration of currently available generally accepted standards of medical practice; peer-reviewed medical literature; government agency/program approval status; evidence-based guidelines and positions of leading national health professional organizations; views of physicians practicing in relevant clinical areas affected by this clinical policy; and other available clinical information. The Health Plan makes no representations and accepts no liability with respect to the content of any external information used or relied upon in developing this clinical policy. This clinical policy is consistent with standards of medical practice current at the time that this clinical policy was approved. “Health Plan” means a health plan that has adopted this clinical policy and that is operated or

CLINICAL POLICY

NICU Apnea Bradycardia Discharge Guidelines



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Note: For Medicare members, to ensure consistency with the Medicare National Coverage Determinations (NCD) and Local Coverage Determinations (LCD), all applicable NCDs, LCDs, and Medicare Coverage Guidelines should be reviewed prior to applying the criteria set forth in this clinical policy. Refer to the CMS website at <http://www.cms.gov> for additional information.

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