Clinical Policy: NICU Apnea Bradycardia Guidelines

Reference Number: CP.MP.82
Date of Last Revision: 01/25 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 continuity of care, discharge planning, and the transition to outpatient and home care of infants affected by ongoing neonatal apnea and bradycardia events. It also serves as a guideline for the approval of continued stay for neonatal admissions. The recommendations below are based primarily on meta-analyses and practice patterns, as there are few random controlled trials in this area.

Policy/Criteria
It is the policy of health plans affiliated with Centene Corporation® that 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, bradycardia, and desaturation) for five to seven days prior to discharge, as evidenced by all of the following:
a. No apnea ≥ 20 seconds;
b. No apnea < 20 seconds with bradycardia of < 80 beats per minute;
c. No apnea < 20 seconds with valid, prolonged or frequent oxygen desaturations ≤ 85% (excludes transient oxygen desaturation ≤ 85% unless requiring supplemental oxygen to resolve);
d. No isolated bradycardia < 80 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. After evaluation for potential causes of apnea, the cardiorespiratory events appear to be associated with gastro-esophageal reflux;
b. Appropriate anti-reflux measures appear to resolve or significantly reduce the severity and duration of bradycardia or apnea events (note: five 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. There has not been a clinically significant cardiorespiratory event (defined in I.A.1) for five to seven days prior to discharge;

d. Parents or caregivers agree with the plan of care and have demonstrated proficiency in managing the cardiorespiratory monitor, providing stimulation, and have completed infant cardiopulmonary resuscitation (CPR) training;
e. Home situation has been assessed and deemed adequate;

B. If nasal cannula airflow is introduced to address apnea/bradycardia events, the infant should be free of clinically significant events (defined in I.A.1) for five to seven days on the same level of support planned for the infant's discharge;
C. Infant has not received caffeine citrate for at least seven days prior to planned discharge;
D. Infant has no additional condition(s) requiring inpatient care.

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 should be evaluated on an individual basis (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.
- Caffeine has a relatively long half-life, and levels may be therapeutic in preterm infants for as long as ten days after discontinuation.[1,2,3,4]
- An assessment of cardiorespiratory stability in a car seat or car bed is recommended prior to discharge for infants born at < 37 weeks gestation or for infants with other risk factors for cardiorespiratory compromise.
- Parents or caregivers are encouraged to attend an infant CPR class and required to complete CPR training as noted in I.A.3.d.
- Additional days may be needed for observation prior to discharge based on gestational age at birth and recorded events.

Background

Apnea of prematurity is a common condition of premature infants, often closely associated with bradycardia.[5,6] The condition often results in prolonged lengths of stay in the neonatal intensive care units, as well as considerable parental anxiety. Each infant admitted to the neonatal intensive care unit (NICU) undergoes a unique hospital experience based upon their gestational age with discharge heavily dependent upon, at a minimum, the attainment of physiological maturity.[7]

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. Most cases are resolved by 37 weeks' post-conceptional age; however, infants born younger than 28 weeks gestation frequently have apnea that persists longer, often to 44 weeks post-conceptional age.[1]

Episodes of bradycardia may be associated with oral feedings and also with apnea events that occur while sleeping.[6] Bradycardia associated with feeding that resolves with interruption of feeding is generally not regarded as a reason to delay discharge.[5,8] 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.[6]

Caffeine is recommended as a treatment option for infants with apnea of prematurity.[6] Caffeine citrate has a mean half-life of approximately 100 hours with some variation noted relative to gestational age at birth and chronological age.[7] Because of its relatively long half-life in infants of < 33 weeks gestation, caffeine citrate has been ideal for once per day dosing in most infants. Also, because of the relatively large therapeutic index, the drug has been considered relatively safe. Maintenance dosing begins 24 hours after the loading dose at 5 to 10 mg/kg daily. Routine drug levels are not necessary unless there are signs of caffeine toxicity, such as tachycardia.[6,9] Infants who fail to respond to caffeine therapy might require intubation, mechanical ventilation, or nasal intermittent positive pressure ventilation (NIPPV).[6]

Cardiorespiratory home 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[10]:

- Persistent apnea of prematurity or apnea of infancy
- Chronic lung diseases (e.g., 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	Revision Date	Approval Date
Policy created Specialist review – Neonatal Pulmonologist	06/13	06/13
References reviewed and updated	05/20	05/20
References reviewed and updated.	04/21	05/21
In I.A.1 and I.B., changed requirement for no clinically significant events before discharge from “5” to “5-7” days. Changed “review date” in the header to “date of last revision” and “date” in the revision log header to “revision date.”	06/21	06/21
Annual review completed. Expanded criteria I.A.3.c. into two criteria points by adding criteria I.A.3.d. Changed “child’s” to “infant’s” in criteria I.B. Reworded criteria former criteria I.E, now I.D., for clarity. Moved criteria I.E. and I.F. to notes section. Minor rewording in description, original notes, and background with no clinical significance. References reviewed and updated. Specialist reviewed.	06/22	06/22
Annual review. Minor rewording throughout criteria with no impact on criteria. Added clarifying language to Criteria I.A.1.c. and updated oxygen saturation percentage from < 85% to ≤ 85%. Updated wording in Criteria I.A.2.a. for clarity and flow. Updated Criteria I.A.2.b. to include verbiage for significantly reducing the severity and duration of bradycardia or apnea events. Updated Criteria I.A.3.d. to include that parents or caregivers agree with the plan of care. Added Criteria I.A.3.e. regarding the home situation being assessed and deemed adequate. Expanded information on CPR requirement in Note section at end of	01/24	01/24

Reviews, Revisions, and Approvals	Revision Date	Approval Date
Criteria. Updated Note section at end of Criteria to include when additional observation days may be needed. Minor rewording in Background with no impact on criteria. References reviewed and updated. Criteria I.A.1.c., Criteria I.A.2.a., and Criteria I.A.2.b. reviewed by internal specialist. Policy reviewed by external specialist.		
Annual review. Replaced "Guidelines" section title with "Policy/Criteria" title and added verbiage regarding health plans affiliated with Centene Corporation®. Updated Criteria I.A.1. to include desaturation as a clinically significant cardiorespiratory event and updated criteria verbiage for clarity. Removed notation in Criteria I.A.1.b. regarding consideration of using heart rate decrease > 33.3% below baseline for older, more mature infants or those with a lower baseline heart rate. Updated Criteria I.A.1.d. from bradycardia to isolated bradycardia and updated from < 70 beats per minute to < 80 beats per minute. Minor rewording for clarity in Criteria I.B. and Criteria I.D. Updated Note at end of criteria section to state caffeine levels may be therapeutic in preterm infants for as long as ten days after discontinuation. Removed statement in Note section regarding "caffeine countdown." Added car bed and added clarifying language to Note section regarding assessment of cardiorespiratory stability in a car seat. Background updated with no impact on criteria. References reviewed and updated. Reviewed by internal specialists.	01/25	01/25

References

1. American Academy of Pediatrics Committee on Fetus and Newborn. Hospital discharge of the high-risk neonate. *Pediatrics*. 2008;122(5):1119-1126. doi:10.1542/peds.2008-2174
2. Darnall RA, Kattwinkel J, Nattie C, Robinson M. Margin of safety for discharge after apnea in preterm infants. *Pediatrics*. 1997;100(5):795 to 801. doi:10.1542/peds.100.5.795
3. Eichenwald EC, Aina A, Stark AR. Apnea frequently persists beyond term gestation in infants delivered at 24 to 28 weeks. *Pediatrics*. 1997;100(3 Pt 1):354 to 359. doi:10.1542/peds.100.3.354
4. Lorch SA, Srinivasan L, Escobar GJ. Epidemiology of apnea and bradycardia resolution in premature infants. *Pediatrics*. 2011;128(2):e366 to e373. doi:10.1542/peds.2010-1567
5. Eichenwald EC; Committee on Fetus and Newborn, American Academy of Pediatrics. Apnea of Prematurity. *Pediatrics*. 2016;137(1):10.1542/peds.2015-3757. doi:10.1542/peds.2015-3757
6. Martin R. Management of apnea of prematurity. UpToDate. www.uptodate.com. Updated October 17, 2024. Accessed November 22, 2024.
7. Anderson N, Narvey M, Canadian Paediatric Society Fetus and Newborn Committee. Discharge planning of the preterm infant. March 04, 2022. https://cps.ca/documents/position/discharge-planning-of-the-preterm-infant. Accessed November 25, 2024.
8. Jefferies AL; Canadian Paediatric Society, Fetus and Newborn Committee. Going home: Facilitating discharge of the preterm infant. *Paediatr Child Health*. 2014;19(1):31 to 42.

9. Long JY, Guo HL, He X, et al. Caffeine for the Pharmacological Treatment of Apnea of Prematurity in the NICU: Dose Selection Conundrum, Therapeutic Drug Monitoring and Genetic Factors. *Front Pharmacol*. 2021;12:681842. Published 2021 Jul 26. doi:10.3389/fphar.2021.681842
10. Corwin MJ. Use of home cardiorespiratory monitors in infants. UpToDate. www.uptodate.com. Updated May 15, 2023. Accessed November 25, 2024.
11. Bodamer O. Neuromuscular junction disorders in newborns and infants. UpToDate. www.uptodate.com. Updated September 30, 2024. Accessed November 25, 2024.
12. Smith VC, Stewart J. Discharge planning for high-risk newborns. UpToDate. www.uptodate.com. Updated April 10, 2023. Accessed November 25, 2024.
13. Chandrasekharan P, Rawat M, Reynolds AM, Phillips K, Lakshminrusimha S. Apnea, bradycardia and desaturation spells in premature infants: impact of a protocol for the duration of 'spell-free' observation on interprovider variability and readmission rates. *J Perinatol*. 2018;38(1):86 to 91. doi:10.1038/jp.2017.174
14. Martin R. Pathogenesis, clinical manifestations, and diagnosis of apnea of prematurity. UpToDate. www.uptodate.com. Updated October 17, 2024. Accessed December 18, 2024.
15. Ji D, Smith PB, Clark RH, et al. Wide variation in caffeine discontinuation timing in premature infants. *J Perinatol*. 2020;40(2):288-293. doi:10.1038/s41372-019-0561-0
16. Simsic JM, Masterson K, Kogon BE, Kirshbom PM, Kanter KR. Pre-hospital discharge car safety seat testing in infants following congenital heart surgery. *Pediatr Cardiol*. 2008;29(2):313-316. doi:10.1007/s00246-007-9021-2

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 administered, in whole or in part, by Centene Management Company, LLC, or any of such health plan’s affiliates, as applicable.

The purpose of this clinical policy is to provide a guide to medical necessity, which is a component of the guidelines used to assist in making coverage decisions and administering benefits. It does not constitute a contract or guarantee regarding payment or results. Coverage decisions and the administration of benefits are subject to all terms, conditions, exclusions and limitations of the coverage documents (e.g., evidence of coverage, certificate of coverage, policy, contract of insurance, etc.), as well as to state and federal requirements and applicable Health Plan-level administrative policies and procedures.

This clinical policy is effective as of the date determined by the Health Plan. The date of posting may not be the effective date of this clinical policy. This clinical policy may be subject to applicable legal and regulatory requirements relating to provider notification. If there is a discrepancy between the effective date of this clinical policy and any applicable legal or regulatory requirement, the requirements of law and regulation shall govern. The Health Plan

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This clinical policy does not constitute medical advice, medical treatment or medical care. It is not intended to dictate to providers how to practice medicine. Providers are expected to exercise professional medical judgment in providing the most appropriate care, and are solely responsible for the medical advice and treatment of members/enrollees. This clinical policy is not intended to recommend treatment for members/enrollees. Members/enrollees should consult with their treating physician in connection with diagnosis and treatment decisions.

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Note: For Medicaid members/enrollees, when state Medicaid coverage provisions conflict with the coverage provisions in this clinical policy, state Medicaid coverage provisions take precedence. Please refer to the state Medicaid manual for any coverage provisions pertaining to this clinical policy.

Note: For Medicare members/enrollees, 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.