MEDICAL POLICY

POLICY TITLE	HOME CARDIORESPIRATORY MONITORING
POLICY NUMBER	MP- 6.008

Original Issue Date (Created):	**7/1/2002**
Most Recent Review Date (Revised):	**6/12/2020**
Effective Date:	**9/1/2020**

I. POLICY

Home cardiorespiratory (pneumogram) monitoring may be considered **medically necessary** when initiated in infants younger than 12 months of age (see Policy Guidelines for further discussion of age limits) in the following situations:

- Those who have experienced a brief resolved unexplained event (previously known as *apparent life-threatening event*) and are not considered lower risk following clinical evaluation; or
- Those with tracheostomies or anatomic abnormalities that make them vulnerable to airway compromise; or
- Those with neurologic or metabolic disorders affecting respiratory control, including central apnea and apnea of prematurity; or
- Those with chronic lung disease (i.e., bronchopulmonary dysplasia); see Policy Guidelines).

Home cardiorespiratory monitoring (pneumogram) is considered **not medically necessary** in infants with any siblings with a history of sudden infant death syndrome (SIDS), but without at least one of the indications cited.

Home cardiorespiratory monitoring (pneumogram) in all other conditions, including but not limited to the diagnosis of obstructive sleep apnea is considered **investigational,** as there is insufficient evidence to support a conclusion concerning the health outcomes or benefits associated with this procedure.

POLICY GUIDELINES

This policy does not address the use of an unattended (unsupervised) home sleep study for the diagnosis and management of obstructive sleep apnea. If obstructive sleep apnea is a consideration, refer to MP 2.045.

This policy applies only to the use of U.S. Food and Drug Administration (FDA) –approved home monitoring systems. Various commercially available infant monitoring devices are marketed to parents for monitoring infants' sleep, breathing, and behavior. Although some of the

devices include pulse oximetry, they are not sold as medical devices and are therefore not cleared for marketing by FDA.

The 2016 Clinical Practice Guidelines from the American Academy of Pediatrics (Tieder et al, 2016) defined brief resolved unexplained event (BRUE; formerly *apparent life threatening event* [ALTE]) as: "An event occurring in an infant younger than 1 year when the observer reports a sudden, brief, and now resolved episode of 1 or more of the following:

- Cyanosis or pallor;
- Absent, decreased, or irregular breathing;
- Marked change in tone (hyper- or hypotonia);
- Altered level of responsiveness."

The diagnosis of bronchopulmonary dysplasia (BPD) is dependent on gestational age, and is outlined in Table PG1 based on the 2001 consensus definition from the U.S. National Institute of Child Health and Human Development (Jobe & Banclari, 2001)

Table PG1. Diagnosis of BPD

Diagnosis	**Gestational Age**	
	Less than 32 Weeks	32 Weeks or Greater
Time point of assessment	36 wk PMA or discharge to home, whichever comes first	Greater than 28 days but less than 56 days postnatal age or discharge to home, whichever comes first
	Treatment With Oxygen greater than 21% for at Least 28 Days Plus	
Mild BPD	Breathing room air at 36 wk PMA or discharge, whichever comes first	Breathing room air by 56 days postnatal age or discharge, whichever comes first
Moderate BPD	Need for 30% oxygen or less at 36 wk PMA or discharge, whichever comes first	Need for 30% oxygen or less at 56 days postnatal age or discharge, whichever comes first
Severe BPD	Need for 30% oxygen or greater and/or positive pressure at 36 wk postnatal age or discharge, whichever comes first	Need for 30% oxygen or greater and/or positive pressure at 56 days postnatal age or discharge, whichever comes first

Adapted from Jobe & Bancalari (2001).
BPD: bronchopulmonary dysplasia; PMA: postmenstrual age.

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As suggested by a policy statement from the American Academy of Pediatrics (see Rationale section), the physician should establish a review of the problem, a plan of care, and a specific plan for periodic review and termination. Clear documentation of the reasons for continuing monitoring is necessary should monitoring beyond 43 weeks of postmenstrual age be recommended. Home cardiorespiratory monitoring for apnea is generally not considered appropriate for pediatric patients older than 1 year of age. There may be a subset of young children who require cardiorespiratory monitoring beyond 1 year of age, such as certain patients with home noninvasive or invasive ventilator use or chronic lung disease.

Home monitors should be equipped with an event recorder.

Cross-reference:

MP-2.045 Diagnosis and Medical Management of Obstructive Sleep Apnea

II. PRODUCT VARIATIONS TOP

This policy is only applicable to certain programs and products administered by Capital BlueCross please see additional information below, and subject to benefit variations as discussed in Section VI below.

FEP PPO- Refer to FEP Medical Policy Manual MP-1.01.06, Home Apnea Monitoring in Children. The FEP Medical Policy Manual can be found at: https://www.fepblue.org/benefit-plans/medical-policies-and-utilization-management-guidelines/medical-policies.

III. DESCRIPTION/BACKGROUND TOP

HOME MONITORING

Apnea Monitoring

Home apnea monitors track respiratory effort and heart rate, and are typically utilized to monitor central apnea of prematurity in newly discharged at-risk or high-risk premature infants (infants are at increased risk of cardio respiratory events until 43 weeks post-conceptual age) and in other infants at risk of apnea. An alarm will sound if there is respiratory cessation (central apnea) beyond a predetermined time limit (e.g., 20 seconds) or if the heart rate falls below a preset rate (bradycardia) to notify the parent that intervention (stimulation, mouth-to-mouth resuscitation, cardiac compressions) is required. Unless an oximeter is added to the two-channel devices, home apnea monitors are not effective at detecting obstructive sleep apneas. False alarms due to movement artifact are common with pulse oximeters, and these devices are not intended for the diagnosis of sleep-disordered breathing in a child.

Sudden Infant Death Syndrome

Sudden infant death syndrome (SIDS) refers to the sudden death of an infant younger than 1 year of age; the circumstances are unexplained after a thorough investigation that includes autopsy,

examination of the death scene, and review of the family history. As a means to decrease the incidence of SIDS, in the 1970s, cardiorespiratory monitoring was suggested. However, clinical studies have failed to establish that the use of home monitoring reduced the incidence of SIDS. The American Academy of Pediatrics (AAP;2011) reiterated its recommendations that home monitoring should not be used as a strategy to prevent SIDS.[1] Instead, AAP recommends that proven practices should be promoted to reduce the incidence of SIDS, which include supine sleeping, use of a firm bed surface, routine immunizations, breast-feeding, and avoidance of exposure to tobacco smoke, alcohol, and illegal drugs. One of these proven practices (supine sleeping) has been promoted in the "Safe to Sleep" campaign (formerly called the "Back to Sleep" campaign) initiated in 1994 by AAP, as well as by the National Institute of Child Health and Development and the Maternal Child Health Bureau of Human Resources and Services Administration. The campaign is a national process to educate health care professionals, parents, and caregivers about the significance of placing infants in the supine sleeping position to reduce SIDS.[2] The incidence of SIDS in the United States decreased dramatically between 1992 and 2001, especially in the years after the first supine sleep position recommendations were issued.

Other Indications

Home cardiorespiratory monitors are used for reasons other than preventing SIDS. They include monitoring infants at high risk of respiratory compromise due to chronic ventilator or oxygen requirements, tracheostomies or anatomic abnormalities that make them vulnerable to airway compromise, and central apnea, including apnea, bradycardia, and oxygen desaturations associated with prematurity. Former premature infants with bronchopulmonary dysplasia[3] (i.e., neonatal chronic lung disease), which may lead to chronic oxygen requirement , may have indications for home cardiorespiratory monitoring.

An additional potential use of home cardiorespiratory monitors is monitoring infants who have had acute events associated with apnea, color change, or loss of tone. Originally, these events were referred to as *apparent life-threatening events* (ALTEs). ALTE was defined by a 1986 National Institutes of Health Conference as "an episode that is frightening to the observer and that is characterized by some combination of apnea (central or occasionally obstructive), color change (usually cyanotic or pallid but occasionally erythematous or plethoric), marked change in muscle tone (usually marked limpness), choking, or gagging. In some cases, the observer fears that the infant has died." In AAP (2016) issued updated clinical practice guideline, which proposed a replacement of the term ALTE with the term *brief resolved unexplained event* (BRUE), which is defined as follows[4]:

> "An event occurring in an infant younger than 1 year when the observer reports a sudden, brief, and now resolved episode of 1 or more of the following: (1) cyanosis or pallor; (2) absent, decreased, or irregular breathing; (3) marked change in tone (hyper- or hypotonia); and (4) altered level of responsiveness. A BRUE is diagnosed only when there is no explanation for a qualifying event after conducting an appropriate history and physical examination."

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Regulatory Status
A number of infant apnea/cardiorespiratory monitors have been cleared for marketing by the U.S. Food and Drug Administration through the 510(k) process. This includes the SmartMonitor 2 Apnea Monitor (Philip Children's Medical Ventures, Respironics), which is intended for continuous monitoring of respiration, heart rate, and pulse oximetry of infant patients in a hospital or home environment. Food and Drug Administration product code: NPF and DQA.

IV. RATIONALE

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SUMMARY OF EVIDENCE
For individuals who have a risk of respiratory failure in infancy who receive home cardiorespiratory monitoring, the evidence includes primarily observational studies. Relevant outcomes are overall survival and morbid events. For prevention of sudden infant death syndrome, the available published literature is primarily from a longitudinal cohort study, the CHIME study. Results from CHIME do not support the use of monitoring. For other respiratory conditions, there is a lack of published evidence due to small numbers of patients and the difficulty of enrolling infants with respiratory conditions. The evidence is insufficient to determine the effects of the technology on health outcomes.

V. DEFINITIONS

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APNEA is defined in infants as cessation of breathing for twenty (20) seconds or longer.

CENTRAL SLEEP APNEA refers to a form of sleep apnea which results from the lack of neurologic stimulation to breathe.

VI. BENEFIT VARIATIONS

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The existence of this medical policy does not mean that this service is a covered benefit under the member's health benefit plan. Benefit determinations should be based in all cases on the applicable health benefit plan language. Medical policies do not constitute a description of benefits. A member's health benefit plan governs which services are covered, which are excluded, which are subject to benefit limits and which require preauthorization. There are different benefit plan designs in each product administered by Capital BlueCross. Members and providers should consult the member's health benefit plan for information or contact Capital BlueCross for benefit information.

VII. DISCLAIMER

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Capital BlueCross's medical policies are developed to assist in administering a member's benefits, do not constitute medical advice and are subject to change. Treating providers are solely responsible for medical advice and treatment of members. Members should discuss any medical policy related to their coverage or condition with their provider and consult their benefit

information to determine if the service is covered. If there is a discrepancy between this medical policy and a member's benefit information, the benefit information will govern. If a provider or a member has a question concerning the application of this medical policy to a specific member's plan of benefits, please contact Capital BlueCross' Provider Services or Member Services. Capital BlueCross considers the information contained in this medical policy to be proprietary and it may only be disseminated as permitted by law.

VIII. CODING INFORMATION

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Note: This list of codes may not be all-inclusive, and codes are subject to change at any time. The identification of a code in this section does not denote coverage as coverage is determined by the terms of member benefit information. In addition, not all covered services are eligible for separate reimbursement.

Covered when medically necessary:

CPT Codes®								
94772	94774	94775	94776	94777				

HCPCS Code	Description
A4556	Electrodes (E.G., Apnea Monitor), Per Pair
A4557	Lead Wires (E.G., Apnea Monitor), Per Pair
E0618	Apnea Monitor, Without Recording Feature
E0619	Apnea Monitor, With Recording Feature

ICD-10-CM Diagnosis Code	Description
P22.0	Respiratory distress syndrome of newborn
P22.1	Transient tachypnea of newborn
P22.8	Other respiratory distress of newborn
P22.9	Respiratory distress of newborn, unspecified
P24.81	Neonatal aspiration with respiratory symptoms
P27.1	Bronchopulmonary dysplasia originating in the perinatal period
P27.8	Other chronic respiratory diseases in the perinatal period
P28.2	Cyanotic attacks of newborn
P28.3	Primary sleep apnea of newborn
P28.4	Other apnea of newborn
P28.5	Respiratory failure of newborn

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P28.81	Respiratory arrest of newborn
P28.89	Other specified respiratory conditions of newborn
P28.9	Respiratory condition of newborn, unspecified
P84	Other problems with newborn
R68.13	Apparent life threatening event in infant (ALTE)
Z93.0	Tracheostomy status
Z99.11	Dependence on respirator [ventilator] status
Z99.81	Dependence on supplemental oxygen

IX. REFERENCES

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1.Task Force on Sudden Infant Death Syndrome, Moon RY. SIDS and other sleep-related infant deaths: expansion of recommendations for a safe infant sleeping environment. Pediatrics. Nov 2011;128(5):1030-1039. PMID 22007004

2. National Institute of Child Health and Human Development (NICHD). Safe to Sleep. n.d.; https://www1.nichd.nih.gov/sts/Pages/default.aspx. Accessed June 15, 2020..

3. Jobe AH, Bancalari E. Bronchopulmonary dysplasia. Am J Respir Crit Care Med. Jun 2001;163(7):1723-1729. PMID 11401896

4. Tieder JS, Bonkowsky JL, Etzel RA, et al. Brief resolved unexplained events (formerly apparent life-threatening events) and evaluation of lower-risk infants. Pediatrics. May 2016;137(5). PMID 27244835

5. Hoppenbrouwers T, Hodgman JE, Ramanathan A, et al. Extreme and conventional cardiorespiratory events and epidemiologic risk factors for SIDS. J Pediatr. May 2008;152(5):636-641. PMID 18410765

6. Strehle EM, Gray WK, Gopisetti S, et al. Can home monitoring reduce mortality in infants at increased risk of sudden infant death syndrome? A systematic review. Acta Paediatr. Jan 2012;101(1):8-13. PMID 21910748

7. Committee on Fetus and Newborn, American Academy of Pediatrics. Apnea, sudden infant death syndrome, and home monitoring. Pediatrics. Apr 2003;111(4 Pt 1):914-917. PMID 12671135

8. AAP Publications Reaffirmed and Retired. Pediatrics. August 1 2012;130(2):e467-e468. PMID

9. McGovern MC, Smith MB. Causes of apparent life threatening events in infants: a systematic review. Arch Dis Child. Nov 2004;89(11):1043-1048. PMID 15499062

10. Tieder JS, Altman RL, Bonkowsky JL, et al. Management of apparent life-threatening events in infants: a systematic review. J Pediatr. Jul 2013;163(1):94-99 e91-96. PMID 23415612

11. Mittal MK, Donda K, Baren JM. Role of pneumography and esophageal pH monitoring in the evaluation of infants with apparent life-threatening event: a prospective observational study. Clin Pediatr (Phila). Apr 2013;52(4):338-343. PMID 23393308

12. *Veit L, Amberson M, Freiberger C, et al. Diagnostic evaluation and home monitor use in late preterm to term infants with apnea, bradycardia, and desaturations. Clin Pediatr (Phila). Nov 2016;55(13):1210-1218. PMID 26957524*
13. *Eichenwald EC, Committee on Fetus Newborn, American Academy of Pediatrics. Apnea of prematurity. Pediatrics. Jan 2016;137(1). PMID 26628729*
14. *American Academy of Pediatrics Committee on Fetus and Newborn. Hospital discharge of the high-risk neonate. Pediatrics. Nov 2008;122(5):1119-1126. PMID 18977994*
15. *Blue Cross Blue Shield Association Medical Policy Reference Manual. 1.01.06, Home Cardiorespiratory Monitoring. July 2019.*

Other:
T*aber's Cyclopedic Medical Dictionary, 20th edition.*

IX. POLICY HISTORY

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MP 6.008	**CAC 2/24/04**
	CAC 5/31/05
	CAC 4/25/06
	CAC 3/27/07 Discussion tabled until April meeting.
	CAC 4/24/07
	CAC 3/25/08
	CAC 3/31/09 Consensus
	CAC 3/30/2010 Consensus
	CAC 5/25/2010 Policy criteria revised to include central sleep apnea. Investigational statement added for all other conditions not specifically indicated in medical necessity criteria.
	CAC 4/24/12 Adopted BCBSA. Added age criteria of younger than 12 months to the medically necessary statement. Removed medically necessary statement for premature infants under 37 weeks gestation.
	CAC 6/4/13 Consensus review. No coding changes.
	CAC 3/25/14 Consensus review. References updated. No changes to the policy statements. Rationale added**.** Codes reviewed.
	CAC 3/24/15 Minor review. Policy statements changed as follows: The phrase "and apnea of prematurity" was added to the indication "those with neurologic or metabolic disorders affecting respiratory control, including central apnea". The word sleep was removed from "central sleep apnea". A statement that certain children may require monitoring beyond one year added to the policy guidelines. A statement was added to the policy guidelines that this policy does not address the diagnosis or management of obstructive sleep apnea. Rationale and reference list updated. Policy coded.

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	CAC 3/29/16 Consensus review. No change to policy statements. References and rationale updated. Coding reviewed**.**
	11/15/16 Administrative update. Variation Reformatting
	CAC 3/28/17 Minor review. The following revisions have been completed: • Clarification added to the 1st policy statement that cardiorespiratory monitoring should be initiated in infants younger than 12 months of age; • The term "apparent life threatening event" has been replaced with "brief resolved unexplained event"; • The diagnosis of bronchopulmonary dysplasia is now addressed within the policy guidelines; • The policy title was changed to "Home Cardiorespiratory Monitoring". Description/Background, Rationale and Reference sections updated. Coding Reviewed.
	12/20/17 Consensus review. No change to policy statements. References and rationale reviewed.
	11/12/18 Consensus review. No change to the policy statements. References updated. Rationale revised.
	3/21/19 Code review. No changes.
	8/16/19 Consensus review. Policy statement unchanged. Reformatted tables. References updated.
	6/12/20 Consensus review. Policy statement unchanged**.** No new references added. Coding reviewed.

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