



MASSACHUSETTS

Blue Cross Blue Shield of Massachusetts is an Independent Licensee of the Blue Cross and Blue Shield Association

Medical Policy

Home Cardiorespiratory Monitoring

Table of Contents

- [Policy: Commercial](#)
- [Policy: Medicare](#)
- [Authorization Information](#)
- [Coding Information](#)
- [Description](#)
- [Policy History](#)
- [Information Pertaining to All Policies](#)
- [References](#)

Policy Number: 224

BCBSA Reference Number: 1.01.06

NCD/LCD: N/A

Related Policies

None

Policy

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity Medicare HMO BlueSM and Medicare PPO BlueSM Members

Home cardiorespiratory monitoring may be considered **MEDICALLY NECESSARY** in infants with special health care needs or dependence on home technological support when initiated in infants younger than 12 months of age* in the following situations:

- 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 (ie, bronchopulmonary dysplasia).

Home cardiorespiratory monitoring is considered **NOT MEDICALLY NECESSARY** when used for cardiopulmonary evaluation in lower-risk infants following a brief resolved unexplained event (BRUE), which was previously known as an apparent life-threatening event (ALTE).

*Age Limits

Upon initiation of home cardiorespiratory monitoring in infants, 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 infants 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.

Bronchopulmonary Dysplasia

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 & Bancalari 2001).

Table PG1: Diagnosis of Bronchopulmonary Dysplasia

| Diagnosis | Gestational Age | |
|--------------------------|---|---|
| | <32 wk | ≥32 wk |
| Time point of assessment | 36 wk PMA or discharge to home, whichever comes first | >28 d but <56 d postnatal age or discharge to home, whichever comes first |
| | Treatment with Oxygen >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 d postnatal age or discharge, whichever comes first |
| Moderate BPD | Need for <30% oxygen at 36 wk PMA or discharge, whichever comes first | Need for <30% oxygen at 56 d postnatal age or discharge, whichever comes first |
| Severe BPD | Need for ≥ 30% oxygen and/or positive pressure at 36 wk PMA or discharge, whichever comes first | Need for ≥30% oxygen and/or positive pressure at 56 d postnatal age or discharge, whichever comes first |

Adapted from Jobe & Bancalari (2001).

BPD: bronchopulmonary dysplasia; PMA: postmenstrual age.

Brief Resolved Unexplained Event (BRUE) Risk Assessment: Lower- versus Higher-Risk of a Repeat Event or a Serious Underlying Disorder

The 2016 clinical practice guideline from the American Academy of Pediatrics reported by Tieder et al (2016)² on BRUE and evaluation of lower-risk infants identified the following patient factors as determining a lower risk:

- Age > 60 days
- Prematurity: gestational age ≥32 weeks and postconceptional age ≥45 weeks
- First BRUE: no previous BRUE ever and not occurring in clusters
- Duration of event <1 minute
- No CPR required by trained medical provider
- No concerning historical features as detailed in Table 2 of the 2016 AAP guideline (e.g., considerations for possible child abuse, history of the event, recent history, past medical history, family history, environmental history, social history)
- No concerning physical examination findings as detailed in Table 3 of the 2016 AAP guideline (e.g., general appearance, growth variables, vital signs, skin, head, eyes, ears, nose and mouth, neck, chest, heart, abdomen, genitalia, extremities, neurologic).

Higher Risk

The guidelines committee was not able to establish a definition of higher risk BRUE. “Outcomes data from ALTE studies in the heterogenous high risk population are unclear and preclude the derivation of evidence-based recommendations regarding management”, which would require further research. However, no such trials are listed in clinicaltrials.gov.

Home cardiorespiratory monitoring is considered NOT MEDICALLY NECESSARY when used as a strategy to reduce the risk of Sudden Infant Death Syndrome (SIDS).

Home cardiorespiratory monitoring in all other conditions, including but not limited to the diagnosis of obstructive sleep apnea, is considered INVESTIGATIONAL.

Prior Authorization Information

Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

| | Outpatient |
|--|--|
| Commercial Managed Care (HMO and POS) | Prior authorization is not required . |
| Commercial PPO and Indemnity | Prior authorization is not required . |
| Medicare HMO BlueSM | Prior authorization is not required . |
| Medicare PPO BlueSM | Prior authorization is not required . |

CPT Codes / HCPCS Codes / ICD Codes

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member’s contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

The following codes are included below for informational purposes only; this is not an all-inclusive list.

The above medical necessity criteria MUST be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:

CPT Codes

| CPT codes: | Code Description |
|-------------------|---|
| 94772 | Circadian respiratory pattern recording (pediatric pneumogram), 12–24-hour continuous recording, infant |
| 94774 | Pediatric home apnea monitoring event recording including respiratory rate, pattern and heart rate per 30-day period of time; includes monitor attachment, download of data, physician review, interpretation, and preparation of a report. |
| 94775 | Pediatric home apnea monitoring event recording including respiratory rate, pattern and heart rate per 30-day period of time; monitor attachment only (includes hook-up, initiation of recording and disconnection) |
| 94776 | Pediatric home apnea monitoring event recording including respiratory rate, pattern and heart rate per 30-day period of time; monitoring, download of information, receipt of transmission(s) and analyses by computer only |
| 94777 | Pediatric home apnea monitoring event recording including respiratory rate, pattern and heart rate per 30-day period of time; physician review, interpretation and preparation of report only |

HCPCS Codes

| HCPCS codes: | 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 |

Description

Home Cardiorespiratory Monitoring

Home cardiorespiratory monitors track respiratory effort and heart rate, and have been used to monitor central apnea of prematurity in newly discharged at risk or high-risk premature infants (infants are at increased risk of cardiorespiratory events until 43 weeks of postconceptual age) and in other infants at risk of apnea. An alarm sounds if there is respiratory cessation (central apnea) beyond a predetermined time limit (eg, 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 2-channel devices, home apnea monitors are not effective for 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

The American Academy of Pediatrics (AAP) defines Sudden Unexpected Infant Death (SUID), also known as Sudden Unexpected Death in Infancy (SUDI) as “any sudden and unexpected death, whether explained or unexplained” that occurs during infancy. Sudden Infant Death Syndrome (SIDS) is a subcategory of SUID/SUDI, which is defined as the sudden death of an infant younger than one year of age whereby 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 reduces 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.³ Instead, AAP recommended 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 effort to educate health care professionals, parents, and caregivers about the significance of placing infants in the supine sleeping position to reduce SIDS.⁴ The incidence of SIDS in the U.S. decreased dramatically between 1992 and 2001, especially in the years after the first supine sleep position recommendations were issued.

Brief Resolved Unexplained Event (BRUE)

The 2016 AAP clinical practice guideline published by Tieder et al² 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 of the following: cyanosis or pallor; absent, decreased, or irregular breathing; marked change in tone (hyper- or hypotonia); and altered level of responsiveness."

Infants with Special Health Care Needs or Dependence on Home Technological Support

According to AAP's 2008 Policy Statement on Hospital Discharge of the High-Risk Neonate reported by Stark et al (Reaffirmed in 2018),⁵ there has been recent increases in discharge of infants dependent on some form of supportive technology due to special health care needs or unresolved medical problems. Conditions that may necessitate use of technological support include apnea of prematurity and bronchopulmonary dysplasia for preterm infants, and upper airway anomalies, central nervous system disorders, and neuromuscular disorders for term infants.⁶ For example, home ventilation can be required for infants with tracheostomy for upper airway abnormalities or who cannot be weaned from assisted ventilation prior to discharge. Additionally, to avoid the potential risks of growth failure and cor pulmonale resulting from marginal oxygenation, discharge with home oxygen therapy has been used for infants with bronchopulmonary dysplasia. In both of these cases, home cardiorespiratory monitoring is recommended to accompany the supportive technology for use in detecting airway obstructions or dislodging of the oxygen.

Summary

Home cardiorespiratory monitors track respiratory effort and heart rate to detect episodes of apnea. They have been used for a variety of indications that may be associated with increased risk of respiratory compromise.

Summary of Evidence

For individuals with risk of respiratory failure in infancy who receive home cardiorespiratory monitoring for prevention of Sudden Infant Death Syndrome (SIDS), the evidence includes a systematic review and large epidemiological studies, including the Collaborative Home Infant Monitoring Evaluation (CHIME) study. Relevant outcomes are overall survival and morbid events. The systematic review and epidemiological studies consistently found that the use of home cardiorespiratory monitors did not decrease the incidence of SIDS. The evidence is sufficient to determine that the technology is unlikely to improve the net health outcome.

For individuals with risk of respiratory failure in infancy who receive home cardiorespiratory monitoring for other respiratory conditions, the evidence includes a systematic review and several observational cohort studies. Relevant outcomes are overall survival and morbid events. For lower-risk infants following a brief resolved unexplained event (BRUE), which was previously known as an apparent life threatening event (ALTE), the systematic review and observational cohort studies found no significant differences between infants with and without respiratory abnormalities in the frequency of respiratory pauses and bradycardia identified by home cardiorespiratory monitors. There is a lack of published evidence for other respiratory conditions, which is likely 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.

Additional Information

Clinical input obtained in 2016 and national guidelines published by the American Academy of Pediatrics have identified specific groups of infants who might benefit from home monitoring because of other factors that increase the risk of sudden death (eg, tracheostomies, chronic lung disease). These conditions identified by the Academy as benefiting from home cardiorespiratory monitoring may, therefore, be considered medically necessary.

Policy History

| Date | Action |
|----------------|---|
| 12/2020 | BCBSA National medical policy review. Policy edited to improve overall readability and increase clarity of the policy statements. New not medically necessary indications described for cardiopulmonary evaluation in lower-risk infants following a brief resolved unexplained event (BRUE), which was previously known as an apparent life-threatening event (ALTE). Effective 12/1/2020. |
| 8/2019 | BCBSA National medical policy review. Description, summary and references updated. Policy statement(s) unchanged. |
| 3/2017 | BCBSA National medical policy review. Title changed. Policy statements clarified to add that monitoring should be initiated in infants under 12 months; term "apparent life-threatening event" replaced with "brief resolved unexplained event." |
| 11/2015 | Added coding language. |
| 5/2015 | New references added from BCBSA National medical policy. |
| 5/2014 | BCBSA National medical policy review. Policy statement clarified. Effective 5/1/2014. |
| 5/2013 | New references from BCBSA National medical policy. |
| 11/2011-4/2012 | Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements. |
| 4/2011 | Reviewed - Medical Policy Group - Cardiology and Pulmonology. No changes to policy statements. |
| 6/2009 | BCBSA National medical policy review. No changes to policy statements. |
| 3/2009 | Reviewed - Medical Policy Group - Allergy and ENT/Otolaryngology. No changes to policy statements. |
| 3/2008 | Reviewed - Medical Policy Group - Allergy and ENT/Otolaryngology. No changes to policy statements. |

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:

[Medical Policy Terms of Use](#)

[Managed Care Guidelines](#)
[Indemnity/PPO Guidelines](#)
[Clinical Exception Process](#)
[Medical Technology Assessment Guidelines](#)

References

1. Jobe AH, Bancalari E. Bronchopulmonary dysplasia. *Am J Respir Crit Care Med*. Jun 2001; 163(7): 1723-9. PMID 11401896
2. 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
3. Moon RY, Moon RY, Darnall RA, et al. SIDS and other sleep-related infant deaths: expansion of recommendations for a safe infant sleeping environment. *Pediatrics*. Nov 2011; 128(5): 1030-9. PMID 22007004
4. National Institute of Child Health and Human Development (NICHD). Safe to Sleep. n.d.; <https://www1.nichd.nih.gov/sts/Pages/default.aspx>. Accessed May 15, 2018.
5. Stark AR, Adamkin DH, Batton DG, et al. Hospital discharge of the high-risk neonate. *Pediatrics*. Nov 2008; 122(5): 1119-26. PMID 18977994
6. Velumula P, Jani S, Kanike N, et al. Monitoring of Infants Discharged Home with Medical Devices. *Pediatr Ann*. Feb 01 2020; 49(2): e88-e92. PMID 32045488
7. Moon RY, Darnall RA, Feldman-Winter L, et al. SIDS and Other Sleep-Related Infant Deaths: Evidence Base for 2016 Updated Recommendations for a Safe Infant Sleeping Environment. *Pediatrics*. Nov 2016; 138(5). PMID 27940805
8. Moon RY, Darnall RA, Feldman-Winter L, et al. SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment. *Pediatrics*. Nov 2016; 138(5). PMID 27940804
9. 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): 636-41. PMID 18410765
10. Strehle EM, Gray WK, Gopiseti 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
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): 338-43. PMID 23393308
12. Veit L, Amberson M, Freiburger 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. AAP Publications Reaffirmed and Retired. *Pediatrics*. August 1 2012;130(2):e467-e468.
14. Committee on Fetus and Newborn. American Academy of Pediatrics. Apnea, sudden infant death syndrome, and home monitoring. *Pediatrics*. Apr 2003; 111(4 Pt 1): 914-7. PMID 12671135