

Aim: To reduce variation in management and unnecessary resource utilization for patients with BRUE.

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)
- Altered level of responsiveness

EXCLUSIONS:

Patients **excluded** from this guideline:

- Critically ill or episode **not** resolved
- Complex chronic condition
- Apparent cause to episode (e.g., choked on milk, obvious reflux event, bronchiolitis, periodic breathing)
- Young infants with a temperature < 36.0 or ≥ 38.0 should be evaluated per [febrile infant guideline](#)

Cause apparent (e.g. choking episode/ reflux) after detailed history and physical exam?

See Table 1 (page 5) for example H&P questions

Yes

Not a BRUE

Manage off-guideline

No

HIGH-RISK BRUE*

See page 2

All low-risk features met?

- Age > 60 days
- Gestational age ≥ 32 weeks and postconceptional age ≥ 45 weeks
- Occurrence of only 1 BRUE (no prior BRUE ever and not occurring in clusters)
- Duration of BRUE < 1 minute
- No CPR by medical provider required
- No concerning historical features
- Normal physical exam/well-appearing

Yes

LOW-RISK BRUE

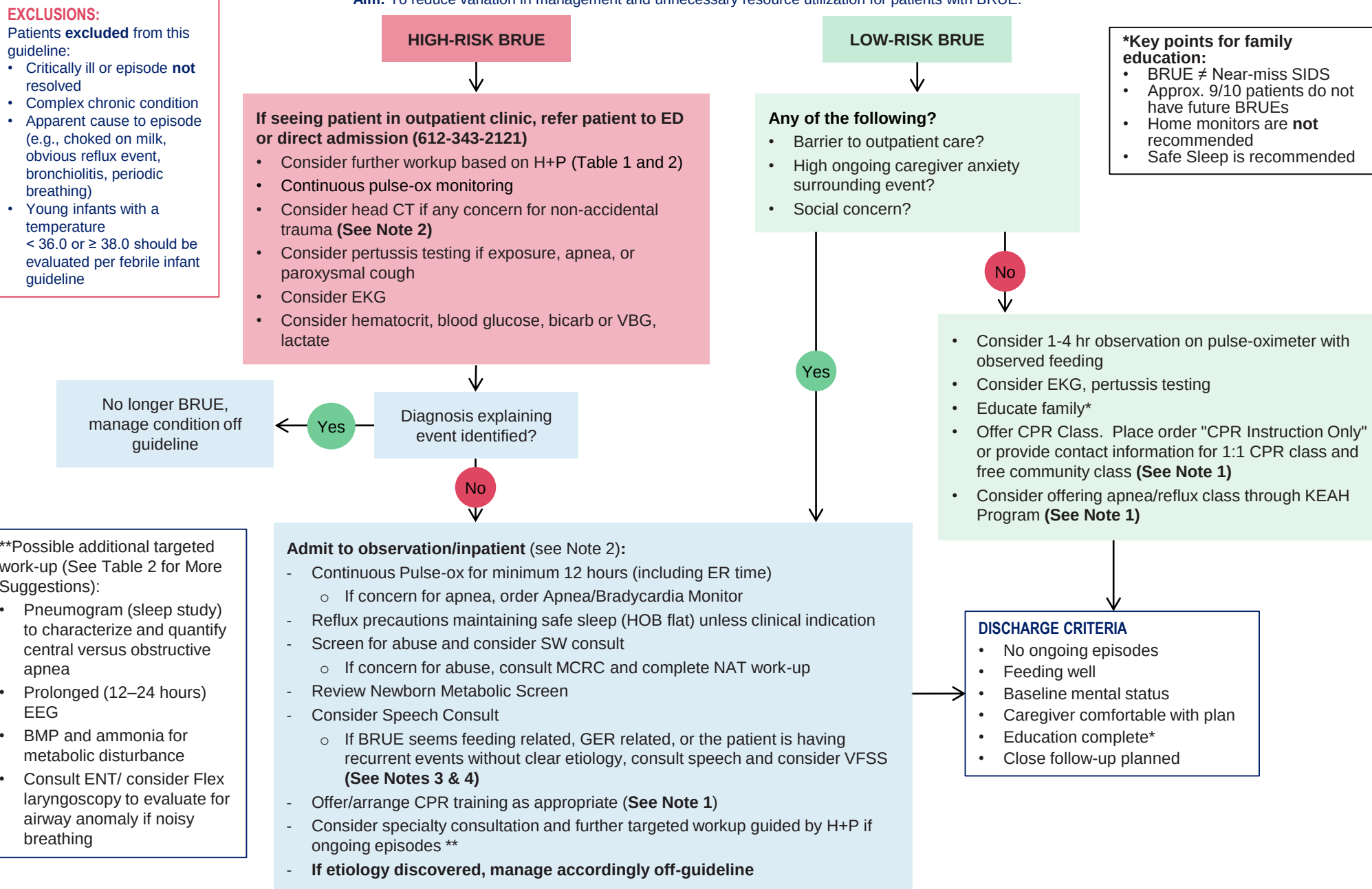
See page 2

***Approximately 90% of BRUEs are classified as High Risk. To further risk stratified, consider using this calculator:**

<https://www.mdcalc.com/calc/10400/brief-resolved-unexplained-events-2.0-brue-2.0-criteria-infants>

While there are no formalized changes to recommendations on next steps, this risk stratification can be used for shared-decision making with parents when guiding additional work-up or observation.⁷

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NOTE 1: APNEA, REFLUX, CPR CLASS INFORMATION

The Kid Experts® At Home program (KEAH) - St. Paul Campus 651-220-6267

- **GER/Reflux Class:** 1:1 family education with The Kid Experts® At Home program (KEAH) RN includes management of reflux symptoms, CPR, and 24/7 RN telephone support.
- **Apnea Home Monitor Class:** 1:1 family education with KEAH RN and Medical Equipment company includes overview of normal and abnormal infant breathing patterns, equipment, home apnea monitor alarm response, CPR and 24/7 RN telephone support post discharge.
- **CPR Teaching:** through Children's Minnesota Respiratory Therapy. 1:1 family education. Place order in EMR.

The Kid Experts® At Home program (KEAH) - Minneapolis Campus 612-813-5831

- **GER/Reflux Class:** 1:1 family education with The Kid Experts® At Home program (KEAH) RN as described above
- **Apnea Home Monitor Class:** 1:1 family education with KEAH RN as described above
- **CPR Teaching:** through Apnea Team. 1:1 family education. Place order in EMR.

Community Free CPR Class

- Call 651-220-5279 and press #1 for Minneapolis campus and #2 for the St. Paul campus. The family will leave a voicemail, and they will receive a call back to schedule.

If the patient will be discharged from the Emergency room and it is during weekday business hours, The Kid Experts® At Home program (KEAH) or RT may be able to see the family prior to discharge from the ED for CPR training. Please reach out to see if this can be arranged. Otherwise, a referral for outpatient classes may be placed and information can be provided to the family to arrange CPR class in the outpatient setting.

The Kid Experts® At Home program (KEAH) 1:1 class including CPR training are associated with a cost. The Community group CPR class is free.

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NOTE 2: LITERATURE REVIEW

- 87-94% of patients will be classified as high risk ^{2, 5}
- Diagnoses among BRUE Patients
 - o 4-8% of patients will have a serious diagnosis ^{2, 5}
 - o 1-2% Seizures/ infantile spasms
 - o 0-2% Apnea
 - o 0-1% Airway abnormalities
 - o Aspiration: When providers order a videofluoroscopic swallow studies in patients with BRUE, there is a high rate of silent aspiration. Boston Children's published a prospective cohort study in September 2024 that showed 28% (n=44/157) of patients with BRUE had a VFSS completed, and 71% (31/44) of those were abnormal (both laryngeal penetration and aspiration; all aspiration events were silent), leading to a change in clinical management in 59% (26/44) of those patients. Presenting symptoms of >1 episode in 24 hours, any prior similar episode, being formula fed, episode during feed, and vomiting during feed were significantly associated with obtaining a VFSS, but not with abnormal VFSS results.⁸
 - o Laryngomalacia: There is a high rate of laryngomalacia in patients with noisy breathing (n=10/18 pts; 56%) ⁶
 - o Head Trauma: The rate of abusive head trauma while still low (0.3%) is 10x higher than other children aged <1 year. ²
- 6-15% of patients are readmitted with recurrent event ^{5, 6}
- After discharge, 77% of parents report that patients continue to have episodes of coughing, choking or BRUE spells ⁶
- BRUE is not synonymous with ALTE. Only 29% of ALTEs will be classified as BRUE (both high and low risk combined) so it is difficult to extrapolate old data on ALTEs to BRUEs ⁹

NOTE 3: GASTROESOPHAGEAL REFLUX

GER is suspected in 26-50% of BRUE cases, but causality is difficult to prove, and GER + BRUE would be considered a concerning feature of reflux. Per Children's MN expert recommendations of Speech and GI (and Aspiration data in Note 2), they do NOT recommend thickening feeds as recommended in the GER pathway in infants with BRUE + GER without obtaining a VFSS first to ensure there is no aspiration. If VFSS is normal and speech has no clinical concerns, then follow the [Children's MN GER/GERD guideline](#).

NOTE 4: SPEECH CONSULTS

- Place consult with admission orders. Speech is available 7 days a week on both campuses.
- If VFSS is needed, this can usually happen within 24 hours during the week but is not available on the weekends.
 - o If you have a high clinical suspicion at the time of admission that the patient will need a VFSS, please place the order with the admission orders and then have the team reach out to speech as soon as possible during business hours.
- If speech or another clinician is concerned for clinically apparent aspiration, the VFSS should happen prior to discharge.
- If there is only a suspicion of silent aspiration, then continued outpatient speech follow-up and outpatient VFSS may be reasonable.
 - o At this time, there are no clear clinical guidelines on which patients may have silent aspiration.⁸ Please use shared decision making with speech and family.
- Please note that the thickening for GER is much less than the thickening needed for aspiration.

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TABLE 1: Examples of additional H+P features to assess

(See AAP guideline Tieder et. al. 2016 for more details)

Event	Exam	Past history	Family history	Social history
What happened before/after?	Bruising/torn frenulum? Vomiting?	Birth and perinatal history, gestational age, newborn screen?	Sudden unexplained death (single-car accident/ drowning)?	Exposure to smoke/molds/toxins?
Duration + location?	Engages with caregiver?	History of bruising?	BRUE/ALTE/SIDS in family member?	Recent stressors?
Is the story consistent and plausible?	Tone and strength?	History of reflux?	Long QT syndrome or other arrhythmia?	Support system and access to resources?
Interventions (back blows, CPR, 911)?	Fontanelle soft?	Previous BRUE or concerning movements?	Genetic/neurologic diseases?	Previous CPS/law enforcement involvement?
Recent illness or changes? Use of OTC medications?	Cardiac and lung sounds?	Development and growth normal?	Substance abuse or mental illness?	Exposure to infectious diseases (e.g., pertussis)?

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TABLE 2: Potential Causes of BRUE in Higher-Risk Infants

(See AAP Framework Merritt et.al. 2019 for more details)

Child maltreatment: Consider MCRC Consult	Gastrointestinal: Consider GI Consult	Pulmonary: Consider Pulmonary or ENT Consult	Other
- Abusive head trauma - Purposeful suffocation - Medical child abuse - Poisoning	- GERD - Oropharyngeal dysphagia - Laryngospasm - Nasopharyngeal reflux - Tracheoesophageal fistula - Esophageal stricture - Extraesophageal vascular slings - Cricopharyngeal achalasia	- Obstructive apnea - Upper airway structural abnormality - Lower airway structural abnormality (e.g., laryngomalacia, laryngeal cleft) - Respiratory dysrhythmias - Central apnea - Meningitis - Head trauma - Congenital central hypoventilation syndrome - Congenital brain abnormality - Parenchymal disease - Infection - Pneumonitis from "microaspiration"	- Anemia - Periodic breathing - Maternal SSRI use causing poor neonatal adaptation
Neurology: Consider Neuro Consult	Cardiology: Consider Cardiology Consult	Infectious disease: Consider ID Consult	Inborn errors of metabolism: Consider Genetics Consult
- Epilepsy and seizures - Structural brain abnormalities - Progressive neurologic disease - Infantile spasms - Neuromuscular disorder - Tuberous sclerosis - Benign neonatal epilepsy syndrome - Maternal myotonic dystrophy	- Cardiac arrhythmias - Congenital heart disease - LQTS - Cardiomyopathy (dilated or hypertrophic)	- Bacterial infections (e.g., sepsis, meningitis, pneumonia and urinary tract infections) (<i>especially consider in neonates</i>) - Respiratory viruses, including RSV - Pertussis - Viral meningitis	- Urea cycle disorders - Fatty acid oxidation disorders - Organic acidemias - Lactic acidemias

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