Management of Apparent Life Threatening Events

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Chair, AAP Subcommittee on Apparent Life Threatening Events
Vice-Chair, AAP Council on Quality and Patient Safety
Division of Hospital Medicine and General Pediatrics
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Management of Brief Resolved Unexplained Events: Re-thinking ALTE

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BRUEs
Disclosure

I have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this CME activity.
You will learn about...

1. Historical framework and epidemiology
2. Apparent life-threatening event (ALTE) vs brief resolved unexplained event (BRUE)
3. Event characterization: explained vs unexplained
4. Risk stratification and new recommendations
5. Tools to implement change in your practice
Historical Framework and Epidemiology

1
What was an ALTE?
Definition of ALTE (Ce 1986)
Definition of ALTE (Ce 1986)

An episode in the first year of life that appears potentially life threatening to the observer and is characterized by some combination of:

- Color change
- Apnea
- Alteration in muscle tone
- Choking or gagging
This statement is more than five years old and is provided solely for historical purposes. Due to the cumulative nature of medical research, new knowledge has inevitably accumulated in this subject area in the time since the statement was initially prepared. Thus some of the material is likely to be out of date, and at worst simply wrong. For reliable, current information on this and other health topics, we recommend consulting the National Institutes of Health's MedlinePlus http://www.nlm.nih.gov/medlineplus/.

This statement was originally published as: Infantile Apnea and Home Monitoring. NIH Consens Statement 1986 Sep 29-Oct 1;6(6):1-10.
ALTEs - Epidemiology

Conservatively

- 1 out of 250–400 children are hospitalized for an ALTE

But scary events are very common

- 43% of healthy infants have had a 20-second apnea episode over a 3-month period
- 5% of parents recall seeing an apnea event
- Normal in infants: choking, gagging, blue discoloration, tone changes, periodic and irregular breathing

ALTEs – Discharge Diagnoses

Most common
- Idiopathic (26-50%)
- GER (26-54%)
- Respiratory infection (8-11%)
- Seizure (9-11%)

Less common
- Child maltreatment (<1%)
- Pertussis (0.05-9%)
- Cardiac arrhythmias (<1%)
- Bacterial infection (0-8%)
- Metabolic Disorder (1.5%)

AN ALTE IS **NOT** A WARNING SIGN FOR SIDS!

- No causal relationship of pre-existing apnea or ALTE and SIDs
- Interventions to reduce SIDs have not reduced ALTEs (eg, back to sleep)
- SIDS and ALTEs have different risk factors

High Resource Use and Variation

- Multicenter study of patients hospitalized with an ALTE
- Mean length of stay = 4.4 days (SD 5.6)
- Mean adjusted charges = $15,567 (SD $28,510)
- Readmission = 2.5% but variable

Systematic Review

For infants that are well appearing upon presentation...

- H&P features can identify risk
- Tailored testing to risk is of value
- True risk cannot be ascertained
- A more precise definition is needed
- Further research is warranted

Management of Apparent Life-Threatening Events in Infants: A Systematic Review

Joel S. Tieder, MD, MPH, Robin L. Altman, MD, Joshua L. Bonkowski, MD, PhD, Donald A. Brand, PhD, Ilene Claudius, MD, Diana J. Cunningham, MLS, MPH, AHP, Craig DeVos, MD, Med, Jack M. Percelay, MD, MPH, Raymond D. Pilette, MD, MPH, MF, and Michael B. H. Smith, MB, FRCP, FRCPCH

Objective To determine in patients who are well-appearing and without a clear etiology after an apparent life-threatening event (ALTE): (1) What historical and physical examination features suggest that a child is at risk for a future adverse event and/or serious underlying diagnosis and would, therefore, benefit from testing or hospitalization? and (2) What testing is indicated on presentation and during hospitalization? Study design Systematic review of clinical studies, excluding case reports, published from 1970 through 2011 identified using key words for ALTE.

Results The final analysis was based on 37 studies: 18 prospective observational, 19 retrospective observational. None of the studies provided sufficient evidence to fully address the clinical questions. Risk factors identified from historical and physical examination features included a history of prematurity, multiple ALTEs, and suspected child maltreatment. Routine screening tests for gastroesophageal reflux, meningitis, bacteremia, and seizures are low yield in infants without historical risk factors or suggestive physical examination findings.

Conclusion Some historical and physical examination features can be used to identify risk in infants who are well-appearing and without a clear etiology at presentation, and testing tailored to these risks may be of value. The true risk of a subsequent event or underlying disorder cannot be ascertained. A more precise definition of an ALTE is needed and further research is warranted. (J Pediatr 2013;.)

An apparent life-threatening event (ALTE) was defined at a consensus development conference convened in 1986 by the National Institutes of Health to address the relationship between sudden infant death syndrome (SIDS) and apnea. An ALTE was defined 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." There are three significant challenges for clinicians managing patients who have experienced an ALTE. First, the infant is often asymptomatic at presentation. Second, although most ALTEs represent a benign event, they can signify more serious illness, such as sepsis or child maltreatment. Third, the decision to perform tests or hospitalize a patient is fraught with uncertainties. Clinicians may hospitalized the infant to facilitate observation, educate the parents, or complete tests. Yet, this approach may subject the patient to unnecessary risk and increase parental anxiety without improving outcomes.5

Given a lack of consensus regarding the management of infants who are initially well-appearing and without a clear etiology, an ALTE expert panel systematically reviewed the literature to answer two key questions: (1) What historical and physical examination features on presentation suggest that an infant is at risk for a future adverse event and/or serious underlying diagnosis and would therefore benefit from diagnostic testing and hospitalization? and (2) What testing is indicated on presentation and during hospitalization?

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The challenge?

- Event difficult to characterize
- Infant often appears well
- Life-threatening?
- Many potential causes
  - some serious
  - most self-limiting/nonrecurring
- Parental and provider anxiety is high
- Common, but risk poorly understood
  - Repeat event
  - Underlying disease
  - Unintended consequences
ALTE...A Recipe for a Testing/Treatment Cascade

- Broad differential diagnosis
- Anxiety provoking
- Common
- Low prevalence of disease
- Perceived reassurance from testing or hospitalization
- Poor understanding of true risk
- Use of nonspecific testing prone to false positive results
Brief Resolved Unexplained Events (Formerly Apparent Life-Threatening Events) and Evaluation of Lower-Risk Infants: Executive Summary

EXECUTIVE SUMMARY

This clinical practice guideline has 2 primary objectives. First, it recommends the replacement of the term "apparent life-threatening event" (ALTE) with a new term, "brief resolved unexplained event" (BRUE). Second, it provides an approach to evaluation and management that is based on the risk that the infant will have a repeat event or has a serious underlying disorder.

Clinicians should use the term BRUE to describe an event occurring in an infant younger than 1 year when the observer reports a sudden, brief, and new resolved episode of ≥1 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. Moreover, clinicians should diagnose a BRUE only when there is no explanation for a qualifying event after conducting an appropriate history and physical examination (see Tables 2 and 3 in www.pediatrics.org/cgi/doi/10.1542/peds.2016-0590). Among infants who present for medical attention after a BRUE, the guideline identifies (1) lower-risk patients on the basis of history and physical examination, for whom evidence-based guidelines for evaluation and management are offered, and (2) higher-risk patients, whose history and physical examination suggest the need for further investigation, monitoring, and/or treatment; but for whom recommendations are not offered (because of insufficient evidence or the availability of guidance from other clinical practice guidelines specific to their presentation or diagnosis). Recommendations in this guideline apply only to lower-risk patients.
ALTE vs BRUE

ALTE
- An episode in the first year of life that appears potentially life-threatening to the observer and is characterized by some combination of...

BRUE
- Event occurring in an infant <1 year where the observer reports a sudden, brief period of one or more of the following...
- No explanation for event after appropriate history and PE
ALTE vs BRUE

**ALTE**
- Color change
- Apnea
- Alteration in muscle tone
- Choking or gagging

**BRUE**
- Cyanosis or pallor
- Absent, decreased, or irregular breathing
- Marked change in tone (hyper- or hypotonia)
- Altered level of responsiveness
ALTE vs BRUE

ALTE
- Both chief complaint and diagnosis
- Not always life-threatening
- Can have ongoing symptoms (e.g., fever, upper respiratory infection)
- Can have a diagnosis (e.g., meningitis, bronchiolitis)

BRUE
- Diagnosis of exclusion
- Excludes patients with an explanation or diagnosis (e.g., GER)
- Excludes currently symptomatic infants
Event Characterization
Explained vs Unexplained
3
BRUE Diagnosis

Patient presents for initial medical assessment after a brief, resolved event that was observed by caregiver in a child <1 year of age

Patient is well-appearing

Patient has additional symptoms or abnormal vital signs (e.g., cough, respiratory difficulties, or fever)

Clinician characterizes the event as a sudden, brief, and now resolved episode of one or more of the following:
- cyanosis or pallor
- absent, decreased, or irregular breathing
- marked change in tone (hyper- or hypotonia)
- altered responsiveness

Event criteria present

Event criteria absent

Not a BRUE

Explanation for event identified (e.g., GER, feeding difficulties, or airway abnormality)

Out of guideline scope; manage accordingly

Perform appropriate history and PE*

No explanation for event identified

Diagnosis of Brief Resolved Unexplained Event is made
<table>
<thead>
<tr>
<th>Pulmonary</th>
<th>Otolaryngologic</th>
<th>Gastrointestinal</th>
<th>Cardiovascular</th>
<th>Neurologic</th>
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</thead>
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<tr>
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<td>Seizures</td>
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<td>Adenotonsillar hypertrophy</td>
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<td>Apnea</td>
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<td>Electrolyte disturbance</td>
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<td>Sepsis</td>
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<td>Hypocalcaemia</td>
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<td>Breath-holding spell</td>
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<td>Hypoglycemia</td>
<td>Miscellaneous</td>
<td>Idiopathic</td>
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<td>Gastroenteritis</td>
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<td>Specific organisms (pertussis, RSV, and other respiratory viruses)</td>
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<td>Viral syndrome</td>
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</tbody>
</table>
Color

ALTE
- Color change
- Apnea
- Alteration in muscle tone
- Choking or gagging

BRUE
- Cyanosis or pallor
- Absent, decreased, or irregular breathing
- Marked change in tone (hyper- or hypotonia)
- Altered level of responsiveness
Color Change—Red, White, and Blue
Normal Color Change

Acrocyanosis

- Vasomotor instability
Concerning Color Change

Central cyanosis
- Bluish discoloration of oral mucous membranes

Peripheral cyanosis
- Increased oxygen extraction by peripheral tissue or vasoconstriction (e.g., shock)
What About Red and White Episodes?

- **Plethora:** Red is normal in infants
- **Pallor:** White or ashen can be normal or a sign of decreased perfusion
- **Skin color is difficult to determine:** skin tone and lighting
Changes to Breathing

**ALTE**
- Color change
- Apnea
- Alteration in muscle tone
- Choking or gagging

**BRUE**
- Cyanosis or pallor
- Absent, decreased, or irregular breathing
- Marked change in tone (hyper- or hypotonia)
- Altered level of responsiveness
Normal Breathing Change

- **Periodic breathing**
  - Typically developing infants have periods of cyclic breathing with pauses
  - Occurs in nearly all preterm infants and most term infants
  - Decreases dramatically after 2 months of age

- **Irregular respirations**
  - Hallmark of active sleep (rapid eye movement or dream sleep)
  - Present at all ages

- **Breath-holding spell**

- Acute decreases in oxygen saturation >10% from baseline are observed in most infants briefly during sleep
Concerning Breathing Change

- Apnea: Cessation of airflow x 20–30 seconds
  - Central: Absence of respiratory effort from central respiratory center
  - Obstructive: Paradoxical inverse movements of the chest wall and abdomen with decreased saturation

- Apnea of prematurity
  - <37 weeks corrected gestational age
  - May persist in infants <28 weeks
Muscle Tone Change

**ALTE**
- Color change
- Apnea
- Alteration in muscle tone
- Choking or gagging

**BRUE**
- Cyanosis or pallor
- Absent, decreased, or irregular breathing
- Marked change in tone (hyper- or hypotonia)
- Altered level of responsiveness
Normal Tone Change

- Stimulation from coughing, gagging, choking, crying (ie, laryngospasm)
- Startle and fencing reflex
- LOC from breath-holding spell
Concerning Tone Change

Seizure
- Rhythmic and not extinguishable
- Eye deviation
- Limp
- Rigid
- Postictal
- Generalized/altered mental status
- Infantile spasm
Change in Responsiveness

**ALTE**
- Color change
- Apnea
- Alteration in muscle tone
- Choking or gagging

**BRUE**
- Cyanosis or pallor
- Absent, decreased, or irregular breathing
- Marked change in tone (hyper- or hypotonia)
- Altered level of responsiveness
Normal Change in Responsiveness

• Immature nervous system

• Somnolence

• LOC with breath-holding spell
Concerning Change in Responsiveness

- Seizure
- LOC
- Hypoxemia
- Hypoglycemia
BRUE Diagnosis

Patient presents for initial medical assessment after a brief, resolved event that was observed by caregiver in a child <1 year of age

Patient is well-appearing

Patient has additional symptoms or abnormal vital signs (e.g., cough, respiratory difficulties, or fever)

Clinician characterizes the event as a sudden, brief, and now resolved episode of one or more of the following:
- cyanosis or pallor
- absent, decreased, or irregular breathing
- marked change in tone (hyper- or hypotonia)
- altered responsiveness

Event criteria present

Event criteria absent

Explanation for event identified (e.g., GER, feeding difficulties, or airway abnormality)

Not a BRUE

Perform appropriate history and PE*

No explanation for event identified

Out of guideline scope; manage accordingly

Diagnosis of Brief Resolved Unexplained Event is made

* PE: Physical Examination
History and PE are Critical

https://www.studyblue.com/notes/n/review-for-test-2-family-assessment/deck/8041126

https://www.bda.org/childprotection/Recognising/Pages/Physical.aspx
Risk Stratification and Recommendations for Lower-Risk

4
Perform appropriate history and PE*

No explanation for event identified

Diagnosis of **Brief Resolved Unexplained Event** is made

**BRUE Risk Classification**

No concerns identified from history and PE*  
Concerns identified from history or PE (e.g., FH of sudden cardiac death or subtle, non-diagnostic social, feeding or respiratory problems)

Apply risk stratification
- Age >60 days
- Born ≥32 wks gestation and corrected gestational age ≥45wks
- No CPR by trained medical provider
- Event lasted <1 minute
- First event

Yes

Lower Risk Patient

No

Higher Risk Patient

Out of guideline scope; manage accordingly
Lower-Risk Criteria

- No concerning historical features
- No concerning PE findings
- Age >60 days
- Prematurity: Gestational age ≥32 weeks and corrected age ≥45 weeks
- First BRUE (no prior BRUE or cluster)
- Duration of event <1 minute
- No CPR required by trained medical provider
AAP and Strength of Recommendations

Management Recommendations for Lower Risk Patients

**Should**
- Educate caregivers about BRUEs and engage in shared decision-making to guide evaluation, disposition, and follow-up
- Offer resources for CPR training to caregiver

**Should Not**
- Obtain WBC count, blood culture, or CSF analysis or culture, serum sodium, potassium, chloride, blood urea nitrogen, creatinine, calcium, ammonia, blood gases, urine organic acids, plasma amino acids or acylcarnitines, chest radiograph, echocardiogram, EEG, studies for GER
- Initiate home cardio-respiratory monitoring
- Prescribe acid suppression therapy or anti-epileptic medications

**May**
- Obtain pertussis testing and 12-lead ECG
- Briefly monitor patients with continuous pulse oximetry and serial observations

**Need Not**
- Obtain viral respiratory test, urinalysis, blood glucose, serum bicarbonate, serum lactate acid, laboratory evaluation for anemia, or neuroimaging
- Admit the patient to the hospital *solely* for cardiorespiratory monitoring
<table>
<thead>
<tr>
<th>1. Cardiopulmonary Evaluation</th>
<th>Evidence Quality; Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A Need not admit infants to the hospital <em>solely</em> for cardiorespiratory monitoring.</td>
<td>B; Weak</td>
</tr>
<tr>
<td>1B May briefly monitor patients with continuous pulse oximetry and serial observations.</td>
<td>D; Weak</td>
</tr>
<tr>
<td>1C Should not obtain chest radiography.</td>
<td>B; Moderate</td>
</tr>
<tr>
<td>1D Should not obtain a measurement of venous or arterial blood gas.</td>
<td>B; Moderate</td>
</tr>
<tr>
<td>1E Should not obtain overnight polysomnography.</td>
<td>B; Moderate</td>
</tr>
<tr>
<td>1F May obtain a 12-lead electrocardiography.</td>
<td>C; Weak</td>
</tr>
<tr>
<td>1G Should not obtain an echocardiography.</td>
<td>C; Moderate</td>
</tr>
<tr>
<td>1H Should not initiate home cardiorespiratory monitoring.</td>
<td>B; Moderate</td>
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<tr>
<td>2. Child Abuse Evaluation</td>
<td></td>
</tr>
<tr>
<td>2A Need not obtain neuroimaging (CT, MRI, or ultrasonography) to detect child abuse.</td>
<td>C; Weak</td>
</tr>
<tr>
<td>2B Should obtain an assessment of social risk factors to detect child abuse.</td>
<td>C; Moderate</td>
</tr>
<tr>
<td>3. Neurologic Evaluation</td>
<td></td>
</tr>
<tr>
<td>3A Should not obtain neuroimaging (CT, MRI, or ultrasonography) to detect neurologic disorders</td>
<td>C; Moderate</td>
</tr>
<tr>
<td>3B Should not obtain electroencephalogram to detect neurologic disorders.</td>
<td>C; Moderate</td>
</tr>
<tr>
<td>3C Should not prescribe antiepileptic medications.</td>
<td>C; Moderate</td>
</tr>
<tr>
<td>4. Infectious Disease Evaluation</td>
<td></td>
</tr>
<tr>
<td>4A Should not obtain a white blood cell (WBC) count, blood culture, or cerebrospinal fluid analysis or culture to detect an occult bacterial infection.</td>
<td>B; Strong</td>
</tr>
</tbody>
</table>
Pulmonology

• **Need not** admit the patient to the hospital *solely* for cardiorespiratory monitoring (B; Weak)
• **May** briefly monitor patients with continuous pulse oximetry and serial observations (D; Weak)
• **Should not** obtain a chest radiograph (B; Moderate)
• **Should not** obtain measurement of blood gases (B; Moderate)
• **Should not** initiate home cardiorespiratory monitoring (B; Moderate)
• **Should not** obtain overnight polysomnography (B; Moderate)
Cardiology

• May obtain a 12-lead electrocardiogram (C; Weak)
• Should not obtain echocardiography (C; Moderate)
Child Abuse

- **Need not** obtain neuroimaging (CT, MRI, ultrasonography) to detect child abuse (C; Weak)
- **Should** obtain an assessment of social risk factors to detect child abuse (C; Weak)
Neurology

• **Should not** obtain neuroimaging (CT, MRI, ultrasonography) to detect neurologic disorders (C; Moderate)

• **Should not** obtain an electroencephalogram (C; Moderate)

• **Should not** prescribe antiepileptic medications (C; Moderate)
Infectious Disease

- **Should not** obtain a white blood cell count, blood culture, or cerebral spinal fluid analysis or culture to detect an occult bacterial infection (B; Strong)
- **Should not** obtain a chest radiograph to assess for pulmonary infection (B; Moderate)
- **Need not** obtain a urinary analysis (C; Weak)
- **Need not** obtain respiratory viral testing in infants (C; Weak)
- **May** obtain test for pertussis (B; Weak)
Have a seat Kermit. What I'm about to tell you might come as big shock...
Gastroenterology

- **Should not** obtain investigations for GER (C; Moderate)
- **Should not** prescribe acid suppression therapy (C; Moderate)
Inborn Error of Metabolism

- **Need not** obtain blood glucose (C; Weak)
- **Need not** obtain serum lactic acid or bicarbonate (C; Weak)
- **Should not** obtain serum sodium, potassium, chloride, blood urea nitrogen, creatinine, calcium, or ammonia (C; Moderate)
- **Should not** obtain venous or arterial blood gas (C; Moderate)
- **Should not** obtain urine organic acids, plasma amino acids, or plasma acylcarnitines (C; Moderate)
Anemia

- **Should not** obtain laboratory evaluations for anemia (C; Moderate)
Patient- and Family-Centered Care

- **Should** offer resources for CPR training to caregiver (C; Moderate)
- **Should** educate caregivers about BRUEs (D; Weak)
- **Should** use shared decision making (C; Moderate)
Implementation and Improvement

5
Implementation & Improvement
Implementation and Improvement: AAP.org

Education
- News and conference outlets:
- Caregiver handout
- Webinar

Workflow integration
- Crowdsourcing of order set, history and physical templates, algorithm

Quality improvement, research, billing
- ICD-9/10 codes, maintenance of certification collaborative with Quality Improvement Innovation Networks (QuIIN)/Value in Inpatient Pediatrics (VIP) Network/Pediatric Emergency Medicine Collaborative Research Committee (PEMCRC)
- Proposed quality measures
- Key Driver Diagram
Key Driver Diagram: AAP.org

Brief Resolved Unexplained Event Key Driver Diagram

Primary Aim

- >90% of infants ≤12 months old with Brief Resolved Unexplained Events (BRUE) will 1) be appropriately diagnosed, 2) have risk factors documented, 3) be appropriately categorized into the correct higher vs. lower risk stratification, and 4) utilize limited work-ups for lower risk patients

Key Drivers

- Providers understand that asymptomatic patients previously classified as ALTE with GERD symptoms, unresolved symptoms, only rubor, fever, respiratory symptoms, vomiting, >12 months old, etc. are not classified as BRUE

- Providers know and utilize BRUE lower-risk factors:
  - Age >60 days
  - GSA ≥32 wks & PCA≥45wks
  - Negative H&P
  - First BRUE, no BRUE clusters
  - Event duration <1 minute
  - No CPR by trained provider

- Providers know and utilize limited work-ups for lower-risk BRUE:
  - Offer CPR training
  - Use shared decision making
  - May Obtain Pertussis testing, EKG, and brief continuous pulse ox
  - No: viral testing, UA, glucose, bicarb, lactic acid, CBC, neuroimaging, admit solely for cardiorespiratory monitoring

Secondary Drivers

- Educational Materials, powerpoint slide decks and webinars on new BRUE definition, lower-risk factors and appropriate work-ups

- EQIPP Modules, PREP modules, presentations at national conferences

- Cross disciplinary training to allow nurse-physician “flattened hierarchy” discussion of test requirements for patients with BRUE

- Admission and Neuroimaging hard stops for when provider lists reason as “ALTE”

- BRUE Note Templates

- BRUE order sets

- Shared Decision making toolkit and family engagement in safety teams

BRUE Definition: Clinicians should use the term brief resolved unexplained event (BRUE) to describe an event occurring in an infant ≤1 year of age 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

Moreover, clinicians should diagnose a BRUE only when there is no explanation for a qualifying event after conducting an appropriate H&P and exam.
**Evento breve inexplicable resuelto:**
lo que los padres y cuidadores deben saber

(Brief Resolved Unexplained Event)

¿Qué es un evento breve inexplicable resuelto?
Un evento breve inexplicable resuelto (brief resolved unexplained event; BRUE por sus siglas en inglés) se produce repentinamente y puede ser atemorizante para los padres y cuidadores. Un evento breve inexplicable resuelto es un diagnóstico realizado después de que el pediatra o el profesional de la salud haya descartado otras causas de la situación.

P: ¿Al tener un evento breve inexplicable resuelto, aumenta el riesgo de que mi bebé sufra el síndrome de muerte súbita del lactante (sudden infant death syndrome, SIDS)?
R: No, si bien no se conocen las causas del SIDS, los eventos como estos no aumentan el riesgo de tal síndrome. Para todos los bebés, es importante crear un ambiente de sueño seguro.

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**Brief Resolved Unexplained Event:**
What Parents and Caregivers Need to Know

What is a brief resolved unexplained event?
A brief resolved unexplained event (or BRUE for short) occurs suddenly and can be scary for parents and caregivers. A brief resolved unexplained event is a diagnosis made after your baby's doctor or health care professional has had a chance to rule out other causes of the situation.

Q: What should I do if it happens again?

Visit www.healthychildren.org/safesleep to learn more about how to create a safe sleeping environment for your baby.
Future Directions

- Guidance on higher-risk BRUEs
- Better identification of child abuse
- Understand epidemiology and risk
- Understand patient- and family-centered outcomes
Take Home Points

- ALTEs/BRUEs are not precursors to SIDS
- BRUE is a diagnosis of exclusion
  - Is the patient asymptomatic and well-appearing?
  - Can you explain the event with careful H&P?
- Be aware of child abuse
- Lower-risk vs Higher-risk?
- Perform diagnostic tests on true, rather than perceived risk.
- Use shared decision making
- *Goodbye ALTE...hello BRUE!*
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Questions and Discussion
References (in order of appearance)