DELL CHILDREN'S MEDICAL CENTER
EVIDENCE-BASED OUTCOMES CENTER

Febrile Seizures Guideline

Definition:

Febrile seizure describes a seizure within 24 hours of a fever, occurring in a child age 6 months to 6 years, without known structural or functional neurologic deficits (i.e. no abnormalities on neuroimaging and no developmental delay). Febrile seizures are further divided into simple or complex, based on clinical features. **Simple febrile seizures** are the most common type, characterized by generalized convulsive seizures lasting less than 15 minutes which do not recur in a 24-hour period. **Complex febrile seizures** are characterized by seizures with a focal onset, those with duration longer than 15 minutes, **OR** seizures occurring more than once in 24 hours.[3-6]

Etiology:

Most are self-limited and resolve with the resolution of the inciting process. Febrile seizure is the most common cause of seizures in childhood, affecting 2-5% of children between the ages of 6 months and 6 years. Seizures in the context of known brain structural abnormalities (e.g. perinatal stroke) or significant cognitive impairment are excluded from the definition of febrile seizures.

Genetic predisposition:

- Monozygotic twins have a 70% concordance for febrile seizures, versus 20% in dizygotic twins.
- Having a first-degree relative (sibling or parent) with febrile seizures increases the risk by 4-5 times that of the general population.
- Four distinct loci have been nominated as candidate genes and multi-gene inheritance is suspected.

Various specific infectious agents have been more strongly associated with a risk of febrile seizures, particularly HHV-6.

The risk of future febrile seizure(s) is approximately 30% in children who have experienced one febrile seizure. Risk of recurrence increases for children who first present at age < 15 months, have a family history of epilepsy or febrile seizures in first degree relatives, present with complex febrile seizures (as opposed to simple), and who attend school or daycare. It is **not** recommended that children be removed from the school environment on the basis of having febrile seizures.[2]

Differential Diagnosis:

- Meningitis/encephalitis
- Movement Disorder (e.g. status dystonicus, motor tics)
- Cardiac arrhythmia
- Breath-holding spell
- Syncope
- Toxic encephalopathy
- Hemiplegic migraine or migraine with aura
- Alternating hemiplegia of childhood

Guideline Inclusion Criteria:

- Age 6 mos - 6 yrs presenting w/ seizure in the context of a fever

Guideline Exclusion Criteria:

- Age < 6 months or greater than 6 years
- Known epilepsy
- New onset afebrile seizure (refer to New Onset Seizures Guideline)

Diagnostic Evaluation:

History: Assess For

- Seizure onset and semiology (e.g. which parts of the body are involved, the patient's actions prior to seizure onset, body/facial movements)
- Known epilepsy
- History of febrile seizures
- Birth history (e.g. pregnancy complications or exposures, delivery complications, NICU stay)
- Ingestion
- Fever or other signs of infection or illness
- Medications
  - Received prior to presentation (type, dose, dosage, route)
  - Use of psychopharmacologic medications
- Metabolic abnormalities
- Trauma, both acutely and any prior history of traumatic brain injury
- Prior neurosurgical intervention

Physical Examination:

- Careful examination for the source of fever (particularly ear, throat, and lung exam)
- Ensure patient's ABCs (Airway, Breathing, and Circulation) are intact and address any needs, if present.
  - Obtain vital signs, including pulse oximeter
  - Provide respiratory support, as appropriate (suction secretions, secure the airway, administer O_2)
  - Assess perfusion (cap refill, lip color, etc.)
  - Obtain intravenous access
  - Cardiac monitor, if indicated
- Neurologic Exam
  - Mental status (GCS)
  - Any ongoing seizure activity (assess pupils, eye movement) (manage per the Status Epilepticus Algorithm)
  - Motor, reflex, and gait assessment for focal motor deficit and/or ataxia
  - Assess for meningeal signs
- Examine for specific rashes or ticks
- Examine for neurocutaneous findings (e.g. hypomelanotic macules, facial angiofibromas, neurofibromas, cafe au-lait macules, port wine stain)

Febrile Seizure Classification:

FEBRILE SEIZURE CLASSIFICATIONS	
Type	**Characteristics**
Simple	• Age 6 mos – 5 yrs (the lower age limit is defined by clinical practice guidelines) • Generalized tonic-clonic seizure lasting < 15 mins, ***without*** recurrence within 24 hrs • No evidence of acute symptomatic etiology (e.g. acute CNS infection, trauma) • Although neurologically impaired children qualify for a diagnosis of febrile seizures, the clinical practice guidelines specifically exclude this subpopulation from their recommendations
Complex	• Seizure behavior differs from generalized tonic-clonic (e.g. focal onset, asymmetry, staring/unresponsiveness) **OR** • Duration is prolonged (> 15 mins) **OR** • > 1 seizure within 24 hrs

Critical Points of Evidence

Evidence Supports

- Use of lumbar puncture for febrile children with signs and symptoms of meningitis or encephalitis.[12]
- Obtaining an EEG in a child with an unprovoked seizure, to evaluate for risk of seizure recurrence (does not require an inpatient admission).[13]
- Obtaining neuroimaging in a child with an unprovoked focal seizure to evaluate for structural abnormalities (does not require an inpatient admission).[13]
- Review seizure first aid and precautions with all families. Seizure first aid includes: stay with the patient having a seizure, remain calm, lay the patient down on the ground and roll them onto their side, protect the head (lay a blanket or pillow under the head), do not restrain the limbs, do not put any objects into the mouth, time the seizure; review rescue medication use.[14]
- NSAIDs and acetaminophen are not preventative against seizures during febrile illness[15]

Evidence Lacking/Inconclusive

- Use of lumbar puncture for febrile children with deficient or unknown immunization history.[12]
- Use of lumbar puncture for febrile children pretreated with antibiotics.[12]

Evidence Against

- Use of electroencephalogram (EEG) in neurologically healthy children with simple febrile seizure.[13]
- Use of neuroimaging in children with simple febrile seizure.[7,8,10]
- Use of laboratory testing (e.g. electrolytes, CBC, glucose) for the sole purpose of identifying the cause of a simple febrile seizure.[12]

Practice Recommendations & Clinical Management

Evaluation:

Laboratory	Imaging	
	Simple Febrile Seizure	**Complex Febrile Seizure**
● Consider LP in simple febrile seizure if patient is unvac or pretreated w/ antibiotics ● Labs such as calcium, magnesium, phosphorus, CBC, and glucose are **not recommended** for the sole purpose of identifying the cause of a **simple febrile seizure** ● Remainder of workup by ED provider based on other clinical symptoms ● Outpatient EEG should **only** be considered in complex febrile seizure (may be performed inpatient if patient otherwise requires inpatient status)[13]	● Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) is **not** indicated[7,8,10]	● Consider MRI w/ and w/o contrast for seizures presenting w/ focal motor onset, focal deficit, or abnormal focal exam[8,10,11] ● Divert to CT **only if** emergent concerns and MRI is unavailable

Consults/Referrals:

- Febrile seizures should be considered for Neurology referral if:
  - There is concern for escalating nature of seizures
  - Persistent encephalopathy
  - Abnormal focal exam

Patient Disposition

Admission Criteria	**Simple**	● Admission is only indicated in: ○ Ill-appearing child ○ Extreme parental anxiety ○ Social concerns ○ Other medical indications
	Complex	● Admit for any of the following: ○ Escalating seizure frequency (multiple seizures in the ED or > 3 seizures in 24 hours at home) ○ Persistent encephalopathy ○ Focal exam ○ Ill-appearing child ○ Other medical indications
Observation Criteria		● Consider observation for any of the following: ○ Extreme parental anxiety ○ Social concerns
Outpatient Neurology Referral		● Consider outpatient neurology referral for: ○ Multiple recurrent febrile seizures (in different illnesses) ○ Focal seizures w/o focal deficits ○ Parental anxiety
Minimum Discharge Criteria		● Seizure cessation ● Appropriate mental status; return to baseline mental status ● Appropriate support system (e.g. primary care physician, caregiver/family)

Outpatient Counseling:

- No routine treatment is recommended for prevention of recurrent simple febrile seizures in new-onset patients.
- An estimated 30% of children with a febrile seizure will have another seizure with a future febrile illness. Families should receive counseling regarding the child's recurrence risk.
- Diastat should be prescribed for recurrent febrile seizures.
- Prolonged febrile seizure patients should be prescribed Diastat for home use in the event of recurrence with prolonged febrile seizure of > 5 minutes duration.
- Families should receive counseling regarding the **extremely low risk** of developing an epilepsy diagnosis after experiencing a febrile seizure.

Diastat Dosing

2-5 Years		6-11 Years		12+ Years	
0.5 mg/kg		0.3 mg/kg		0.2 mg/kg	
Weight (kg)	Dose (mg)	Weight (kg)	Dose (mg)	Weight (kg)	Dose (mg)
6-10	5	10-16	5	14-25	5
11-15	7.5	17-25	7.5	26-37	7.5
16-20	10	26-33	10	38-50	10
21-25	12.5	34-41	12.5	51-62	12.5
26-30	15	42-50	15	63-75	15
31-35	17.5	51-58	17.5	76-87	17.5
36-44	20	59-74	20	88-111	20

*If in between doses when calculating the dose of Diastat, please round up to the higher Diastat dose, i.e calculation gives you a dose of 8.5mg, round up to 10mg

Follow-Up Care:

- Children diagnosed with simple febrile seizures should follow up with their PCP
- Children with a Neurology referral should be evaluated in the Neurology clinic within one month

Outcome Measures:

- Inappropriate Neurology referral
- Reason for admission to inpatient
- Utilization of EEG inpatient
- Utilization of neuroimaging

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Guideline Revision History	
April 27, 2015	V1.0 Draft Guideline approved. First Published to EBOC library.
May 2020	Seizure Diagnostic Evaluation table added.
July 2020	Status Epilepticus Critical Care Pathway added. Seizure Clusters Pathway removed.
May 2025	Full Guideline revision. Line by line review and update. Separated neuro documents into three individual guidelines: 1) Status Epilepticus Guideline 2) New Onset Seizures Guideline and 3) Febrile Seizures. The **Febrile Seizures Guideline** has been updated for improved clarity, organization, and alignment with current best practices. Key changes include updated language and formatting, revised age criteria for febrile seizures (now 6 months to 6 years), and a clarified definition of complex febrile seizures. The guideline now excludes seizures associated with known structural brain abnormalities or significant cognitive impairment and includes new information on recurrence risk. Evaluation and disposition recommendations were reorganized into tables, with added guidance such as considering LP in unvaccinated patients and limiting outpatient EEG to complex cases. Lab testing is no longer recommended for simple febrile seizures. The counseling section now emphasizes the low risk of developing epilepsy and removes prior recommendations for scheduled diazepam use. Additionally, new outcome measures were added to monitor neurology referrals, admissions, EEG, and neuroimaging utilization. The Seizure Diagnostic Evaluation Table addendum was removed.

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