

# Febrile Seizure: Acute Presentation v3.0

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If actively seizing,  
use [Seizure Pathway](#)

### Inclusion Criteria

- Patients age 6-60 months with seizure AND fever  $\geq 38^{\circ}\text{C}$  or parental report of fever within 24 hours

### Exclusion Criteria

- Known epilepsy, probable intracranial infection, intracranial shunt, immunodeficiency, cardiac right-to-left shunt, or oncology patients

### Admit Criteria

- Prolonged post-ictal period OR
- Focality of seizure without return to baseline OR
- Disabling parental anxiety OR
- Lack of access to services OR
- Consider if multiple seizures within 24 hours

Signs or symptoms  
of [intracranial infection](#)  
or [meningitis](#)?

Clinical judgement of low risk

### [Acute Evaluation](#)

- Lab testing should focus on finding the cause of the patient's fever
- Routine analysis of serum electrolytes, calcium, phosphorus, complete blood count and blood glucose are not recommended, unless they are indicated by a suspicious history or physical findings.
- Blood glucose level and urine drug screen may be considered useful if the child does not return to baseline mental status or regain consciousness after the seizure.
- Consider neurology consultation if new prolonged focal neurologic deficit with suspicion of subclinical status epilepticus or seizure duration > 30 minutes
- EEG or neuroimaging not recommended for routine evaluation

Consider outpatient f/u

### [Consider Non-Urgent Outpatient Follow-up](#)

- When to consider neuro consult, outpatient EEG, outpatient MRI

Assess admit and discharge criteria

### Discharge Criteria

- Patient appears non-toxic and returns to neurological baseline
- Parental anxiety addressed
- Parental education provided
- Appropriate outpatient follow-up is identified

Discharge

### Parental Education

- [Seizures from a fever \(PE265\)](#)
- Follow-up with primary MD

Clinical judgement of  
significant risk

### [Evaluate for Meningitis or Intracranial Infection](#)

- Consider CT if concern for increased intracranial pressure
- Lumbar Puncture
- Labs: CBC, blood culture, glucose
- Treat with empiric antibiotics

No  
meningitis

Meningitis present

Off  
Pathway

**Note:** Antipyretics may be recommended for the acute illness, but are not recommended as prophylaxis to decrease the incidence of febrile seizures

# Assess Risk of Meningitis or Intracranial Infection

## History

- Altered mental status
- Headache
- Neck stiffness

## Physical Signs

- Drowsiness
- Seizing
- Focal neurological deficit
- Signs of infection of head or neck with potential for intracranial extension (such as mastoiditis, sinusitis, etc.)
- Bulging fontanelle

## Complex Features

- Focal seizures
- Seizure duration >15 minutes
- Multiple seizures in 24 hours

[LOE: Expert opinion ]

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# Acute Evaluation

## Risk of Intracranial Infection

*There is no clear evidence that patients with complex febrile seizure are at higher risk for intracranial infection than patients with a simple febrile seizure in the absence of additional symptoms. [LOE: Guideline (Whelan 2017)] In children age 6 to 72 months of age with febrile seizure in the absence of any other signs or symptoms, the prevalence of CNS infections was 0.2% (range 0% to 1.4%, 4 studies, n=911 patients), and the risk of bacterial meningitis is 0.2% (range 0.0 to 1.0% in 5 studies, n=1109 patients). In children with complex febrile seizures, the overall average prevalence of CNS infections was 2.2% (range 0.5% to 2.9%, 2 studies, n=718 patients), and of bacterial meningitis was 0.6% (95% CI 0.25 to 1.5%). [LOE: Very low certainty (Najaf-Zadeh 2013)]*

## Lumbar Puncture

Perform a lumbar puncture in any child who presents with a seizure and a fever and has meningeal signs and symptoms (e.g. neck stiffness, Kernig and/or Brudzinski signs, altered consciousness >30 minutes or bulging anterior fontanelle). *[LOE: Guideline (AAP 2011, Natsume 2017)]* Consider risk of intracranial infection in under-immunized patients or in those pretreated with antibiotics which can mask signs and symptoms of meningitis *[LOE: Guideline (AAP 2011, Whelan 2017)]*

## Labs

*Incidence of bacteremia in children less than 24 months of age with or without seizures is the same [LOE: Guideline (AAP 2011)].* The following tests are not routinely needed for children with febrile seizure: serum electrolytes, calcium, phosphorus, magnesium, blood glucose, or complete CBC. Consider labs in cases of poor general condition, prolonged altered consciousness, or signs of dehydration. *[LOE: Guideline (AAP 2011, Natsume 2017)]*

## Imaging

Head CT scan is not routinely recommended in evaluation or management of patients with simple or complex febrile seizures. CT scans may have diagnostic use if there is a strong indication of an acute/subacute bleed or structural lesion based on a patient's exam and history. *[LOE: Guideline (AAP 2011, Whelan 2017)]*

Non-urgent, outpatient MRI brain is recommended for patient with focal complex febrile seizures, especially with postictal neurologic deficit. There is no evidence to support routine use of neuroimaging in children with simple or complex febrile seizure without interictal or postictal focality. Urgent brain MRI in the emergency room is not recommended. *[LOE: Guideline (Whelan 2017, AAP 2011)]*

## EEG

*The impact of EEG after complex febrile seizure in patients who have returned to baseline has not been evaluated in randomized-controlled trials [LOE: Guideline (Whelan 2017, Natsume 2017, AAP 2011, Shah 2017)].* Consider EEG for evaluation of complex febrile seizure. EEG is not necessary after simple febrile seizure. *[LOE: Guideline (AAP 2011)].*

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# Outpatient Follow-up

## Prevention with antipyretics

Prophylactic use of antipyretics during febrile current or future febrile illnesses does not affect the incidence of febrile seizures [\[LOE: Guideline \(Natsume 2017\)\]](#).

## When to consider Neuro consult and outpatient imaging

- *There is no evidence to support routine use of neuroimaging in children with simple or complex febrile seizure without interictal or postictal focalicity. [LOE: Guideline (Whelan 2017, AAP 2011)]*
- Non-urgent, outpatient MRI brain is recommended for patients with focal complex febrile seizures, especially if they continue to have a postictal focal deficit. [\[LOE: Guideline \(Whelan 2017, AAP 2011\)\]](#)
- Consider non-urgent outpatient neurology consultation, EEG, and MRI for patients with complex febrile seizure AND other risk factors for epilepsy [Local expert opinion]
  - Family history of epilepsy
  - Previous traumatic brain injury or central nervous system infection
  - Baseline neurodevelopmental or neurological deficits/abnormalities (cerebral palsy, developmental delay, macro/microcephaly)
  - Evidence of neurocutaneous syndrome (neurofibromatosis, tuberous sclerosis, etc)

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# Febrile Seizure Approval & Citation

Approved by the CSW Febrile Seizure team for June 13, 2019

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**Retrieval Website:** <https://www.seattlechildrens.org/pdf/febrile-seizures-pathway.pdf>

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# Evidence Ratings

This pathway was developed through local consensus based on published evidence and expert opinion as part of Clinical Standard Work at Seattle Children's. Pathway teams include representatives from Medical, Subspecialty, and/or Surgical Services, Nursing, Pharmacy, Clinical Effectiveness, and other services as appropriate.

When possible, we used the GRADE method of rating evidence certainty. Evidence is first assessed as to whether it is from randomized trial or cohort studies. The rating is then adjusted in the following manner (from: Guyatt G et al. J Clin Epidemiol. 2011;4:383-94, Hultcrantz M et al. J Clin Epidemiol. 2017;87:4-13.):

Certainty ratings are *downgraded* if studies:

- Have serious limitations
- Have inconsistent results
- If evidence does not directly address clinical questions
- If estimates are imprecise OR
- If it is felt that there is substantial publication bias

Certainty ratings are *upgraded* if it is felt that:

- The effect size is large
- If studies are designed in a way that confounding would likely underreport the magnitude of the effect OR
- If a dose-response gradient is evident

## Certainty of Evidence:

★★★★ High: The authors have a lot of confidence that the true effect is similar to the estimated effect

★★★○ Moderate: The authors believe that the true effect is probably close to the estimated effect

★★○○ Low: The true effect might be markedly different from the estimated effect

★○○○ Very low: The true effect is probably markedly different from the estimated effect

Guideline: Recommendation is from a published guideline that used methodology deemed acceptable by the team

Expert Opinion: Based on available evidence that does not meet GRADE criteria (for example, case-control studies).

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## Summary of Version Changes

- **Version 1.0 (11/15/2011):** Go live
- **Version 1.1 (3/3/2017):** Updated email address and self-assessment
- **Version 2.0 (6/13/2019):** Updated literature review and discharge criteria, replaced ordering guidance with reference to seizure pathway
- **Version 3.0 (1/30/2023):** Updated admit criteria, updated risk of intracranial infection guidance, replaced abbreviations

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## Medical Disclaimer

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

However, in view of the possibility of human error or changes in medical sciences, neither the authors nor Seattle Children's Healthcare System nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such information.

Readers should confirm the information contained herein with other sources and are encouraged to consult with their health care provider before making any health care decision.

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# Bibliography

## Methods

A literature search was conducted in January 2019 to target synthesized literature on febrile seizures for 2012 to current and limited to English and humans. The search was executed in Ovid Medline, Embase, Cochrane Database of Systematic Reviews (CDSR) and Turning Research into Practice (TRIP) databases.

Screening and data extraction were completed using DistillerSR (Evidence Partners, Ottawa, Canada). Two reviewers independently screened abstracts and included guidelines and systematic reviews that addressed optimal diagnosis, treatment, and prognosis of patients who meet pathway inclusion/exclusion criteria. One reviewer extracted data and a second reviewer quality checked the results. Differences were resolved by consensus.

## Results

The searches of the 4 databases (see methods) retrieved 80 records. Once duplicates had been removed, we had a total of 75 records. We excluded 64 records based on titles and abstracts. We obtained the full text of the remaining 9 records and excluded 5. One article (the 2011 AAP guideline), which was outside the current search dates and referenced in the 2011 version of this pathway, was added to included articles. For this update we have included a total of 5 studies (4 new). The flow diagram summarizes the study selection process.

### Identification

Records identified through  
database searching (n=80)

Additional records identified  
through other sources (n=0)

### Screening

Records after duplicates removed (n=75)

Records screened (n=75)

Records excluded (n=64)

### Eligibility

Records assessed for eligibility (n=9)

Articles excluded (n=5)  
Did not answer clinical question (n=4)  
Did not meet quality threshold (n=1)

### Included

New studies (n=4)

Articles added from prior pathway version (n=1)

Studies included in pathway (n=5)

Flow diagram adapted from Moher D et al. BMJ 2009;339:bmj.b2535

# Bibliography

## Included Studies

- (AAP), Subcommittee on Febrile Seizures, American Academy of Pediatrics. Neurodiagnostic evaluation of the child with a simple febrile seizure. (2011). *Pediatrics*, 127(2).
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- Natsume, J., Hamano, S.-I., Iyoda, K., Kanemura, H., Kubota, M., Mimaki, M., . . . Sugie, H. (2017). New guidelines for management of febrile seizures in Japan. *Brain & development*, 39(1), 2-9. doi:https://dx.doi.org/10.1016/j.braindev.2016.06.003
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- Whelan, H., Harmelink, M., Chou, E., Sallowm, D., Khan, N., Patil, R., . . . Greydanus, D. (2017). Complex febrile seizures-A systematic review. *Disease-A-Month*, 63(1), 5-23. doi:https://dx.doi.org/10.1016/j.disamonth.2016.12.001