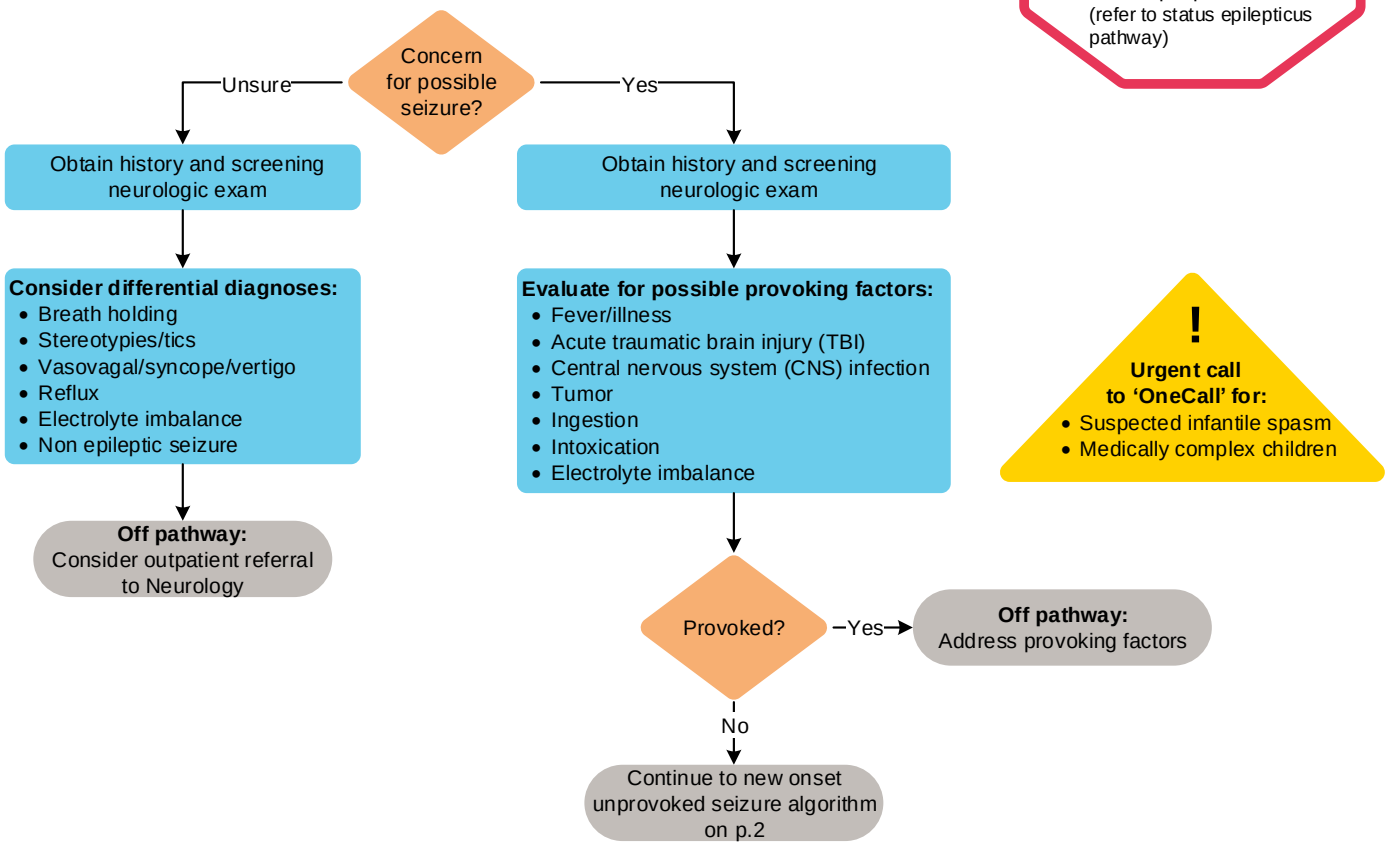
NEW ONSET SEIZURE

ALGORITHM 1. CONCERN FOR POSSIBLE SEIZURE

Inclusion Criteria
- Age 6 months to 21 years
- First-time seizure

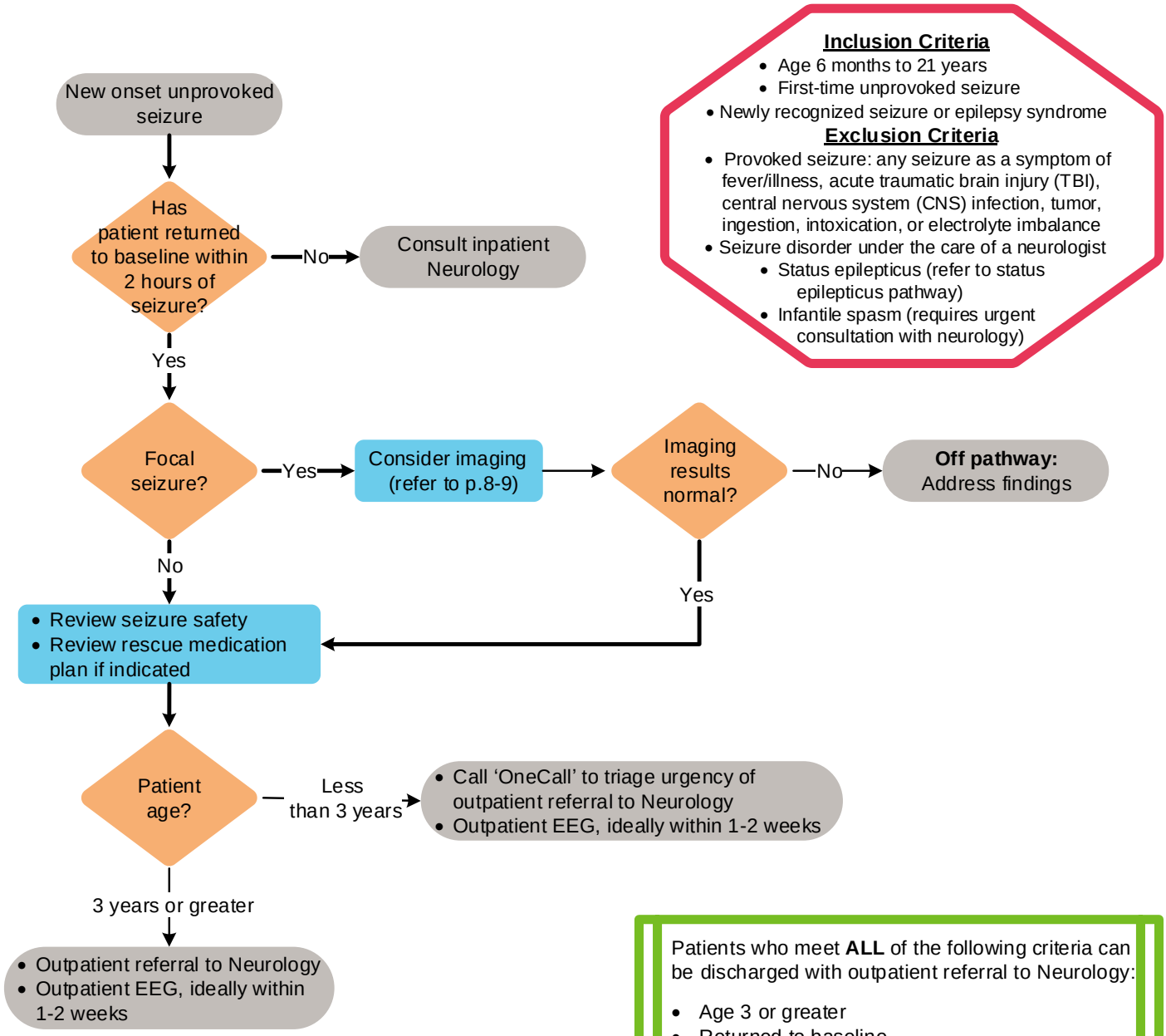
Exclusion Criteria
- Status epilepticus (refer to status epilepticus pathway)



NEED REAL TIME HELP? CALL US!

Call 'OneCall' at 720-777-3999 or 719-305-3999 (Colorado Springs)

ALGORITHM 2. NEW ONSET UNPROVOKED SEIZURE



Patients who meet **ALL** of the following criteria can be discharged with outpatient referral to Neurology:

- Age 3 or greater
- Returned to baseline
- Normal exam

If any of the above criteria is **NOT** met, a neurology consult is recommended for disposition.

NEED REAL TIME HELP? CALL US!

Call 'OneCall' at 720-777-3999 or 719-305-3999 (Colorado Springs)

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TARGET POPULATION

Inclusion Criteria

- Patients age 6 months to 21 years
- Patients with first-time unprovoked seizure
- Patients with newly recognized seizure or epilepsy syndrome

Exclusion Criteria

- Patients with provoked seizure, as a symptom of:
  - Fever/illness
  - Acute traumatic brain injury (TBI)
  - Central nervous system (CNS) infection
  - Tumor
  - Ingestion
  - Intoxication
  - Electrolyte imbalance
- Patients with seizure disorder under the care of a neurologist
- Patients with status epilepticus (refer to Status Epilepticus Clinical Pathway)
- Patients with infantile spasms (requires urgent consultation with neurology)

BACKGROUND | DEFINITIONS

Seizure: A transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain. A seizure does not necessarily mean that a person has epilepsy[1].

The recurrence risk following a single seizure is less than 50%. The risk increases with each of the following factors[2],

1. An abnormal EEG
2. Developmental delay
3. Abnormal exam findings
4. Family history of epilepsy
5. Abnormal brain imaging
6. Seizure onset less than 3 years old

Epilepsy: Clinically defined as:

1. At least 2 unprovoked (or reflex to certain stimuli) seizures occurring more than 24 hours apart

   OR

2. One unprovoked (or reflex to certain stimuli) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years

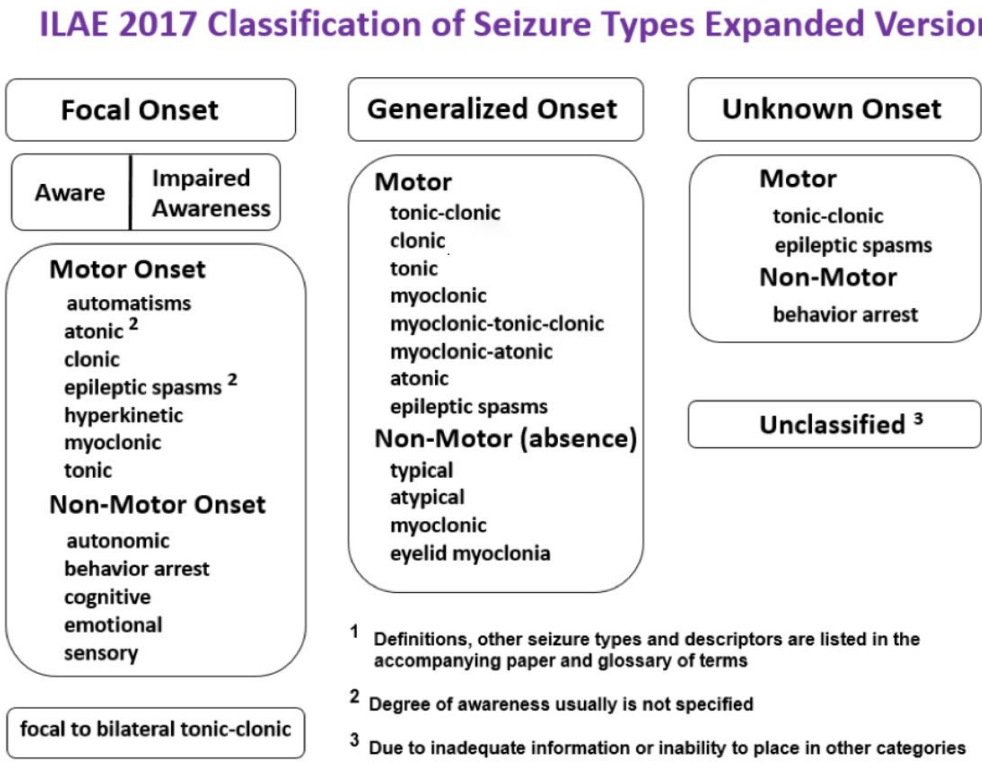
   OR

3. Diagnosis of an epilepsy syndrome

Note: Epilepsy is considered resolved for individuals who had an age-dependent epilepsy syndrome and are past the applicable age or those who have remained seizure-free for the past 10 years, with no seizure medicines for the last 5 years[2].

Incidence of epilepsy: The estimated annual incidence in the U.S. is 48 cases of epilepsy for every 100,000 people. The incidence is higher in young children and older adults. When considered over a lifetime, approximately 1 in 26 people will develop epilepsy[3].

COMMON SEIZURE TYPES



Fisher et al. Operational classification of seizure types by the International League Against Epilepsy[5]

DIFFERENTIAL DIAGNOSES FOR SEIZURES

Breath-holding spells:

- 6 months through 6 years of age, most common from 1 to 3 years of age
- Preceding cry and / or precipitating injury or surprise followed by a long exhalation and respiratory pause (breath-holding)
- Children might stiffen or have clonic movements briefly as part of the syncopal portion of the event

Syncope:

- Not unusual to have a few seconds of stiffening or jerking with a loss of consciousness
- Helpful history includes:
  - Preceding triggers such as standing up quickly
  - Review of systems with pre-syncopal or other cardiac symptoms
  - Quick return to alertness is less likely to be seizure

Gastroesophageal reflux (GERD)/ Sandifer syndrome:

- Age of patient is typically in the first years of life
- Sandifer syndrome refers to posturing/arching with reflux
- Timing with feeding and other reflux symptoms like spitting up are more suggestive of symptomatic reflux

Nonepileptic events (pseudo-seizures, psychogenic) should be considered with:

- Eyes closed during the ictus
- Other behavioral concerns in review of history
- Flailing rather than rhythmic movement
- Pelvic thrusting
- No change in color
- Prolonged or stuttering course without a postictal period
- Staring episodes are more likely to be a seizure when:
  - Spells noted in multiple environments (absence)
  - Spells interrupt activities (absence) or have postictal manifestations (focal)
  - Spells don't stop with physical touch
  - Spells precipitated by hyperventilation during exam
  - Children sometimes describe a sense of "lost time" or people suddenly moving to a new location

Other nonepileptic events including abnormal movements, such as stereotypies, tics, or tremor:

- If the events can be interrupted or suppressed, they are unlikely to be seizures. Calling someone's name or waving a hand is not enough to interrupt a behavioral event.

  Tip: Direct the family to immediately and physically stimulate the patient (such as picking the child up or giving a firm nudge) to assess future events.
- Consider underlying electrolyte imbalance if concern for new onset abnormal movement, such as tremor.

INITIAL CLINICAL EVALUATION

Event History

It is critical to obtain as detailed a history as possible at the time of presentation. The determination that a seizure has occurred is typically based on a detailed history provided by a reliable observer. Keep in mind there might be multiple types of events, each of which should have its own description.

Components of event history should include the following when possible:

Description:

- It is useful to note the term the family uses for an event if there is more than one type for ease of communication.
- Include what is happening before the event starts – such as awake/asleep, crying, arising etc.
- Ask in detail about preceding symptoms – such as fear behavior or sensation, autonomic symptoms like pupillary dilatation, drooling, change in respiratory or heart rate, incontinence, pallor, vomiting.
- Obtain detail about the event from patient and all observers including details such as - eyes open/closed (closed eyes are less likely to be a seizure), automatisms such as lip smacking or hand fumbling, limp/stiff/jerking at different points in the event, incontinence and length.
  - Clear loss of consciousness from the onset suggests a generalized seizure. Inability to interact normally without complete loss of consciousness suggests focal seizure (previously called complex partial) or absence if brief.
- Ask in detail about behaviors after the event such as sleepiness, confusion, weakness and aggression.
- Find out when the events started, how often they are occurring, and the date of the last event.

Length of Time:

- Note: For first-time seizures people often greatly overestimate the length, so it is helpful to compare to something familiar like the length of a commercial, getting in the car, or events that did occur, like calling 911.

Triggers:

- Common triggers for seizures are illness, fever, and sleep deprivation.
- Trauma and crying as triggers may suggest breath-holding or syncope rather than seizures.
- History of medication exposure or ingestion could suggest an underlying cause of provoked seizure.

Past Medical History and Review of Systems

- Birth history: To suggest an in utero or perinatal insult (e.g. loss of fetal movement or a complicated delivery/abnormal placenta) might suggest an acquired brain insult as a cause of seizures.
- Bed-wetting or daytime incontinence in a child who is usually dry might be a sign of seizures.
- Review of systems for jerking in the morning, sudden falls, staring spells, episodes of loss of awareness, developmental history, regression in skills, change in academic performance.

Family History

In addition to asking about seizures and developmental disabilities in family members, also ask specifically about febrile seizures and unexplained injuries (one-car accidents or drowning) which might represent a seizure. Sometimes families have new family history at a follow up visit - so ask at follow up visits as well.

Examinations

General exam: A thorough general exam is important and should include:

- Head size compared to body size. Limb asymmetry might suggest a remote insult or developmental brain malformation.
- Skin markings (including Wood's lamp examination in light-skinned children). Skin markings may suggest a neurofibromatosis or tuberous sclerosis. Unusual moles or discolored hair patches in the scalp can overlay a cortical malformation. Dysmorphic features can be a clue to an underlying genetic condition.

  Tip: consider head imaging more strongly with such findings

Screening neurologic exam: May indicate new or old neurologic injury

- Cranial nerves: pupil reactivity, nystagmus, facial symmetry/strength, palate elevation, tongue protrusion
- Motor: muscle bulk, tone, and strength (assess for asymmetries), reflexes including plantar response
- Coordination: finger to nose movements (assess for focal tremors)
- Gait: Look for asymmetry
- Ophthalmoscopic exam for papilledema, especially if acutely ill

Additional exams:

- Hyperventilation is helpful to reveal absence seizures during a visit. You might use a pinwheel or ask patients to blow forcefully on a piece of tissue to make it move for 2 minutes and observe during that time and for several minutes after it is completed.

LABORATORY STUDIES I IMAGING

Note: Labs are rarely helpful to identify etiology during the initial presentation if the patient returns to baseline without intervention.

Labs

Routine laboratory testing other than blood glucose testing is not indicated after a first unprovoked seizure. Laboratory tests should be ordered based on individual clinical circumstances that include suggestive historic or clinical findings such as vomiting, diarrhea, dehydration, or failure to return to baseline alertness.

Urine toxicology

- Consider if patient has prolonged post-ictal state or if there is any suspicion of drug exposure or substance abuse

Blood glucose or electrolytes

- Consider if clinical picture suggests possible hypoglycemia or electrolyte changes (i.e. prolonged vomiting, poor feeding, or if the patient has not returned to baseline neurologic status after 2 hours)

Lumbar puncture (LP)

- If concern for possible meningitis or encephalitis based on the whole clinical picture; with a lower threshold to obtain for children under 6 months of age who are not returning to baseline

Electroencephalogram (EEG)

Electroencephalogram (EEG) is the most useful test in evaluation of seizures. It is acceptable and practical to obtain the initial EEG on an outpatient basis, ideally within 1-2 weeks of the seizure. If possible, a sleep-deprived outpatient EEG capturing both wakefulness and sleep during the recording is preferred.

NOTE: Consider urgent inpatient EEG for persistent mental status changes to rule out subclinical seizures.

It is possible and common to have normal EEGs, even with definitive epilepsy. EEG abnormalities in between seizures (inter-ictal) are not uncommon and do not necessarily confirm a diagnosis of epilepsy, so it is important to confirm that the EEG findings support a specific diagnosis.

The EEG is usually diagnostically reliable with conditions such as:

- Absence epilepsy
- Juvenile myoclonic epilepsy
- Childhood epilepsy with centrotemporal spikes
- Infantile spasms and other epileptic encephalopathies (not in scope of this pathway)

Imaging

- Brain imaging uncovers abnormalities requiring acute intervention in only 2% of children at the time of first seizure
- Abnormalities which affect prognosis and management are found in 10-20% of non-urgent studies for first seizures
- Infants are more likely to have seizures from a remote symptomatic etiology, such as perinatal stroke or focal cortical dysplasia[5]
- Brain imaging is often not needed for generalized seizures or recognizable self-limited epilepsy syndromes

Brain imaging *IS* indicated for:

- Patients of any age with focal findings during or after the seizure
- Focal EEG abnormality (unless the features are consistent with a known epilepsy syndrome)
- Abnormal patient exam such as motor or limb size asymmetry or skin findings associated with brain abnormalities such as neurofibromatosis, tuberous sclerosis, and patches of discolored hair (which can be associated with underlying focal cortical dysplasia)
- Any concern for child abuse or traumatic cause of seizures – in this case, consider CT for evaluation

Imaging Modalities

Magnetic resonance imaging (MRI):

- If a neuroimaging study is obtained, MRI is the preferred modality for most cases
- MRI is more sensitive for subtle findings such as developmental brain abnormalities and remote insult

Computed tomography (CT) scan

- Useful to assess acutely for blood, bone windows for skull fracture, and is adequate to assess for hydrocephalus
- First line study to obtain if concerned about traumatic cause or non-accidental injury

INITIAL CLINICAL MANAGEMENT

The first phone call or visit after a first seizure with quick return to neurologic baseline should:

1. Provide reassurance
2. Confirm all caregivers know basic choking intervention and seizure safety (see caregiver education)
3. Result in a seizure action plan for all settings of the child's life, including: school, grandparents, sleep overs etc. (see caregiver education)
4. Discuss treatment: antiseizure medications are usually not indicated for first-time seizure. Consider medications after a first recognized seizure if history uncovers a strong suspicion of absence (petit mal) seizures or previously unrecognized seizures (see therapeutics). Consider consultation with Pediatric Neurologist if suspected need for antiseizure medication.
5. Discuss return precautions and indications for EMS activation (911)

- For self-limited seizures a patient does not need to return to the emergency room for each similar event
- Education at the first visit or call can prevent unnecessary emergency room visits

  Tip: Epilepsy.com also has resources for providers

THERAPEUTICS

<table>
<tr><th colspan="3">At-home Rescue Medications</th></tr>
<tr><th>Generic (Brand) Formulation</th><th>Dosing Recommendations</th><th>Side Effects/ Helpful Tips</th></tr>
<tr>
<td>Diazepam (Diastat Rectal, Diastat AcuDial)

2.5 mg kit
10 mg kit (delivers 5, 7.5, and 10 mg doses)
20 mg kit (delivers 12.5, 15, 17.5, and 20 mg doses)</td>
<td>
<table>
<tr><th>Age</th><th>Dose</th></tr>
<tr><td>Age 2-5 years</td><td>0.5 mg/kg rectally x 1
Maximum total dose: 20 mg</td></tr>
<tr><td>Age 6-11 years</td><td>0.3 mg/kg rectally x 1
Maximum total dose: 20 mg</td></tr>
<tr><td>Age 12 years or greater</td><td>0.2 mg/kg rectally x 1
Maximum total dose: 20 mg</td></tr>
</table>

When calculating dose, round UPWARD to next available dose
</td>
<td>
▪ Drowsiness
▪ Dizziness
▪ Unsteadiness
▪ Respiratory depression (in overdose or with other CNS depressants)

Common guidelines for use include: a single seizure more than 5 minutes and more than 6 seizures in an hour, with case-by-case exceptions

We typically recommend calling 911 the first time it is used
</td>
</tr>
<tr>
<td>Midazolam (Versed)

Vials for IV administration – multiple concentrations and vial sizes. Make sure to order 5 mg/mL concentration.</td>
<td>
High risk medication

0.2-0.3 mg/kg/dose

Deliver half the drug volume in one nostril and administer the remaining volume in opposite nostril. Max volume 1 ml per nostril

<table>
<tr><th>Weight</th><th>Dose = Volume</th></tr>
<tr><td>Less than 10 kg</td><td>Refer to Diastat section above</td></tr>
<tr><td>10-15 kg</td><td>3 mg = 0.6 mL total, 0.3 mL per nostril</td></tr>
<tr><td>16-26 kg</td><td>5 mg = 1 mL total, 0.5 mL per nostril</td></tr>
<tr><td>27-32 kg</td><td>8 mg = 1.6 mL total, 0.8 mL per nostril</td></tr>
<tr><td>33 kg or greater</td><td>10 mg = 2 mL total, 1 mL per nostril</td></tr>
</table>
</td>
<td>
▪ Nasal burning/irritation
▪ Local irritation (sneezing, dry mouth, coughing, tears)
▪ Drowsiness
▪ Respiratory depression (in overdose or with other CNS depressants)

Consult/phone neurology referral for initiation of this medication. At Children's we do not provide the prescription until caregivers have had hands-on training from our nurses regarding use.

Midazolam (Versed) IV formulation: Caution- high risk for pharmacy errors such as use of oral syrup (incorrect) rather than IV formulation. There are a variety of vial sizes and concentrations so clear communication about dosing is needed.

Intranasal infuser device (atomizer) and needle-free systems for withdrawing can be hard to obtain. Nasal atomizers are available in the Walgreens in Children's.
</td>
</tr>
<tr>
<td>Clonazepam (Klonopin)

Oral Disintegrating Tablet</td>
<td>Dissolve in oral cavity

Used more often for seizure clusters, including more than six seizures in 1 hour (less commonly used for prolonged seizures)

0.01 – 0.03 mg/kg, max 2mg</td>
<td>▪ Fatigue
▪ Dizziness
▪ Increased saliva</td>
</tr>
</table>

Anti-seizure Medications Commonly Used First Line for New Onset Seizure in Pediatrics		
Generic (Brand) Formulation	**Dosing Recommendations, Monitoring, and Clinical Pearls**	**Side Effects**
Levetiracetam (Keppra) Solution: 100 mg/mL Tablet (IR): 250 mg, 500 mg, 750 mg, 1000 mg (62.5 mg and 125 mg available by compounding) Tablet (ER): 500 mg, 750 mg (non-formulary at CHCO)	**Dosing:** **Initial:** 7.5 mg/kg/dose BID x 1 week, then 15 mg/kg/dose BID ▪ Increase total daily dose by 20-25% every week based on clinical response and tolerability **Target dose:** 15-30 mg/kg/dose BID **Maximum dose:** 30 mg/kg/dose BID or 1500 mg BID ▪ NOTE: doses >3000 mg/day have been used in trials, however, there is no evidence of increased benefit **Monitoring and Clinical Pearls:** ▪ Easy titration ▪ Less drug interactions ▪ Monitor blood pressure in patients aged < 4 years periodically	**Common:** ▪ Sleep changes ▪ Irritability ▪ Behavior disturbance ▪ Increased blood pressure (diastolic) **Idiosyncratic and/or Less Common:** ▪ Anaphylaxis and angioedema ▪ Pancytopenia ▪ Psychosis ▪ Hypogammaglobulinemia
Ethosuximide (Zarontin) Syrup: 250 mg/5mL Capsule: 250 mg	**Dosing:** **Initial:** 250 -500 mg PO daily ▪ Increase daily dose by 250 mg every 4-7 days based on clinical response, serum levels, and tolerability **Target dose:** 20 mg/kg/day ▪ If clinical response not achieved, serum levels can be checked to see if they are within accepted therapeutic range (40-100 mcg/mL) **Monitoring and Clinical Pearls:** ▪ Laboratory monitoring: baseline CBC with diff and LFTs, repeat in 6 weeks and periodically thereafter ▪ Drug level monitoring (to assist with titration and/or toxicity if needed): therapeutic range 40-100 mcg/mL ▪ Drug Interactions: may increase or decrease serum concentrations of other anticonvulsant medications ▪ Take with food or milk to minimize GI upset	**Common:** ▪ Nausea/vomiting/diarrhea ▪ GI upset ▪ Hiccups ▪ Headaches ▪ Sedation/drowsiness ▪ Sleep disturbance ▪ Hyperactivity **Idiosyncratic and/or Less Common:** ▪ Blood dyscrasias (aplastic anemia) ▪ SJS/TEN ▪ Hepatic failure ▪ Dermatitis/rash ▪ Serum sickness
Oxcarbazepine (Trileptal) Suspension: 300 mg/5mL Tablet IR: 150, 300, 600 mg Nonformulary for Kaiser: Tablet XR (Oxtellar *brand only*): 150, 300, 600 mg	**Dosing:** **Initia**l: 4-5 mg/kg/dose BID ▪ If < 20kg, initial 8-10 mg/kg/dose BID ▪ Increase total daily dose by 5 mg/kg every 3 days based on clinical response and tolerability **Target dose**: 15-22.5 mg/kg/dose BID **Maximum dose**: 30 mg/kg/dose BID (although more than 25 mg/kg/dose BID not often used); 2400 mg/day commonly considered maximum dose **Monitoring and Clinical Pearls** Laboratory monitoring: ▪ Serum Na if indicated clinically or if patient at high risk of hyponatremia (i.e. pt at risk for electrolyte imbalance) ▪ Prodrug rapidly converted to active component 10-monohydrate derivative (MHD) ▪ Drug interactions: Cyp 3A4 Inducer ▪ Risk of SJS/TEN increased in Han Chinese, Thai, and Philippines populations due to association with HLA-B*1502	**Common:** ▪ Unsteadiness ▪ Dizziness ▪ Blurry vision ▪ N/V ▪ Abdominal pain ▪ Diplopia ▪ Nystagmus **Idiosyncratic and/or Less Common:** ▪ Rash ▪ Hyponatremia *(higher incidence than carbamazepine)* ▪ Osteoporosis

INDICATIONS FOR CONSULTATION WITH A NEUROLOGIST

Referral to Neurology should happen at any point in which the practitioner feels the patient is beyond their comfort level or scope of practice. In particular, consider referral or consultation with neurology for the following:

- New onset unprovoked seizures under 3 years of age
- Complex past medical history with new onset seizure
- Suspected infantile spasms
- Not clear if event is seizure or type of seizure is uncertain

PARENT | CAREGIVER EDUCATION

Basic seizure safety information

- Epilepsy Foundation
- Seizure First Aid

Seizure action plan

- Description of seizure type(s)
- Action plan - multiple tiers including what should be treated as an emergency
- Rescue medication instructions
- Seizure Action Plan Resource

Home therapy for seizures

- Using Intranasal Midazolam (Versed): How to Prepare and Give for Seizures - English I Spanish

Community Resources

- AAP Center on Epilepsy
- Epilepsy Foundation of America - this site is sometimes adult focused so not all information pertains to children
- Epilepsy Foundation of Colorado
- Wyoming Epilepsy Association
- Family Voices - services are limited but include navigators in large facilities like Children's Colorado
- Parent to Parent of Colorado - helps link families to other families with similar issues
- Grupo Vida - Spanish friendly family support
- County public health nurse can assist with case management - anyone can initiate a request for case management by contacting the family's county health department
- Local school nurse can assist with seizure safety at school

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APPENDIX: COMMON EPILEPSY SYNDROMES

This list focuses on common syndromes and is not inclusive (references: epilepsy.com and epilepsydiagnosis.org)

1. Childhood epilepsy with centrotemporal spikes:

(formerly called "benign childhood epilepsy with centrotemporal spikes" (BECTS) or "Rolandic epilepsy")

- Self-limiting epilepsy (remitting at predictable age)
- Age: Onset is between 3 and 14 years (peak 8-9 years). Seizures usually resolve by age 15 years.
- Gender: Both sexes are affected
- History/Physical: Antecedent, birth and neonatal history is normal. A history of febrile seizure is seen in 5-15% cases. Neurological exam is normal.
- Deficits: During the course of the active epilepsy, behavioral and neuropsychological deficits may be found, particularly in language and executive functioning.
- Seizures: Patients and their families often describe nocturnal and very early morning seizures with facial twitching, arrest of speech, and drooling. The child often remembers the event, Seizures can include jerking of a limb or progress to a generalized seizure.
- Treatment: Seizures are often sporadic and usually brief, so treatment is not always indicated, even after a second seizure depending on the family's preference.
- Tip: if the EEG and story are diagnostic, imaging is not needed since it is typically normal.

2. Childhood Absence Epilepsy (CAE):

- Typically a self-limiting epilepsy.
- Age: Onset between the ages of 2 to 12 years (peak 5 to 6 years). Seizures usually resolve by puberty.
- Gender: Both sexes are equally affected.
- History/Physical: Antecedent and birth history is normal. A history of febrile seizures is seen in 15-20% of cases. Neurological examination and head size are normal. Development and cognition are typically normal.
- Deficits: Attention deficit hyperactivity disorder and learning difficulty may occur for some children.
- Seizures: brief episodes of alteration in awareness lasting 10-15 seconds and then immediate return to baseline. A small percentage of patients have generalized convulsions.
- Treatment: Seizures respond well to medication for the majority of patients.
- Tip: Consider Juvenile absence epilepsy (JAE) with onset after age 8 and less frequent absence seizures, along with generalized tonic-clonic seizures. JAE has a lower likelihood of spontaneous remission. Imaging is typically normal and is not needed.

3. Juvenile Myoclonic Epilepsy (JME):

- Typically, a chronic epilepsy with many patients requiring long-term treatment with anti-seizure medications.
- Age: Onset between 8 to 25 years of age. A small number (approximately 5%) of cases evolve into this syndrome from childhood absence epilepsy. Seizures continue into adulthood.
- Gender: Both males and females are equally affected.
- History/Physical: Antecedent and birth history is normal. A history of febrile seizures is seen in 5-10% of cases. Development and cognition are typically normal. Neurological examination and head size are normal.
- Seizures: three types of characteristic seizures, including myoclonic seizures (often in the morning), absence seizures, and generalized tonic-clonic seizures.
- Treatment: anti-seizure medication that can be effective for the three types of seizures in this syndrome (absence, myoclonic, and generalized tonic-clonic).

- Tip: Ask about early morning jerking movements (i.e dropping toothbrush or fork in the morning due to myoclonic jerks) for teens presenting with generalized convulsions. Counsel patients on seizure triggers such as sleep deprivation and alcohol. Imaging is typically normal and is not needed.

4. Mesial Temporal Lobe Epilepsy:

- Less common in pediatric patients compared to adult epilepsy.
- Seizure: Behavioral arrest with loss of awareness. Automatisms are common and include oro-alimentary and/or gestural automatisms. Seizures often start with a subjective psychic or sensory phenomenon (aura) which can be experiential such as fear or déjà vu. Epigastric and auditory phenomena also occur. Autonomic features are common including pallor and palpitations. There is typically confusion after the seizure.

Note: Temporal focal seizures with impaired awareness need to be distinguished from absence seizures. While both may have automatisms, temporal lobe seizures are typically longer (> 30 seconds), associated with pallor, and followed by confusion after the seizure.

- Deficits: Co-morbid mood and learning conditions can significantly affect quality of life.
- Treatment: Focal or broad-spectrum anti-seizure medications can be used.
- Tips: These seizures can be difficult to treat so consider referral to a neurologist more quickly than you might other syndromes.
- Brain imaging with MRI warranted.

5. Panayiotopoulos syndrome:

- Age: Onset is between 1 and 14 years of age (majority between 3 and 6 years). Seizures usually resolve by age 11-13 years.
- Gender: Both sexes are affected equally.
- History/Physical: Antecedent and birth history is normal. Head size and neurological examination are usually normal. Development and cognition are normal. However, during active seizure periods, subtle neuropsychological deficits in language and executive functioning have been reported. EEGs are abnormal with occipital spikes but not slowing in the majority of cases.
- Seizures: characterized by autonomic, mainly emetic symptoms and often with unilateral deviation of the eyes or head deviation. About two thirds start in sleep; the child may wake up with similar complaints while still conscious or else may be found vomiting, conscious, confused, or unresponsive. Other autonomic manifestations include pallor, flushing or cyanosis, change in pupil size, coughing, incontinence of urine or feces. In most seizures children eventually become unresponsive and might manifest more easily recognizable seizure symptoms.
- Treatment: This disorder is not common but is worth mentioning because the seizures are rare and often to do not warrant treatment, even after a second seizure.

Tips: Seizures can be confused with migraine headache. **Imaging is not necessary if the clinical description and EEG support the diagnosis**.

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Clinical Pathways & Measures Committee – February 18, 2020
Pharmacy & Therapeutics Committee – February 6, 2020

MANUAL/DEPARTMENT	Clinical Pathways/Quality
ORIGINATION DATE	September 25, 2015
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REVIEW/REVISION SCHEDULE

Scheduled for full review on February 18, 2024.

Discrimination is Against the Law. Children's Hospital Colorado complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex. Children's Hospital Colorado does not exclude people or treat them differently because of race, color, national origin, age, disability, or sex.

Children's Hospital Colorado provides free aids and services to people with disabilities to communicate effectively with us, such as: Qualified sign language interpreters, written information in other formats (large print, audio, accessible electronic formats, other formats). Children's Hospital Colorado provides free language services to people whose primary language is not English, such as: Qualified interpreters, information written in other languages.

If you need these services, contact the Medical Interpreters Department at 720.777.9800.

If you believe that Children's Hospital Colorado has failed to provide these services or discriminated in another way on the basis of race, color, national origin, age, disability, or sex, you can file a grievance with: Corporate Compliance Officer, 13123 E 16th Avenue, B450, Aurora, Colorado 80045, Phone: 720.777.1234, Fax: 720.777.7257, corporate.compliance@childrenscolorado.org. You can file a grievance in person or by mail, fax, or email. If you need help filing a grievance, the Corporate Compliance Officer is available to help you.

You can also file a civil rights complaint with the U.S. Department of Health and Human Services, Office for Civil Rights, electronically through the Office for Civil Rights Complaint Portal, available at ocrportal.hhs.gov/ocr/portal/lobby.jsf, or by mail or phone at: U.S. Department of Health and Human Services 200 Independence Avenue, SW Room 509F, HHH Building Washington, D.C. 20201 1-800-368-1019, 800-537-7697 (TDD) Complaint forms are available at www.hhs.gov/ocr/office/file/index.html.

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ATENCIÓN: si habla español, tiene a su disposición servicios gratuitos de asistencia lingüística. Llame al 1-720-777-9800.

CHÚ Ý: Nếu bạn nói Tiếng Việt, có các dịch vụ hỗ trợ ngôn ngữ miễn phí dành cho bạn. Gọi số 1-720-777-9800.

주의: 한국어를 사용하시는 경우, 언어 지원 서비스를 무료로 이용하실 수 있습니다. 1-720-777-9800 번으로 전화해 주십시오

注意：如果您使用繁體中文，您可以免費獲得語言援助服務。請致電1-720-777-9800。

ВНИМАНИЕ: Если вы говорите на русском языке, то вам доступны бесплатные услуги перевода. Звоните 1-720-777-9800.

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ملحوظة: إذا كنت تتحدث اذكر اللغة، فإن خدمات المساعدة اللغوية تتوافر لك بالمجان. اتصل برقم 1-720-777-9800 (رقم

ACHTUNG: Wenn Sie Deutsch sprechen, stehen Ihnen kostenlos sprachliche Hilfsdienstleistungen zur Verfügung. Rufnummer: 1-720-777-9800.

ATTENTION : Si vous parlez français, des services d'aide linguistique vous sont proposés gratuitement. Appelez le 1-720-777-9800.

ध्यान दनु होस्तपाइले नेपाल बोल्नहन्छ भन तपाइको निम्त भाषा सहायता सवाहरू नःशल्क रूपमा उपलब्ध छ । फोन गनु होसर् 1-720-777-9800 ।

PAUNAWA: Kung nagsasalita ka ng Tagalog, maaari kang gumamit ng mga serbisyo ng tulong sa wika nang walang bayad. Tumawag sa 1-720-777-9800.

注意事項：日本語を話される場合、無料の言語支援をご利用いただけます。1-720-777-9800 まで、お電話にてご連絡ください。

Ntị: Ọ bụrụ na asụ Ibo, asụsụ aka ọasụ n'efu, defu, aka. Call 1-720-777-9800.