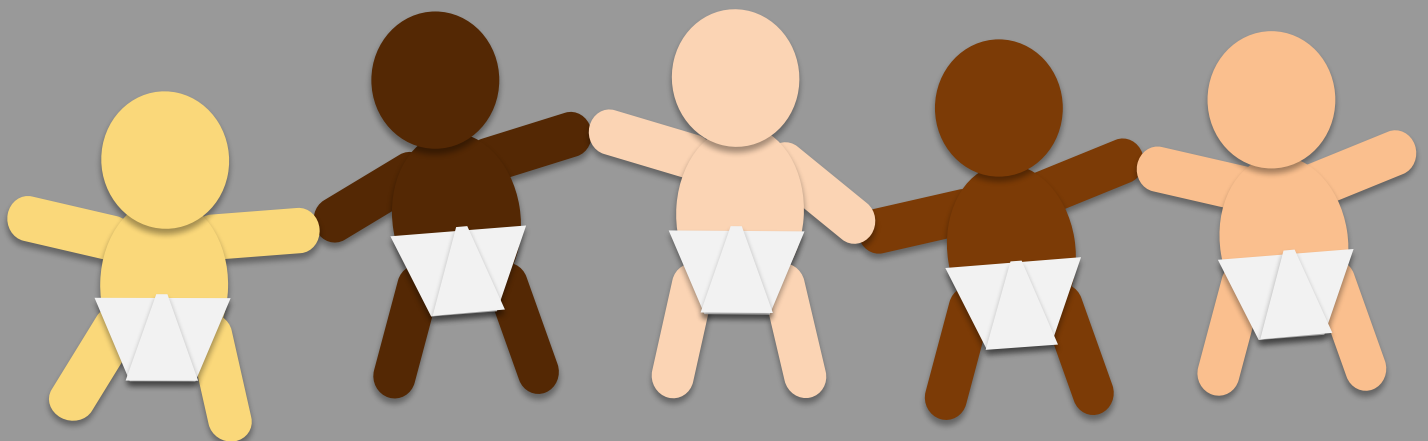


# SimBox+ *Tele* SimBox

## Pediatric Seizure Emergency Department/Hospitalist



### Preparation

**SimBox: Background**

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**Case Summary / Objectives**

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### Scenario

**Case scenario script and progression**

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### Purpose

#### **Thank you for your interest in SimBox low fidelity learning tools!**

This series of cases features low fidelity simulations that allow your teams to engage in the first 5-10 minutes of an emergency scenario.

You will use your own equipment and resources in your own clinical environment, or in the convenience of a virtual environment to practice non technical skills.

### SimBox, SimBox<sup>+</sup> vs TeleSimbox

There are three ways in which the simulation can be delivered:

#### **SimBox Original:**

Low-fidelity manikin + video and tablet-based resources for use *in situ*.

**SimBox<sup>+</sup>** (SimBox **PLUS** a telefacilitator).

SimBox was adapted for use in remote or underserved areas and/or limited access to content or simulation experts, with a remote facilitator.

#### **TeleSimBox:**

As a result of the COVID 19 Pandemic, SimBox was adapted to meet the demands for virtual learning platforms, and continuous education for learners of all levels. This version targets non-technical skills.

### Best way to use these resources

#### **SimBox or SimBox<sup>+</sup>**

- Review this document + run a session in your ED with a doll/pillow.

#### **TeleSimBox**

- Reference: Telefacilitation tips at the end of this document.
- [Watch a sample recording](#) of the telesimulation to see how it is run.

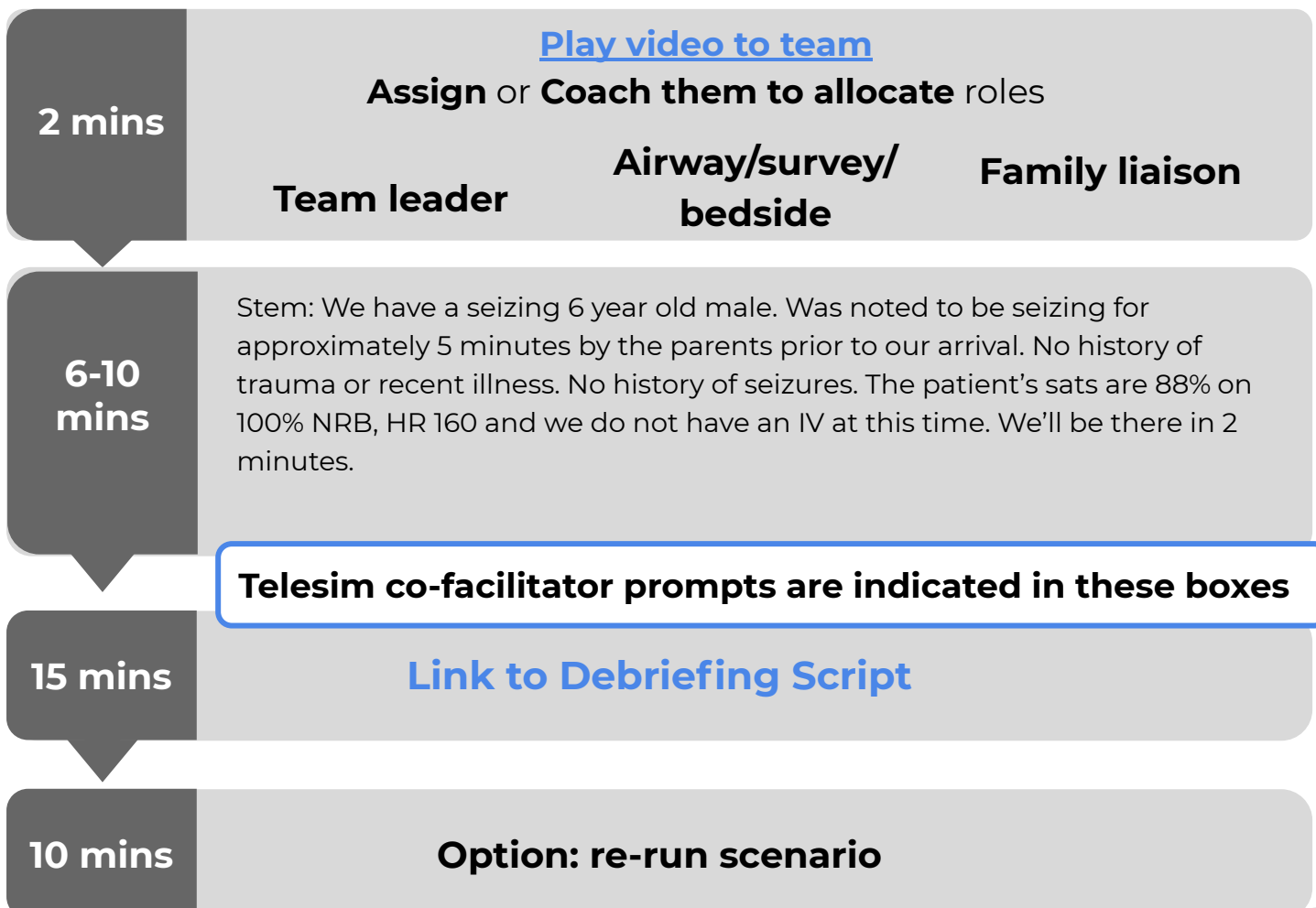
For additional questions or concerns, you can arrange a one-on-one tutorial with the project team.

**After this activity, the team will be able to manage the pediatric patient with concern for seizure with emphasis on the following objectives:**

1. Team-centered care: verbally assemble necessary staff, equipment and resources to care for a seizing pediatric patient. Demonstrate effective teamwork and communication (i.e. sharing mental model, directed orders, closed loop communication)
2. Family-centered care: obtain appropriate history from family member (SAMPLE), address family concerns, update on care
3. Medical knowledge: verbalize the initial management of an acutely ill pediatric patient (ABC's), verbalize first line diagnostic tests of a seizing patient, verbalize the first line therapeutic interventions of a seizing patient, demonstrate handoff of care at the end of the case

### Overall Scenario Schema

[Link to Pre-briefing Script for SimBox/SimBox+](#)



## Scenario script:

“Please assign roles as you would in a typical scene response. You will hear a brief EMS dispatch and then see a two minute countdown clock as you prepare for the arrival of the patient.” [\\*CLICK TO PLAY VIDEO\\*](#)

### 2 minute warning

**VIDEO GIVES 120 SECOND COUNTDOWN, THEN PATIENT APPEARS**

- Team assembles + confirms roles
- Asks for equipment: monitor, temperature, oxygen, breathing (BVM/CPAP), access (IV/IO), Broselow tape/app, antiepileptic drugs (AEDs)
- Calls for help

**The recorded narrator on the video states:** “Patient has arrived.”

### 2 minute Prep Ends

- Team confirms patient is on monitors, pulse oximeter, BP cuff, temp
- Notes patient is hypoxemic on 100% NRB

**Facilitator states:** “Patient is seizing, SpO2 is in the 80s on 100% oxygen through NRB.”

**+4:45 min**  
HR 150  
BP 90/50  
RR 20  
SPO2 80%

- Team requests reposition of airway
- Requests airway/breathing intervention (BVM/CPAP)
- Asks RN for access (IV/IO)

**Facilitator states:** “Seizing, not responsive, no IV, sats improving with BVM/CPAP, CRT 3 seconds, temp 37 degC. I’ll get AEDs - confirm medication, dose and route.””

**+6:10 min**  
HR150s-160s  
BP 90/50  
RR 20  
Sat 90%

- Team verbalizes illness state: afebrile seizing patient in respiratory distress
- Estimate weight from Broselow
- Order specific benzo/dose/route of administration

## SAMPLE History

If CPAP vs BVM: state “child is pinking up.” If ask for IV: state “cannot get IV, is shaking too much. Is there another way to administer AEDs?”

**Signs/Symptoms:** Generalized seizure began at home ~5 mins prior to arrival, has never done this before. No recent fevers or infectious symptoms.

**Allergies/meds:** None.

**Medical history:** Uneventful birth and past medical history. Vaccines up to date. No known family history of seizures or neurologic, vascular, hematologic, or biliary diseases. Single child, lives with Mom, Dad. No concern for accidental or non-accidental trauma.

**Last meal:** Usual cereal for breakfast ~2 hrs prior.

**Events:** No obvious triggering events.

+ 7:00 min

HR 160s  
BP 90/53  
RR 33  
Sat 92%

**ASSISTANT STATES:** "Giving benzodiazepine medication now." (*specific med/dose/route requested by team*)

- Team confirms first benzo administered
- Orders 2nd dose benzo to have at bedside
- Reassesses ABCs
- States that if cannot get IV on 3rd attempt will consider IO
- Orders STAT Glucose, Na, K, Chloride, Bicarb, Ca

+ 8:00 min

HR 170  
BP 106/62  
RR 47  
Sat 96%

**Facilitator states:** "Patient's seizure is slowing. Glucose 170."

- Team recognizes that seizure has stopped
- Stops bagging/CPAP

+ 8:30 min

HR 170s  
BP 106/62  
RR 53  
Sat 97%

**Facilitator STATES:** "It looks like the child has stopped seizing. Please sign the patient out to the PICU now arriving to help."

- Reevaluate ABCDs
- State differential and further workup plan
- Hands off patient to PICU team
- Updates family

**Facilitator:** This will end the drill. The patient has been handed off to another team. Thank you for participating. We will now move to the debriefing.

Conclude simulation and move to debrief.  
[Link to resource page: educational content](#)

<b>TASK</b>		<b>Done correctly</b>	<b>Not done correctly</b>	<b>Not done</b>
<b>Team-centered care</b>	<b>Verbally assemble the necessary staff, equipment and resources to care for a seizing pediatric patient in the ED</b>			
	<b>Demonstrate effective teamwork and communication (i.e. designate leader/roles, directed orders, closed-loop communication, sharing mental model)</b>			
	<b>Demonstrate appropriate PPE</b>			
<b>Family-centered care</b>	<b>Obtain an appropriate history from the family member (SAMPLE)</b>			
	<b>Address family concerns, update on care (translate medical aspects of care in plain language)</b>			
<b>Medical knowledge</b>	<b>Verbalize the initial management of an acutely ill pediatric patient (airway, breathing, circulation)</b>			
	<b>Verbalize the first line diagnostic tests of a seizing patient (monitors, dextrose)</b>			
	<b>Verbalize the first line therapeutic interventions of a seizing patient (benzodiazepines)</b>			
	<b>Demonstrate handoff of care at end of case</b>			

## Tips to establish psychological safety in simulation

**Basic Assumption:** “we believe that everyone participating in our activities is intelligent, capable, cares about doing their best and wants to improve” - [CMS, Boston MA](#)

### Introduce team and Prebrief

**Welcome your team, make introductions:** “This simulated resuscitation is to practice our team’s response to an emergency. We will spend about 15 minutes in simulation, then we will debrief for 20 to discuss what went well and what could be improved with input from the team. Even though it is not real, and the manikin can’t be harmed, everyone will get the most out of this scenario if we take it as seriously as possible.”

### Describe

**Describe simulator capabilities, equipment and how to participate:**

“Act as you would within your role. You will not get monitor feedback unless your equipment is attached to the patient. Airway equipment should be attached to oxygen, etc. Try to make tasks realistic and timely using your equipment. Please ask for clarifications.”

### Demo

**Closed loop communication demo:**

Know your role and task designation with closed loop communication to verify and complete.

Leader: Tech, we need an EKG.

Tech: OK going to get the machine.

Tech: OK, I’ve got the EKG machine here.

### Disclose

In case of a safety concern during the simulation, state “Let’s take a safety pause.” If a real event happens that is **not** part of the simulation, state “This is not a simulation.” Disclose if video recording.



## Components of a Debrief (Based on 3Ds + PEARLS)

“The purpose of this debrief is to discuss areas of great performance and discover areas for improvement. It is not a blame session- everyone is here to do their best.”

**Defuse**  
1-2 minutes

### **Solicit emotions and reactions**

“Reactions?”; “Let’s take a moment to gather our thoughts.”

**Summary**  
1-2 minutes

### **Clarify facts**

“Can a teammate share a short summary of the case?”; “Were there other thoughts?”

**Discover**  
7-8 minutes

### **Explore Performance**

“What went well?”

“What could be improved?”

Use observations of learner experiences to highlight strengths of the team and individuals, while asking learners for their thoughts, observations and reflections. Then provide specific areas of opportunity for improvement.

**Deepen**  
1-2 minutes

### **Provide focused feedback and identify patient care priorities**

Elicit any other outstanding issues or concerns

**Take-Home points**  
1-2 minutes

### **Identify take-home points to apply to future practice**

: Round the room reflections and thanks for participation

This page provides possible questions to elicit teaching points during the debrief for each objective. Use the questions on this one-page guide or feel free to use the accompanying pamphlet of "Peripheral Brain Cards." These questions are not meant to replace the discussion that you have with your team, but can help to steer the debriefing session.

**Goal:**  
demonstrate a team based approach to care of a seizing patient

***How did your team prepare for the arrival of the seizing patient?***

Crisis & Crew Resource Management: Assign roles, designate team leader, share mental model and practice closed loop communication

**Skill:**  
1. Perform a systematic assessment/r assessment of the seizing patient

***1. How does your team perform a systematic assessment of an ill pediatric patient?***

**PAT** Pediatric Assessment Triangle

Appearance **TICLS**: **t**one, **i**nteractivity, **c**onsolability, **l**ook/gaze, **s**peech/cry

Work of breathing: **Important to undress visualize WOB**

Circulation/capillary refill: **Where and how is this assessed in the pediatric patient?**

**Airway Breathing Circulation Caveats:** Consider pediatric anatomic differences. **ABC vs CAB** (in adult patient)

**SAMPLE mnemonic:** **s**igns/symptoms, **a**llergies, **m**edications, **l**ast meal, **e**vents preceding

2. Prioritize treatment

***2. How did you prioritize the interventions for this seizing patient?***

ABCDs, Monitors, AEDs, Access Always reassess - monitor for apnea side effect (of both seizure and AEDs). Call for help.

3. Manage medication side effects that lead to cardio pulmonary deterioration

***3. What is your first priority in this patient?*** Airway.

***When the breathing slowed/became irregular and the patient was still hypoxic on 100% NRB, what maneuvers worked?*** Performing BVM (rate 30-50)

***What are ways to give benzodiazepine medication without IV/IO access?***

IN/buccal/IM,PR

***How did you get access?*** PALS recommends 3 PIV attempts in 90 secs prior to getting IO. Proximal tibia is preferred location for IO

**Knowledge:**  
Describe common seizure activity in pediatric patients  
Describe at least 3 causes of seizure

***1. How do you recognize a seizure in a pediatric patient?***

There are various clinical manifestations including: unresponsiveness, apnea, tremulousness, tonic-clonic activity, fixed eye deviation, etc.

***2. What mnemonic is useful in remembering seizure etiologies?***

**VITAMINS:** **V**ascular, **I**nfection, **C**erebral malaria, **T**rauma/**T**oxicology, **A**utoimmune, **M**etabolic, **I**diopathic, **N**eoplasm, **S**yndromes

**Attitudes:** Utilize team communication skills. Discuss the importance of family centered care/interactions

***How is a shared mental model helpful to the team?***

***Was there closed-loop communication between team members?***

***How does the team manage the reactions of family members while you are caring for a seriously ill child?***

A large body of literature supports family presence. This does not lead to increased malpractice.

A social worker or other provider should be assigned to stay with the family through this difficult time.

### VITAMINS: Seizure Etiology



## VITAMINS

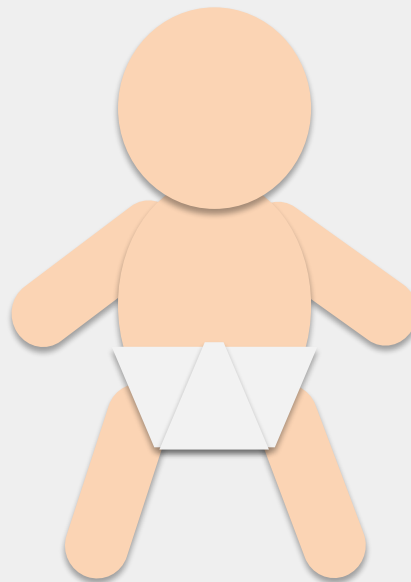


### Seizure Etiology

- V VASCULAR**  
Stroke, post stroke, AV malformations
- I INFECTION**  
Meningoencephalitis, Lyme disease, TB meningitis, brain abscess, HIV related, cerebral malaria
- T TRAUMA / TOXICOLOGY**  
Non-accidental trauma, brain injury (hemorrhage), toxicologic (prescription and non-prescription, recreational drugs, opioid withdrawal)
- A AUTOIMMUNE**  
SLE, CNS vasculitis
- M METABOLIC**  
Hepatic encephalopathy, uremia, hypoglycemia, low Na, Ca, Mg, porphyria
- I IDIOPATHIC**  
Epilepsy
- N NEOPLASM**  
Primary or secondary brain tumor
- S SYNDROMES**  
Tuberous sclerosis, Down syndrome, Sturge Weber syndrome, Von Hippel Lindau syndrome, other neurodevelopmental syndromes

ELIZABETH SANSEAU MD, MAYBELLE KOU MD, ILENE CLAUDIUS MD

REFERENCE: [HTTPS://COMMONS.WIKIMEDIA.ORG/WIKI/FILE:VITAMIN\\_B12\\_CAPSULE.JPG](https://commons.wikimedia.org/wiki/File:Vitamin_B12_Capsule.JPG)



### Stepwise Approach to Seizure Management

**ABCDE's**  
**A**irway  
**B**reathing  
**C**irculation  
**D**isability/**D**extrose  
**(A**nti)**E**pileptic drugs

### How to Optimize Airway & Breathing

#### Open airway

- Jaw thrust
- Chin tilt
- Shoulder roll
- Suction PRN
- Accessories: nasopharyngeal

#### Assist breathing

- Bag mask ventilation (BVM)
- Continuous positive airway pressure (CPAP)
- Intubate/ventilate

### Anti- Epileptic Drugs (No IV Access)

Administer first line AED t = 5 mins;  
Benzodiazepine (BZ) Q5 min x 2

- Midazolam 0.3 mg/kg Buccal max 10 mg
- Midazolam 0.2 mg/kg IN/IM max 10 mg
- Diazepam 0.5 mg/kg PR max 50 mg

### Anti- Epileptic Drugs (IV/IO Access)

- Midazolam 0.1 mg/kg max 5 mg
- Lorazepam 0.1 mg/kg max 4 mg

Administer 2nd line AED t + 15 mins if still has SZ activity after 2nd BZ dose

- Levetiracetam 40-60 mg/kg (max 2500 mg)  
OR
- Phenytoin/Fosphenytoin 25 mg/kg  
OR
- Valproic Acid 40 mg/kg

### Initial seizure management

- Initiate Airway, Breathing, Circulation, cardiorespiratory + BP monitoring
  - O<sub>2</sub> 10-15 L/min non-rebreather mask + place end tidal capnography
  - Monitor for respiratory depression, hypotension, arrhythmias
- 
- Give first line agent: Benzodiazepine (refer to local protocols/below)
  - Establish IV line if needed
  - Rapid bedside glucose: If less than 60 mg/dL, give 5 mL/kg D10W IV push
    - Then start D10W infusion @5 mL/kg/hr (MAX 250 mL/hr). Recheck glucose in 5 min.

### Ongoing seizure

5 min

#### First Line Agents: Benzodiazepines

If no IV access, give 1st dose of:

- **Midazolam 0.2 mg/kg IM or IN (MAX 10 mg)**  
1 mL/nostril of 5mg/mL solution **OR** one of:
  - Midazolam buccal 0.5 mg/kg (MAX 10 mg)
  - Diazepam rectal 0.5 mg/kg (MAX 20 mg)

If IV access, give 1st dose of:

- **Lorazepam 0.1 mg/kg (MAX 4 mg) IV over 2 min **OR**:**
- Midazolam IV 0.1 mg/kg (MAX 10 mg) IV over 2 min



Reassess ABCs, monitor for respiratory depression  
**If still seizing:**

10 min

#### Repeat dose of First Line Agent (as above)

- Consider intraosseous (IO) access if failed IV attempts x2 and persistent seizure
- Prepare second line agent per protocol or medical control



Reassess ABCs, monitor for respiratory depression  
**If still seizing:**

15 min

#### Second Line Agents:

Give one of:

- **Fosphenytoin (20 mg PE\*/kg in NS, MAX 1000 mg PE\*) IV/IO over 10 min **OR****
- **Levetiracetam 60 mg/kg/dose (MAX 3000 mg) IV/IO over 15 min **OR****
- Phenytoin (20 mg/kg in NS, MAX 1000 mg) IV/IO over 20 min **OR**
- Phenobarbital (20 mg/kg in NS, MAX 1000 mg) IV/IO over 20 min
- Prepare third line agent

### OVERVIEW

Ben Lawton. The First Afebrile Seizure, Don't Forget the Bubbles, 2014. Available at: <https://doi.org/10.31440/DFTB.4794>

Thanos Konstantinidis. Febrile seizures, Don't Forget the Bubbles, 2014. Available at: <https://doi.org/10.31440/DFTB.2560>

### VIDEOS & PODCASTS

Elma Raissi. Febrile Seizure. Peds Cases, 2015. Available at: <https://www.pedscases.com/febrile-seizures>

Michelle Bischoff. Status Epilepticus in Children. Peds Cases, 2010. Available at: <https://pedscases.com/status-epilepticus-children>

Michelle Bischoff. Seizure Types and Epilepsy. Peds Cases, 2010. Available at: <https://pedscases.com/seizure-types-and-epilepsy>

Anand Swaminathan, "REBEL Core Cast 9.0 – Pediatric Status Epilepticus", REBEL EM blog, April 17, 2019. Available at: <https://rebelem.com/rebel-core-cast-9-0-pediatric-status-epilepticus/>

### ALGORITHMS

TREKK Status Epilepticus PedsPac, 2018. Available at: [https://trekk.ca/search?q=status+epilepticus&events=events&teams=teams&external\\_resources=external\\_resources](https://trekk.ca/search?q=status+epilepticus&events=events&teams=teams&external_resources=external_resources)

We want to hear how this went for you and thank you for your feedback. Please go online and click on either participant or facilitator survey: <https://www.acepsim.com> OR use QR code: Take out your mobile device, open camera, get QR code in front of camera, a link should pop up, click on that link.



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