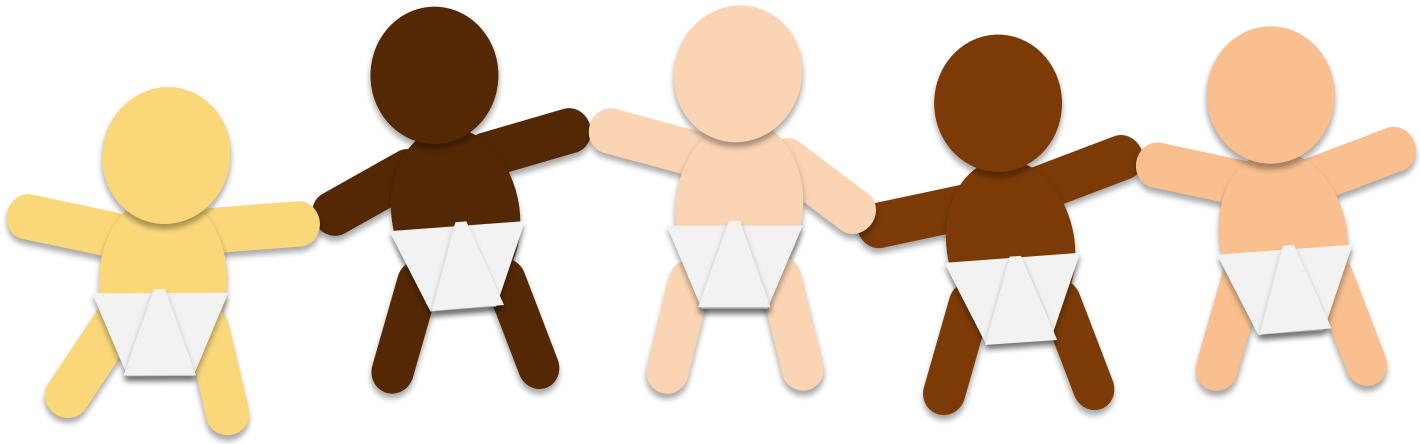
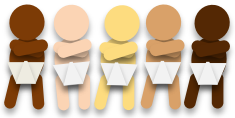
ImPACTS ED 2022

Simulation Guide II



Emergency Department



Contents
with links to pages

ImPACTS

IMPROVING PEDIATRIC ACUTE CARE THROUGH SIMULATION

To ensure a successful simulation day for everyone here are some simple steps to complete **PRIOR** to simulation day:

- ❑ Pre-simulation virtual or in person meeting with PECC and ImPACTS one week prior to simulations to ensure learner attendance, supplies, logistics, meeting time day of simulation. Approximately 30 minutes.
- ❑ **Prepare PECC to actively facilitate the simulation with your team**
- ❑ Confirm sim date with ImPACTS project manager (white20@iu.edu)
- ❑ Remind the PECC to review the simulation guide and complete the PECC survey. All resources and survey for the PECC can be found: ImPACTS Website (Password: ImPACTSsim)
- ❑ Send reminder to PECC to send out email to learners 24-48 hours prior to simulation (template found here)

ACEP SimBox will be utilized to facilitate the in situ simulations. Below is information on how to best utilize SimBox.

- SimBox utilizes a video to facilitate the simulation, meaning a high technology mannequin is not necessary!
- Simply play the video for the scenario and follow the guide for facilitator and parent scripting.
- The video includes a pre-brief, monitor with patient video, and a guided debrief following the sim.
- Ensure you have adequate internet connection to play the video prior to the simulation.
- This format for simulation can be utilized by the ED staff at anytime by accessing the SimBox website: https://www.acepsim.com/

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IMPROVING PEDIATRIC ACUTE CARE THROUGH SIMULATION

Please use the below e-mail template to share with all leaners signed up for simulation day. Please send 24 hours prior to sim day.

Thank you for signing up for pediatric simulations tomorrow, **DATE/TIME** in the **SPOKE SITE ED**.
We are excited that content experts from the **HUB SITE** team will join us to conduct these three simulations in our ED.

This simulation is the last part of the 12-week asynchronous peds-curriculum that has been created to support community EDs. Thank you for participating in this program and please provide any feedback regarding your experience. **After** tomorrow's simulation please complete the post program survey:

https://iu.co1.qualtrics.com/jfe/form/SV_42V8bzT1b0X1xEa

Please bring whatever resources you typically have on shift (stethoscope, phone, etc…).

Preparation

- ❑ Review this entire guide and become familiar with scenarios.
- ❑ Utilize the Prebriefing / Debriefing Scripts, Prompts and Resources.
- ❑ Review the SimBox videos https://www.acepsim.com/
- ❑ Review the Checklists prior to simulations
- ❑ Remind PECC to send reminder e-mail to all learners 24-48 hours prior to sim
- ❑ Remain in constant communication with PECC to ensure attendance, equipment/supplies, and space to run simulations. Confirm 24 hours prior and morning of simulations with PECC that space is available and minimum learners will be attendance
- ❑ Communicate with PECC "no go" criteria (i.e. ED census surge)

Equipment and Supplies

- ❑ Plan to arrive early (typically 1 hour before simulations begin) to set up
- ❑ Ensure that computer has good internet connection and video will load.
- ❑ Collaborate with PECC to ensure equipment and supplies are available for use. List of equipment and medication needed for each scenario.
- ❑ Encourage PECC to communicate if unable to obtain certain equipment and supplies so they Hub site can supply if needed

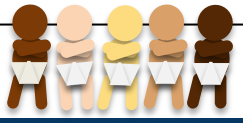
Schedule

Introductions/Overview (0-15 minutes)
Who we are: Hub team member introductions
Who you are: names/experience for leaners

We will start with an orientation to the environment and simulation mannequins. Next, we will conduct the simulations. During the simulation, your team will use available equipment, guidelines, and resources to simulate caring for a critically ill child in the ED. Each simulation will be followed by a debriefing discussion facilitated by our team. We will end with a feedback survey about the experience and simulations. Please see the pre-brief script on the next page for more details.

Simulation
Simulation Burn (15 min – 40 min)
Simulation Refractory Status Epilepticus (40-70 min)
Simulation Newborn/Maternal Care Delivery (70-100 min)

Group wrap-up
Answer any questions or concerns about the overall experience
Reminder to complete post program surveys



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IMPROVING PEDIATRIC ACUTE CARE THROUGH SIMULATION

Learner Post-Survey
To complete at conclusion of
Sim Day

ImPACTS

IMPROVING PEDIATRIC ACUTE CARE THROUGH SIMULATION

Site Name:	Date	Team 1 2

Name	E-mail	Role (MD, RN, RT, etc)	Years in Role

Best practices for establishing 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."
Center for Medical Simulation, Boston MA

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

DEMO: Closed loop communication.
Know your role and task designation. Use 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

If a safety concern arises during the simulation, I will state:
"Let's take a safety pause."
If a real event happens that is not part of the simulation, I will state:
"This is not a simulation."
Disclose if video recording, privacy and permission.

Pediatric Burn Case

After this activity, the team will be able to resuscitate a pediatric patient with emphasis on the following objectives:

1. Apply Crisis Resource Management and teamwork in a pediatric resuscitation (with attention to role designation, directed orders, sharing mental model and closed loop communication with team and family members).
2. Prioritize treatment of potential etiologies to guide stabilization or escalation of care for a pediatric patient.
3. Determine the appropriate destination for transfer.

Prebrief: Use narrated video + or your own script

2 mins

Assign or Coach them to allocate roles.
Adapt roles based on the participating team:

Team Leader	Airway	Bedside Survey
Respiratory Tx	Bedside Nurse	Medication Nurse
Parent Liaison	Pharmacy	Recorder

10 mins

Stem: A 18 month old male is brought to the Emergency Department with a scald burn.

Your team will focus on the resuscitation of a pediatric burn patient.

Telesim Co-facilitator prompts are indicated in these boxes

15 mins

Debrief: Use the narrated video or pause the video and use your own script

10 mins

Option: re-run scenario

Scenario script:

"You will hear a brief EMS dispatch and then see a two minute countdown clock as you prepare for the arrival of the patient."

Link to ED Pediatric Burn Video

Facilitator states: "ED, ED this is an ALS unit, coming in with a 18 month old boy with significant burns that he got after pulling hot water off the stove over himself. We will arrive in 2 minutes."

2 minute warning

- Team assembles + confirms roles
- Asks for equipment: Broselow tape/ app, monitors, access, medications
- Dons PPE
- Calls for help

"The patient has arrived. You have put on the appropriate PPE (mask and gloves). The patient is crying and screaming in pain. His clothes appear wet and you can see large blisters on his exposed skin."

Time 0 (min 7)

- Team places patient monitors, pulse oximeter, BP cuff, temp probe
- Estimates weight
- Assesses ABCDEs
- Begins to carefully remove all clothes

"Airway is patent. Breath sounds are equal bilaterally. Femoral pulses are 2+ and CRT 2 sec. He is alert and moving all limbs. We are trying to remove all his clothes, but he is crying inconsolably. He has severe scald burns on his chest, abdomen, and anterior surface of his left arm and both legs. His weight is 10 kg."

1 (min 8)

HR 160
Sats 99% RA

- Asks to remove the patient's diaper too (if not done)
- Asks RN for access and verbalizes need to start fluid resuscitation at 125 mL/hr
- Checks BP and temperature

"He is still screaming in pain, IV placement and BP measurement attempted and unsuccessful. Is there anything we can give him for his pain right away?"

2 (min 10)

HR 170
RR 24
Sats 99% RA
BP -/-
T 37

- Team verbalizes illness state: Patient with extensive scald burns
- Orders 1 mcg/kg IN fentanyl
- Asks to cover patient with dry, clean sheet
- Performs secondary survey

Case progression: Burn

"1 mcg/kg IN fentanyl given. Patient seems much more comfortable now. His BP is 100/60, and his HR is now 150. We were able to get an IV. Secondary survey with no new significant findings."

HR 150
RR 24
Sats 99 % RA
CRT 2 sec
BP 100/60

- Team notes improvement in tachycardia and normal BP with appropriate pain management
- Asks for POC glucose
- Calculates the total body surface area (TBSA) burned
- Calculates the rate of resuscitation fluids using the "**3 mL/kg LR x % TBSA burn PLUS D5LR or D5 1/2NS maintenance" formula**

"LR started. POC glucose is 107. Do we need to cover these burns?"

3
(min 12)

HR 150
RR 22
Sats 99 % RA
CRT 2 sec
BP 100/60

- Team dresses burns in dry, clean, sterile dressings
- Reassesses ABCDE
- Informs the social work team
- Discusses what is the most appropriate destination for transfer (eg pediatric burn center) & contacts burn team

"We have covered the burns with dry, sterile dressings. He is calm and comfortable. Accepting team is ready for handoff."

Advanced learner option: Recognition and management of electrolyte disturbances and/or need for an advanced airway.

HR 130
RR 22
Sats 99 % RA
CRT 2 sec
BP 100/60
T 37

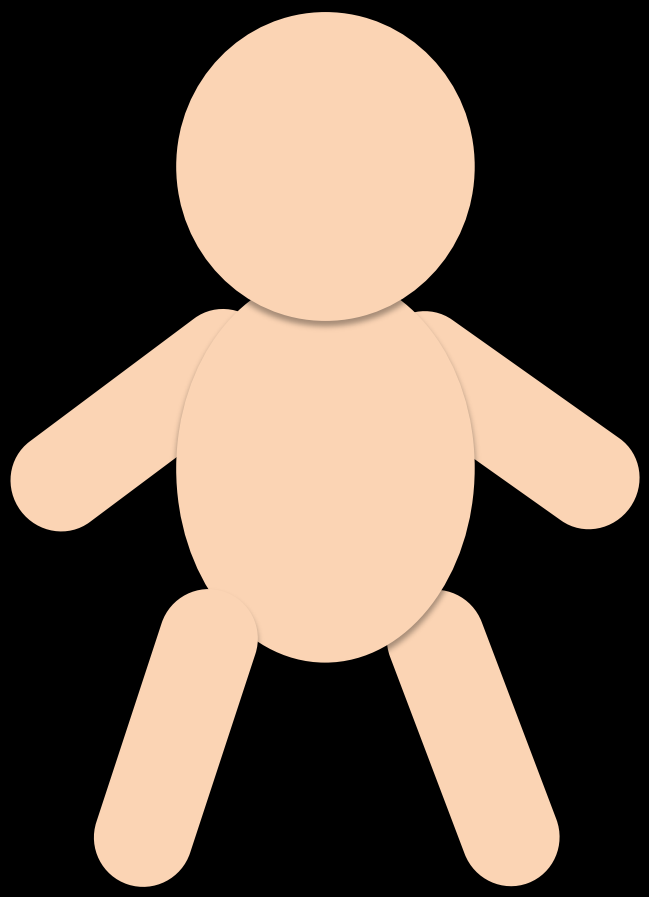
- Team handoffs to the receiving Transfer/ Pediatric Burn/ ICU team
- Formulates pain & fluid management plan for transport
- Updates family and answers their questions
- Prepares for transfer

After team performs handoff, state "This concludes the simulation" and move to debrief.

Case progression: Burn

Estimating our patient's burn area:

Front



Back

SimBox 3.0

Patient photos

SimBox 3.0

Parent Script Instructions

Throughout case make sure to ask for updates every 1-2 minutes if not provided by team. Expect people to inform you of what is going on, you can ask for updates. You will be confused and frustrated.

1. Upon arrival, state: *"I was cooking in the kitchen, he was watching TV. I stepped away for a minute and heard a yell, when I came into the kitchen he was soaking wet and crying"*

2.**If asked**, give this information:
Signs/ symptoms: "He was in the living room watching TV. I was in the kitchen making lunch. I stepped away from the kitchen for less than a minute to let the dog outside. All of a sudden I heard crying coming from the kitchen and he was standing by the stove soaking wet. He must have pulled the pot with boiling noodles in it down from the stove top on top of himself."

Allergies/ Medications: None.

Medical history: None, born full term, up to date on immunizations.

Last meal: Pancakes for breakfast approximately 4 hours prior to the incident.

*** Note everything else that they may ask is normal or you don't know.

TASK		DONE CORRECTLY	NOT DONE CORRECTLY	NOT DONE
Team-centered care	Verbally assemble the necessary staff, equipment, and resources to care for a pediatric burn patient.			
	Demonstrate effective teamwork and communication (i.e. designate leader/roles, directed orders, closed-loop communication, sharing mental model).			
Family-centered care	Obtain an appropriate history from the family member (SAMPLE).			
	Address family concerns, update on care (translate medical aspects of care in plain language).			
	Involve social work for parental support early.			
Medical knowledge	Perform an efficient primary and secondary survey.			
	Prioritize early and efficient pain management, using intranasal fentanyl or intramuscular morphine, when no IV access has yet been established.			
	Calculate TBSA %			
	Appropriately estimate TBSA in a pediatric burn patient to guide fluid resuscitation and proper destination for transfer.			
Psychomotor	Demonstrate appropriate wound management (removing clothing/diaper, using dry, sterile dressings).			
Communication	Demonstrate handoff of care at the end of the case.			

Refractory Status Epilepticus

After this activity, the team will be able to manage an infant with status epilepticus presenting in the ED 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
2. Family-centered care: obtain appropriate history from family member (SAMPLE), address family concerns, update on care.
3. Medical knowledge:
   - Verbalize abnormal vital signs and definition of status epilepticus in an infant
   - Apply status evidence-based guidelines effectively (2020 EIIC Guidelines)
   - Implement interventions specific to managing a deteriorating patient in status epilepticus

Overall Scenario Schema

Prebrief: Use narrated video + or your own script

2 mins

Assign or Coach them to allocate roles

Team Leader	Pharmacy	Bedside RN
Respiratory Tx	Medication RN	Technician

6-10 mins

Stem: EMS is bringing in a 10 m.o girl, with active generalized tonic-clonic seizure that started about 20 minutes ago. Mom gave one dose of rectal diastat (5mg) at home. Pt continued to seize so, mom called 911. They will be here in 2 minutes.

Link to Seizure Video

Co-facilitator prompts are indicated in these boxes

20 mins

Use the narrated video or pause the video and use your own script

10 mins

Option: re-run scenario

Scenario script:

"I will assign each of you roles, including team lead, bedside survey and airway provider and parent liaison. You will hear a brief EMS patch and then will have two minutes to prepare for the arrival of the patient. You will now hear the EMS dispatch."

Facilitator states: "We are 2 minutes out with a 10-month-old female who is actively seizing, we have no IV access, patient received Diastat at home administered by Mother. We have given one dose Midazolam IM. We will be there in 2 minutes.

2 minute warning

- Team assembles + confirms roles
- Calls for help & prepares equipment

Monitor
BP cuff
Defibrillator, pads, electrodes
PIV start supplies
IO supplies
Atomizer
Respiratory equipment
Nasal cannula
Masks / NRB
NPA, OPA
Bag/mask sets
LMA
Intubation supplies
Range of sizes
- Endotracheal Tubes (3.0-4.5)
- Stylets
- Laryngoscopes

Colorimetric CO2 detectors
Capnography cannula
Suction supplies and devices
Fluids and Flushes
D5NS, NS, LR
D10, D25, D50
Pull-Push Setup – 3 way stopcock with 20 or 60mL syringe
Intubation Medications
Lidocaine 10 mg/mL
Fentanyl 50 mcg/mL
Atropine 0.1 mg/mL
Etomidate 2 mg/mL
Ketamine 10, 50, 100 mg/mL available
NMB: Rocuronium 10 mg/mL, Vecuronium 10 mg/mL (has to be reconstituted with 10 mL NS)
Seizure meds
Lorazepam 2mg/mL and 4mg/mL
Midazolam 1mg/mL and 5mg/mL
Diazepam 5mg/mL
Phenobarbital 65mg/ml or 130mg/mL
Levetiracetam 100 mg/mL – depends, can vary!
Valproic Acid 100 mg/mL
Fosphenytoin 50mgPE /mL
Antibiotics generic antibiotics

Case progression: Status Epilepticus

Time 0

- Prepare room and staff for patient arrival

Facilitator states: "Patient has arrived. They are actively seizing – GTC, unresponsive to painful stimuli."

1

Rhythm: sinus tach
HR: 190/min
BP: 92/45
RR: 35/min
O_2 Sat: 90% on RA
T: 36.7 °C

- Verbalize abnormal vital signs
- Reposition airway, suction & apply oxygen
- Obtain bedside glucose
- May administer IM, IN, or IV benzodiazepine
- Assess physical exam findings (pupils, cap refill, lung sounds)

Modifiers & Triggers to move to next phase

- Patient continues to seize
- If no airway reposition or oxygen sats decrease to 85%
- If only oxygen applied sats remain 90-92%
- If reposition and oxygen applied sats increase to 95%

Facilitator states: "Patient is still seizing"

2

Rhythm: sinus tach
HR: 140/min
BP: 92/50
RR: 25/min
O_2 Sat: 98%
T: 36.7 °C

- Administer non-benzo, non-sedating antiepileptic agent
- Obtain additional labs (BMP)
- Provide ventilation and advanced airway
- Verbalize other seizure causes (trauma, tox, infection)

Modifiers & Triggers to move to next phase

- Seizure continues despite administration of non-benzo, non-sedating antiepileptic agent
- Pt becomes bradypneic (RR 12) and desats (85%) requiring BVM and subsequent intubation

Facilitator states: "Patient is continuing to seize, there is little to no respiratory effort"

3

HR: 120/min
BP: 95/52
RR: 25/min
O_2 Sat: 98%
T: 36.7 °C

- Administer third line medication
- Provide airway for patient
- Disposition-admit and monitor
- Team leader hands off to receiving Transport/PICU/ Floor team
- Updates family

Facilitator states: "Patient has stopped seizing and is now post ictal.

Wrap

After team performs handoff, state "This concludes the simulation" and move to debrief.

Link to resource page: educational content

Parent Script Instructions

Throughout case make sure to ask for updates every 1-2 minutes if not provided by team. Expect people to inform you of what is going on, you can ask for updates. You will be confused and frustrated.

1. Upon arrival, state: "Lizzie has been having seizures since birth. We have been on medication since then; I give her 50 mg Topamax daily and diastat (5mg) if she has a seizure. I did the same this time, but she re-started the seizure again. And then I called 911"

2. If asked, give this information:

Signs/symptoms: Shaking upper and lower extremities for the past 20 minutes.

Allergies: None

Meds: Topamax daily (50mg)

Past medical history: She was born prematurely, at 28 weeks. She was immediately put in NICU and stayed there for a few weeks. She had seizures since then and we have been seeing our doctor regularly. He prescribed Topamax daily and diastat as needed. I vaccinate her per her pediatrician's recommendations. She is my only child.

Last meal: breastmilk and breakfast cereal this morning Events proceeding: Nothing unusual. She hasn't been sick. Frequency of seizures: usually once a week, sometimes more, sometimes less. It usually goes away with one does of diastat (5mg). *** Note everything else that they may ask is normal or you don't know.

3. If after 5 minutes the seizure still hasn't stopped, ask with frustration: "why is she still seizing, please give her appropriate medication! Will this cause permanent brain damage? Please do something!"

4. When they give her oxygen, ask: "Why is that needed, does she have trouble breathing?"

5. If they start talking about intubation or bring intubation equipment, ask: "Why does she need to be intubated? I don't understand? Won't that hurt her?"

6. If after 10 minutes the seizure still hasn't stopped, ask: "What is happening? Why is she still seizing? Can't we move her to a better hospital? This cannot be good for her brain!"

Laboratory Values

VBG pH 7.25 pCO2 55 pO2 35 HCO3 19 BE -3

ABG pH 7.30 pCO2 50 pO2 65 HCO3 19 BE -3

CBC: Hgb/Hct: 10/30, Plt: 170, WBC 26K

BMP/chemistry: Na 135 mEq/L, K 4.2 mEq/L, Cl 105 mmol/L, CO2 19 mmol/L, BUN 25 mg/dL

Glucose: 90

Data Collection Form: Status Epilepticus

Date: _____ Location: _____

□ Team 1 □ Team 2 Case start time: _____ Case end time: _____

#	Metrics	Yes	No	Latent Safety Threats
1	6 kg (4.8-7.2) Wt used: _____ kg			
2	Respiratory depression verbalized			
	in the first 3 minutes			
3	Began oxygen non-rebreather		□ Nasal cannula	
	OR heated humidified high flow		□ Simple mask	
	in the first 3 minutes		□ None	
4	Airway positioned in the first 3 minutes			
	□ Nasal trumpet placed OR			
	□ Jaw thrust, chin lift			
5	Placed IV in the first 3 minutes			
6	Checked bedside glucose			
	in the first 3 minutes			
7	First Dose of Medication Given	Route:	Dose Given:	
	□ Midazolam □ Keppra □ Fosphenytoin □ Phenytoin □ Propofol □ Phenobarbital □ Other_____	□ IV/IO □ Rectal □Nasal □ IM		
8	Second dose of Medication given	Route	Dose Given:	
	□ Midazolam □ Keppra □ Fosphenytoin □ Phenytoin □ Propofol □ Phenobarbital □ Other_____	□ IV/IO □ Rectal □Nasal □ IM		
9	Third Dose of Medication given	Route	Dose Given:	
	□ Midazolam □ Keppra □ Fosphenytoin □ Phenytoin □ Propofol □ Phenobarbital □ Other_____	□ IV/IO □ Rectal □Nasal □ IM		
10	Fourth Dose of Medication □ Midazolam □ Keppra □ Fosphenytoin □ Phenytoin □ Propofol □ Phenobarbital □ Other_____	Route □IV/IO □IV Drip □Rectal □Nasal □IM	Dose Given:	
11	Family presence			
	The parent was allowed to stay			
12	Family-centered care			
	Team interacted with parent			
13	Disposition			
	Verbalized plan to admit/transfer			
14	Cognitive aids used (mark all that apply):			
	□ Broselow □ Smartphone/Online reference □ Other _____ □ None			
15	Medications given (mark all that apply and write the dose):			
	RSI Meds: □ Rocuronium _____ □ Succinylcholine _____ □ Etomidate _____			
	□ Lidocaine _____ □ Other _____			
16	Did the team intubate? □ Yes □ No			

Notes:

Newborn and Maternal Care

After this activity, the team will be able to resuscitate a newborn baby with emphasis on the following objectives:

1. Demonstrate how to adequately locate and use NRP equipment in the Emergency Dept
2. Prioritize treatment of potential etiologies to guide stabilization or escalation of care for a newborn baby.
3. Demonstrate how to adequately perform initial basic steps of newborn resuscitation (warm, dry, stimulate, position and clear airway, ventilate).
4. Demonstrate the element of MR SOPA for corrective ventilation steps.
5. Demonstrate when and how to provide effective ventilation for a neonate.
6. Provide post birth care to mother

Overall Scenario Schema

Prebrief: Use narrated video + or your own script

2 mins

Assign or Coach them to allocate roles

Team Leader	Pharmacy	Bedside RN
Respiratory Tx	Medication RN	Technician

6-10 mins

Stem: A newborn has just been delivered by EMS in the ambulance bay. He is limp, cyanotic, and apneic.

Link to Neonatal Case Video

Co-facilitator prompts are indicated in these boxes

20 mins

Use the narrated video or pause the video and use your own script

10 mins

Option: re-run scenario

Scenario script:

"I will assign each of you roles, including team lead, bedside survey and airway provider and parent liaison. You will hear a brief update on the patient and then have 2 minutes to prepare."

Facilitator states: EMS is bringing in a mother who just delivered in the back of the ambulance, they are pulling into the bay now.

2 minute warning

- Team assembles + confirms roles
- Calls for help & prepares equipment

Warm:
- Newborn warmer bed set to 100% heat with scale and timer
- Warm blankets, hat, temperature sensor

Clear airway:
- Bulb suction
- 10F or 12F suction catheter attached to wall suction, set at 80- 100 mmHg

Auscultate:
- Stethoscope, cardiac leads & monitor

Ventilate/ Oxygenate:
- Pulse oximeter
- Flowmeter set to 10L/min
- Oxygen blender set to 21% (21-30% if <35 weeks' gestation)
- Term and preterm sized masks
- Positive pressure ventilation (PPV) device (eg T piece resuscitator (ie: Neopuff group), self inflating bag or flow inflating bag with neonatal mask)

Intubate:
- Laryngoscope with size 0 and 1 straight blades
- Stylet
- Endotracheal tubes (sizes 2.5, 3.0 & 3.5)
- Carbon dioxide (CO_2) detector
- Measuring tape and/ or ETT insertion depth table
- Waterproof tape or tube securing device, scissors
- Laryngeal mask (size 1) and 5 mL syringe

Access:
- Heel stick sampling kit
- PIV needle, tapes and saline flush

Medications:
- Normal saline for volume expansion: 10 mL/kg
- Epinephrine 0.1-0.3mL/kg of the 1 mg/10 mL (0.1 mg/mL)
- Oxytocin

Case progression: Newborn Resuscitation

"The woman is reported to be at 39 weeks gestation with a previous history of a precipitous delivery. This was an uncomplicated pregnancy with no reported issues. The umbilical cord has been clamped and cut. The infant has been brought in by EMS and is on the bed with mom. The infant appears limp without any respiratory effort. Mother is also brought into the room"

Time 0

HR 70
BP N/A
Rhythm Sinus
Sat 50% RA
RR 0
Time to stay at vitals: 3 min

Patient State: cyanotic, limp

- Team starts APGAR timer
- Place infant on warmer bed, dry and stimulate and suction
- Assess HR and respirations
- Place pulse oximeter on right upper extremity and place cardiac leads

Modifiers & Triggers to move to next phase
- After 3 minutes have elapsed

IF Facilitator is asked:
Term? Yes
Tone? Floppy
Crying: No

1

HR 80
BP 45/30
Rhythm Sinus
Sat 60%
RR 10
Time to stay at vitals: 3 min of ventilation

Patient State: cyanotic, limp

- Begin bag mask ventilation
- Auscultates HR and assesses for chest rise
- Obtain history from mom and complete exam on mom.
- Administer Oxytocin to mom

Modifiers & Triggers to move to next phase
- After 3 minutes of PPV administered

Facilitator states: No chest rise is visualized, HR remains below 100. OB has just been called to an emergency c-section, can someone take over care for mom?

2

HR 80
BP 50/35
Sat 75%
RR 10
Time to stay at vitals: 5 min

Patient State: cyanotic, limp

- Recognize need to adjust PPV
- Provide routine post partum care to Mom
- Discuss MR SOPA
- Mask adjustment and Reposition
- Suction, Open mouth, increase Pressure, Alternative airway

Modifiers & Triggers to move to next phase
- Moving through MR SOPA algorithm AND after 3 min of adequate PPV

Facilitator states: "I can see symmetric chest rise, tone is improving and baby is moving, color is improving"

3

Transition time: 2 min
HR 160
BP 70/50
Sat 95%

Patient State: pink, crying

- Hand off to NICU team or Transport
- Updates family

After team performs handoff, state "This concludes the simulation" and move to debrief.

Link to resource page: educational content

Maternal history

Prenatal history: P2G1001, no maternal medical problems, unknown gestational age, but mother thinks close to term. No prenatal care since 2nd trimester since mother lost her job and insurance. Precipitous delivery. No maternal peripartum fevers or bleeding.

Family history: No known family history of congenital cardiac disease.

Social history: Denies substance use.

Laboratory Values- Newborn

Glucose:110

Script for Mom

Ask for update on the baby every 1-2 minutes if not provided by the team. Mom will have PIV placed by EMS prior to arrival to ED

If asked about prenatal care: "I have not had prenatal care since 18 weeks, I was laid off and have no health insurance. Prior to that I had no issues, all the labs they drew were normal. No alcohol or drug use. I have felt good movement throughout this pregnancy, I thought I had a three more weeks until I would deliver."

If asked about maternal history: "I have no significant family history, only medication has been my prenatal vitamins. No bleeding, but this morning I thought I peed my pants and then started to feel contractions every 1-2 minutes so I called 911"

Data Collection Form: Newborn

Date: _____ Location: _____

□ Team 1 □ Team 2 Case start time: _____ Case end time: _____

#	Metrics	Yes	No	Latent Safety Threats
1	Wt used: _____ kg			
2	Infant warmer utilized			
3	Warm, dry, stimulate, clear airway (if necessary)	False		
	< 30 seconds			
4	False Positive pressure ventilation initiated AFTER warm/dry/stim			
	in the first 1 minute			
5	Administer Oxytocin to mother			
6	Place pulse ox on right upper extremity AND place ECG leads			
7	Take ventilation corrected steps MR SOPA verbalized □Mask (adjust) □ Reposition head □Suction □Open mouth □Pressure (increase) □Alternative airway			
8	Verbalize re-evaluate ventilation for response			
	□ Increased HR			
	□ Improved oxygen saturations			
9	Checked bedside glucose			
10	Disposition			
	Verbalized plan to admit/transfer			
11	Cognitive aids used (mark all that apply):			
	□ Broselow □ Newborn Algorithm □ Smartphone/Online reference □ Other _____ □ None			
12	Medications given (mark all that apply and write the dose):			
	□ Rocuronium _____ □ Succinylcholine _____ □ Etomidate _____			
	□ Ketamine_____ □ Epinepherine_____			
	Other meds: _____			
13	Did the team intubate? □ Yes □ No			
14	Did the team initiate chest compressions? □ Yes □ No			

Notes:

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 min

Solicit emotions and reactions:
"How does everyone feel?"; "Let's take a moment to gather our thoughts."

Discover
7-8 min

Clarify facts:
"Can a teammate share a short summary of the case?"
"Were there other thoughts?"

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.

Deepen
1-2 min

Identify patient care priorities and gaps in the overall system of care. Then provide **focused feedback and** specific areas of opportunity for improvement. Elicit any other outstanding issues or concerns.

Summary
1-2 min

Identify take-home points to apply to future practice: Round the room reflections and thanks for participation.

Ref: PEARLS Debrief Framework .+ The 3D model of debriefing. *Semin Perinatol.* 2011;35(2):52-58

Burn Teaching Content

This page provides possible questions to elicit teaching points during the debrief. These questions are not meant to replace your team's discussion, but can help to steer the debriefing session.

CLASSIFY BURNS BY DEPTH OF INJURY

SUPERFICIAL: Dry, red. Blanches with pressure. Epidermis only.

SUPERFICIAL PARTIAL-THICKNESS: Blisters. Moist, red, weeping. Blanches with pressure. Extends into papillary dermis.

DEEP PARTIAL-THICKNESS: Blisters, easily unroofed. Wet or waxy dry. Variable color. Does not blanch with pressure. Includes more of the dermis.

FULL THICKNESS: Waxy white to gray to charred and black. Dry and inelastic. No blanching with pressure. All of dermis involved.

FOURTH DEGREE: Extends through the subcutaneous fat into the facia and/ or muscle.

HOW ARE BURNS IN CHILDREN DIFFERENT THAN ADULTS?

Infants and young children have a smaller body surface area (BSA) than adults, but are often exposed to the same offending agent (tap water, a hot drink, clothing iron), and thus sustain a proportionately larger TBSA burn than an adult.

A 7 kg child has a tenth of the weight of a 70 kg adult but a third of their TBSA. This relatively large body surface area results in both a greater surface exposure to the environment and a greater evaporative water loss per kg than adults. Therefore, children require more IV fluid per kg during resuscitation.

Infants less than 6 months have limited muscle mass, so cannot generate as much heat by shivering. Temperature regulation in this age group depends much more on environmental temperature control.

Children under age 2 years have thinner skin and are more prone to full thickness burns at lower temperatures or shorter duration of contact than adults.

WHEN TO TRANSFER A CHILD TO A BURN CENTER?

- Partial thickness burns >10% of TBSA.
- Full-thickness burns.
- Burns of the face, hands, feet, genitalia, perineum or major joints.
- Inhalation, electrical or chemical injuries.
- Significant pre-existing medical disorders, concontaminant trauma or need for special social, emotional or rehabilitative intervention.
- Burned children in hospitals without qualified personnel or equipment for the care of children.

PEDIATRIC BURN 🔥 MANAGEMENT

Primary Survey

🔥 Airway/ Breathing

- **Think of airway edema & smoke inhalation injury.**
- **Assess for CO poisoning by calculating the carboxyhemoglobin.**
- **Use humidified oxygen and treat bronchospasm with β**-agonists.

🔥 Circulation

- Initiate fluids early if > 20% TBSA (partial thickness or deeper).
- Preferred IV fluid is Lactated Ringer's (LR).
- Burns <20% TBSA do not require burn resuscitation.
- Do not bolus unless hypotensive.
- Start IVF during the primary survey:
  - <5 y/o: 125 mL/h
  - 6-13 y/o: 250 mL/h
  - >14 y/o: 500 mL/h

🔥 Disability

- Altered mental status? Think hypoxia, hypoglycemia or non- burn related cause.

🔥 Exposure

- Stop the burning process.
- Remove all clothing, diapers, shoes, jewelry.
- Examine for any associated, pre-existing or covert injuries; Burn injuries may mask less painful but more lethal injuries.
- Cover the wounds with dry clean linens and dressings.
- Take warming measures to conserve body temperature. Remember to cover the head to help maintain heat, and use warm/thermal blankets.
- Topical antibiotic ointments are not indicated if you will transfer to a burn center.
- Do not apply ice or cold cold solutions, as it may result in hypothermia and cold injury to the burned surface
- Burn debridement should be done at a Burn Center.

SimBox 3.0

Secondary Survey

🔥Fluid Resuscitation

Total fluid volume to be repleted over first 24h:
≥30kg: 2 mL/kg LR x %TBSA Burn.
<30kg: 3 mL/kg LR x % TBSA burn PLUS D5LR or D5 1/2NS at maintenance rate.

- Give half over the first 8 hours.
- Give the other half over the next 16 hours.
- Subtract any fluids given already.
- Use LR for resuscitation fluids.
- Only for second and third degree burns.
- Titrate based on response and UOP; insert Foley catheter.

E.g. 20 kg child with 40% TBSA Burn:
Total fluid resuscitation in first 24h: 3 mL x 20 kg x 40 = 2.400 mL.
2.400 mL / 2 = 1.200 mL to be given over the first 8 hours, so the calculated initial rate will be 1.200 mL/ 8h= 150 mL/h.

Secondary Survey (continued)

Perform a thorough physical examination:
- Evaluate for concomitant injury
- Assess vascular status of extremities and thorax. Circumferential burns may result in vascular compromise and may require escharotomy.

Treat pain and anxiety:
- IN fentanyl, Tylenol suppository, IM Toradol if no IV access.
- Remember nonpharmacologic interventions: reassurance, soothing, distraction, child life specialists.

"AMPLET" Mnemonic:
- Allergies, Medications, Past medical and surgical history, Last intake, Events and Environment, Tetanus (tetanus prophylaxis should be considered for all burns).

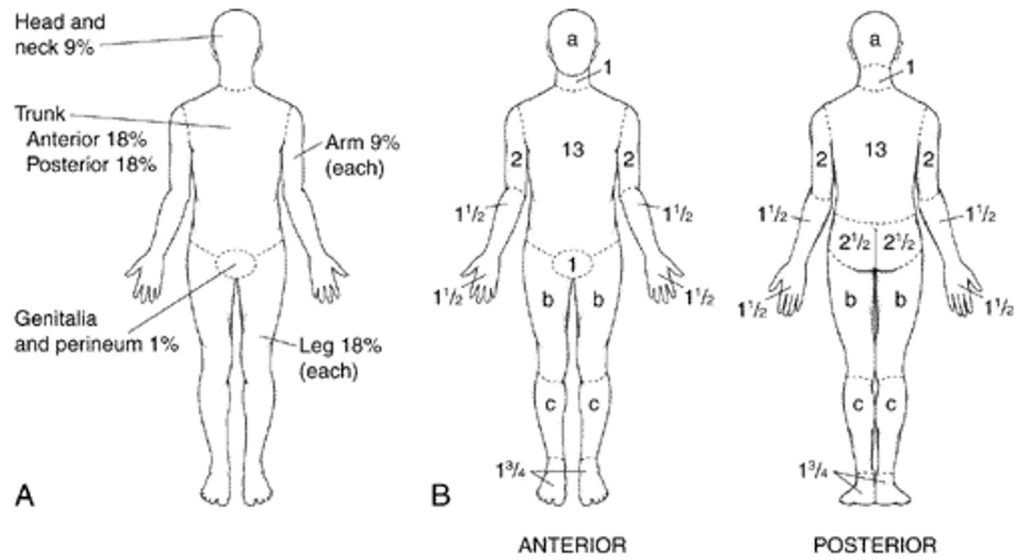
Ask for the circumstances of the injury:
- Non accidental scalds are a common form of abuse.
- Is the story consistent with the injury pattern?
- Does the mechanism match the developmental stage of the child?
- Document: photographs are crucial.
- Reporting of child abuse is mandatory in the US. The child's pediatrician is often a valuable source of information.

There is no need for prophylactic IV antibiotics.

Labs: CBC, BMP, gas/ glucose, CK, UA.

Determine the total body surface area (TBSA) burned.

Estimating Percent Total Body Surface Area in Children Affected by Burns



Relative percentage of body surface areas (% BSA) affected by growth

	0 yr	1 yr	5 yr	10 yr	15 yr
a— ½ of head	9½	8½	6½	5½	4½
b— ½ of 1 thigh	2¾	3¼	4	4¼	4½
c— ½ of 1 lower leg	2½	2½	2¾	3	3¼

(A) Rule of "nines"
(B) Lund-Browder diagram for estimating extent of burns

U.S. Department of Health and Human Services, Public domain, via Wikimedia Commons

Rule of 9s: Used in adults but is not very accurate in children as the proportion of body surface area made by anatomic parts, especially the head, varies considerably by age.

Lund Browder diagrams

Palm method (fingertip to wrist equals 1% of TBSA)

Superficial burns are NOT included in TBSA.

SimBox 3.0

Content based on the guidelines issued by the American Burn Association

This page provides possible questions to elicit teaching points during the debrief. We are tailoring content for each objective. These questions are not meant to replace your team's discussion, but can help to steer the debriefing session.

GOAL: DEMONSTRATE A TEAM BASED APPROACH TO 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: PERFORM A SYSTEMATIC ASSESSMENT/REASSESSMENT OF THE SEIZING PATIENT

PRIORITIZE TREATMENT

MANAGEM MEDICATION SIDE EFFECTS THAT LEAT TO CARDIO PULMONARY DETERIORIATION

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: signs/**s**ymptoms, **a**llergies, **m**edications, **l**ast meal, **e**vents preceding

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.

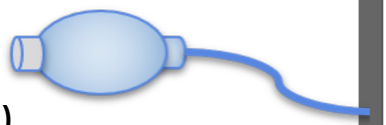
3. What is your first priority in this patient? Airway.
When the breathing slowed/became irregular and the patient was still hypoxic on 100% NRB, what maneuvers worked? Performing BVM (rate 30-50)
What are ways to give benzodiazepine medication without IV/IO access? IN/buccal/IM,PR
How did you get access? PALS recommends 3 PIV attempts in 90 secs prior to getting IO. Proximal tibia is preferred location for IO

KNOWLEDGE: DESCRIBE SEIZURE ACTIVITY IN CHILDREN AND COMMON CAUSES

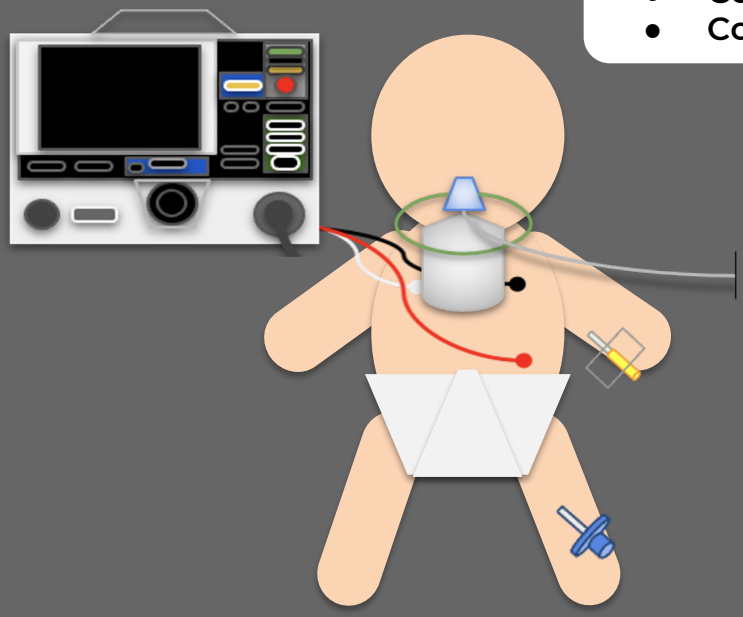
1. How do you recognize a seizure in a pediatric patient?
There are various clinical manifestations including: unresponsiveness, apnea, tremulousness, tonic-clonic activity, fixed eye deviation, etc.
2. What mnemonic is useful in remembering seizure etiologies?
VITAMINS: **V**ascular, **I**nfection, **C**erebral malaria, **T**rauma/**T**oxicology, **A**utoimmune, **M**etabolic, **I**diopathic, **N**eoplasm, **S**yndromes

ABCDE's
- Airway
- Breathing
- Circulation
- Disability/Dextrose
- (Anti)Epileptic drugs

Airway Management
- Jaw thrust, Chin lift, Shoulder roll
- Suction PRN
- Accessories: NP/OP airway



Assist breathing
- Bag mask ventilation (BVM)
- Continuous positive airway pressure(CPAP)
- Consider definitive airway



1. FIRST LINE ANTIEPILEPTIC @ t= 5 MINS
Benzodiazepine (BZ) Q5 min x2

NO IV Access

Buccal:	Midazolam 0.3 mg/kg	max 10 mg
IN/IM:	Midazolam 0.2 mg/kg	max 10 mg
Rectal:	Diazepam 0.5 mg/kg PR	max 0 mg

Midazolam 0.1 mg/kg IV/IO	max 5 mg
Lorazepam 0.1 mg/kg IV/IO	max 4 mg

2. IF SEIZURE ACTIVITY AFTER 2ND BZ DOSE ADMINISTER 2ND LINE ANTIEPILEPTIC @ 15 MIN

LEVETIRACETAM	40-60 MG/KG
FOSPHENYTOIN OR PHENYTOIN	20-25 MG/KG
PHENOBARBITAL (neonate)	20 MG/KG

3. Consider Nonconvulsive status epilepticus NCSE if prolonged "seizure" or postictal period

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 Hipple Lindau syndrome, other neurodevelopmental syndromes

ELIZABETH SANSEAU MD, MAYBELLE KOU MD, ILENE CLAUDIUS MD

COMMONS.WIKIMEDIA.ORG/WIKI/FILE:VITAMIN_B12_CAPSU

PEDIATRIC SEIZURES

MANAGING CONVULSIVE STATUS EPILEPTICUS

Defined as:

1) Seizure >5 min and/or ongoing seizure upon arrival to ED
2) 2+ seizures without full recovery of consciousness between them

ETIOLOGY

Vascular: stroke, AV malformation

Infection: meningitis, Lyme, TB, brain abscess, HIV-related

Trauma: hemorrhage, toxicologic

Autoimmune: SLE, CNS vasculitis

Metabolic: hypoglycemia, low Na|Ca|Mg encephalopathy

Idiopathic

Neoplasm

Syndromes: Tuberous sclerosis, Rhetts, Sturge Weber, VHL

SYMPTOMS

Convulsions

Incontinence (urine or stool)

Clenched Teeth

Irregular breathing or apnea

Trouble Speaking

Staring or eye rolling

OPTIMIZING THE PEDIATRIC AIRWAY

Airway Differences: Short, anterior airway, large tongue and epiglottis, prominent occiput.
Neonatal seizures are non focal: watch for lipsmacking or blinking

Position Head

Jaw Thrust

Use index/middle fingers to push back of jaw up, thumbs on chin

Shoulder Roll

Use rolled towel under shoulders to achieve neutral neck

Chin LIft

Use two fingers under chin to lift

Suction

Suction secretions from nose and oral cavity

Assist Breathing

1) Airway adjuncts: NP/OP
2) Bag Mask Assist if RR <20
4) Consider supraglottic device or tracheal intubation if apneic and unconscious

Pediatric Status Epilepticus Algorithm

* in children over 1 month of age

Recognition of Status Epilepticus

An unresponsive patient with either one of the following has convulsive status epilepticus:

- Seizure >5 min and/or ongoing seizure on presentation to EMS/ED
- 2 or more seizures without full recovery of consciousness between seizures

Initial Management

- Initiate ABCs, cardiorespiratory and BP monitoring
- O_2 10-15 L/min via non-rebreather mask
- Prioritize giving the first dose of benzodiazepine as early as possible, followed by checking blood glucose
- Monitor for respiratory depression, hypotension, arrhythmias
- Give acetaminophen 15 mg/kg/dose (MAX 650 mg) PR if febrile
- **Consider other investigations:**
  - Electrolytes, blood gas, calcium, CBC, serum glucose
  - Other: anticonvulsant drug levels, LFTs, blood & urine culture

Phase 1 5-15 min

Prehospital

1. Give Midazolam IM/intranasal (IN) (see dosing table).
2. Check blood glucose:
   If blood glucose <3.3 mmol/L (<60 mg/dL):
   Treat with D25W 2 mL/kg/dose IV (MAX 100 mL/dose) OR D10W 5 mL/kg/dose IV (MAX 250 mL/dose).
3. If still seizing after 5 minutes, give Midazolam second dose. MAX cumulative dose 10 mg in prehospital setting.

Emergency Department (ED)

1. Give benzodiazepine if two doses not already given prior to ED arrival (see dosing table).
2. Check blood glucose if not already done. Treat hypoglycemia as above. Reassess blood glucose in 5 minutes.
3. Give second benzodiazepine dose for ongoing seizures 5 minutes after first dose. When IV/IO access available, switch to IV/IO route.

CAUTION: Do not give more than 2 doses of benzodiazepines.

First Line Agents

No IV/IO	
Midazolam IM or IN	≤13 kg: 0.2 mg/kg/dose 13-40 kg: 5 mg/dose >40 kg: 10 mg/dose MAX 10 mg/dose
IV/IO	
Lorazepam IV/IO	0.1 mg/kg/dose MAX 4 mg/dose
Midazolam IV/IO	0.1 mg/kg/dose MAX 10 mg/dose

Phase 2 15-20 min

Reassess ABCs, monitor for respiratory depression. If still seizing give one of these second-line agents:

Drug	Dose	Age	Comments/Cautions
Levetiracetam	60 mg/kg/dose IV/IO (MAX 3000 mg/dose) infuse over 5 minutes	Any age	↓side effects/drug interactions, low risk of psychosis
Fosphenytoin	20 mg phenytoin equivalent (PE)/kg/dose IV/IO/IM (MAX 1000 mg PE/dose) infuse over 10 minutes	Any age	↓BP, ↓HR, arrhythmia; avoid in toxicologic seizures; choose alternate drug if on phenytoin at home or consider partial loading dose of 10 mg PE/kg/dose
Valproic Acid	40 mg/kg/dose IV/IO (MAX 3000 mg/dose) infuse over 10 minutes	>2 years	In Canada, only available via Health Canada Special Access Program; caution in patients with liver dysfunction, mitochondrial disease, urea disorder, thrombocytopenia or unexplained neurodevelopmental delay
Phenytoin	20 mg/kg/dose IV/IO (MAX 1000 mg/dose) **Infuse over 20 minutes**	Any age	↓BP, ↓HR, arrhythmia; avoid in toxicologic seizures; choose alternate drug if on phenytoin at home or consider partial loading dose of 10 mg/kg/dose; use only if fosphenytoin not available
Phenobarbital	20 mg/kg/dose IV/IO (MAX 1000 mg/dose) **Infuse over 20 minutes**	**<6 mos**	Respiratory depression, especially in combination with benzodiazepines

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

Administer alternative second line agent (e.g., if fosphenytoin given, use levetiracetam)

Pediatric Referral Centre Discussion:

- Need for intubation vs. bag-mask ventilation; hypercapnia is common and resolves with seizure cessation and non-invasive respiratory support
- Additional work up including full septic work up, use of antibiotics/antivirals, brain imaging
- Persistent altered LOC possibly related to non-convulsive status epilepticus or severe underlying brain disorder
- Third line agent: infusion of midazolam, pentobarbital, propofol OR ketamine

EIIC EMSC Innovation and Improvement Center | trekk translating Emergency Knowledge for Kids

This page provides possible questions to elicit teaching points during the debrief. We are tailoring content for each objective. These questions are not meant to replace your team's discussion, but can help to steer the debriefing session.

DESCRIBE SIGNS/ SYMPTOMS OF SHOCK IN A NEONATE

- Learners should approach a sick neonate in a standardized fashion.
- Airway, breathing, and circulation should be assessed immediately.
- Interventions such as airway repositioning/ adjuncts, BMV and CPR should be started concurrently, if required.
- After A, B, C have been addressed, the patient should be evaluated for disability and exposed for a thorough head to toe exam and a blood sugar level should be obtained.
- Labs/imaging should be ordered and antibiotics and fluids administered in a timely fashion.
- Learners should consider the different types of shock and how to treat each condition.

CONSTRUCT A DIFFERENTIAL DIAGNOSIS FOR PERSISTENT HYPOXEMIA IN THE NEWBORN

The differential diagnosis of a persistently cyanotic and hypoxic neonate despite appropriate NRP is broad and includes, but is not limited to:

- **Neurologic:** hypoxic-ischemic encephalopathy (HIE), intraventricular hemorrhage (IVH), seizures, stroke.
- **Respiratory:** respiratory distress syndrome, meconium aspiration syndrome (MAS), pneumonia, pneumothorax, pleural effusion, persistent pulmonary hypertension of the newborn (PPHN), pulmonary hypoplasia secondary to a variety of other causes.
- **Congenital anomalies:** congenital diaphragmatic hernia, congenital cystic adenomatoid malformation (CCAM), tracheoesophageal fistula (TEF).
- **Infectious:** sepsis - consider in setting of chorioamnionitis, Group B Strep, TORCH infections (toxoplasmosis, syphilis, varicella-zoster, parvovirus B19, rubella, cytomegalovirus, herpes infection).
- **Electrolyte disturbance or metabolic abnormality, hypoglycemia in infant of diabetic mother.**
- **Toxic exposures:** maternal narcotic (consider giving naloxone), alcohol or anesthetics.
- **Hematologic:** fetomaternal hemorrhage (order blood products).
- **Congenital heart disease (CHD):** cyanotic CHD or ductal-dependent CHD (critical right heart obstructive lesions, critical left heart lesions, and parallel circulations such as transposition of the great arteries TGA). Obtain pre- and post- ductal saturations and consider giving prostaglandin E_1 (PGE) in consultation with a pediatric cardiology and NICU team.

Knowledge: NRP guidelines

Learners should approach a newborn delivery in a standardized fashion with emphasis on airway and breathing

Team briefing and equipment check

Term? Tone? Breathing?

YES → Stay with mother for routine care
- Warm and maintain normal temperature
- Position airway
- Clear secretions (if needed)
- Dry
- Ongoing evaluation

NO ↓

Warm and maintain normal temp
Position airway
Clear secretions (if needed)
Dry
Stimulate

Apnea, gasping or HR<100 bpm?

NO → **Labored breathing or persistent cyanosis?**

YES ↓

PPV
SpO2 monitor
Consider ECG monitor

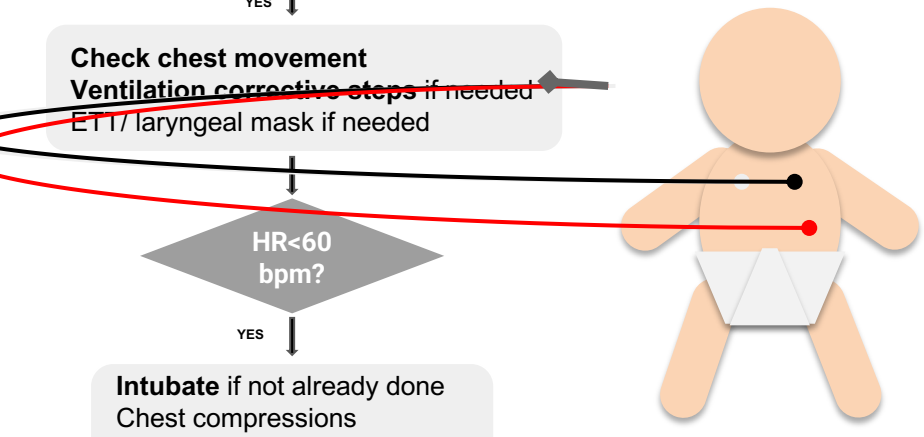
YES ↓

Position and clear airway
SpO2 monitor
Supplemental O2
Consider CPAP

HR<100 bpm?

YES ↓

Check chest movement
Ventilation corrective steps if needed
ETT/ laryngeal mask if needed



HR<60 bpm?

YES ↓

Intubate if not already done
Chest compressions
100% FiO2
ECG monitor

HR<60 bpm?

YES ↓

IV epinephrine
If HR consistently <60 bpm consider hypovolemia or pneumothorax

Pre-ductal SpO2 target	
1 min	**60%- 65%**
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	**80%-85%**
10 min	85%-95%

MR SOPA Corrective Steps	
M R	**M**ask adjustment, **R**eposition Airway
S O	**S**uction mouth + nose, **O**pen mouth
P	**P**ressure Increase
A	**A**lternative airway (ETT/ laryngeal mask)

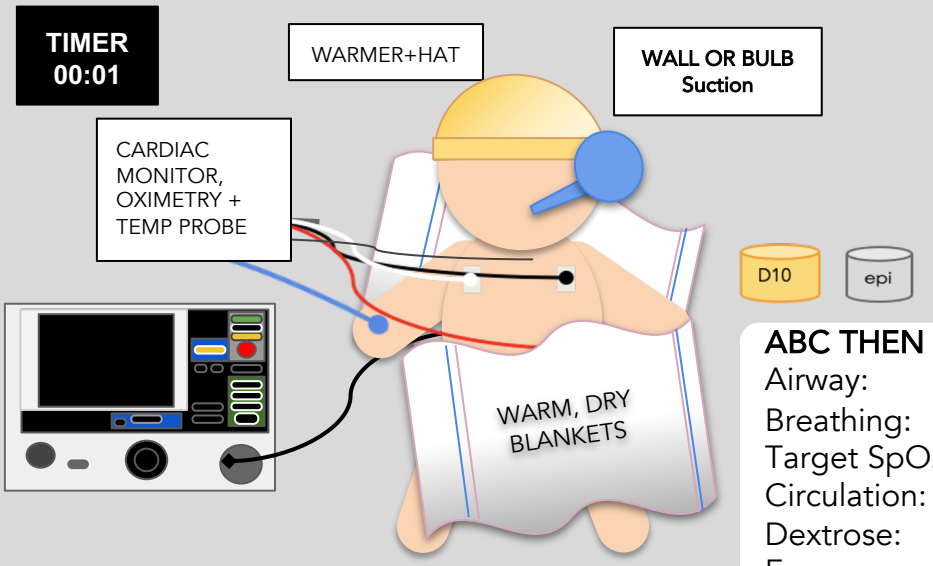
Endotracheal Intubation

GA (wks)	Depth of insertion (at lips)	Wt (g)	ETT size (mm)
23-24	5.5	500-600	**Size 2.5** <1,000 or <28 wks
25-26	6.0	700-800	
27-29	6.5	900-1,000	**Size 3.0** 1,000-2,000 g or 28-34 wks
30-32	7.0	1,100- 1,400	
33-34	7.5	1,500- 1,800	**Size 3.5** >2,000 or >34 wks
35-37	8.0	1,900- 2,400	
38-40	8.5	2,500- 3,100	
41-43	9.0	3,200- 4,200	**3.5-4.0**

Medication	Dose/ Route	Precautions
Epinephrine 1: 10,000 (0.1 mg/mL)	0.1- 0.3 mL/kg IV	Give rapidly and follow with 0.5- 1 mL normal saline flush Repeat every 3 to 5 minutes if HR < 60 with chest compressions
Volume expanders Normal saline O negative blood	10 mL/kg IV	If not responding to resuscitation/ signs of shock/ history of blood loss

Adapted from NRP; Textbook of Neonatal Resuscitation, 7th edition

NEONATAL RESUSCITATION PROGRAM: **DRY, SUCTION MOUTH, STIMULATE!**



APGAR @ min 1 + 5
- Appearance
- Pulse
- Grimace
- Activity
- Respiration

ABC THEN DE **CPR + IV *access if HR<60***

Airway: Patent? Position?
Breathing: Gasping? Apneic?
Target SpO2?
Circulation: HR >100
Dextrose: Goal >40 mg/dL
Exposure: Goal >36.5 C

AIRWAY

Wait to intubate?

- Can WAIT up to 10 minutes

DO
If HR NOT at goal
Doing chest compressions
*No premedication necessary

DON'T
If things are getting better:
- HR is at goal &
- SpO2 not at goal

BREATHING:

Hand on chest to evaluate breathing.
- Continue to bag-mask baby until you notice spontaneous regular respirations that are not from bagging.
- **Use End tidal CO2 monitor**: rapidly detects sudden changes in ventilation.

CIRCULATION:

Heart rate (HR): **EKG leads work best.**
***Dry skin before applying.**
- **Listen to chest and/or palpate umbilical stump** (umbilical artery).
- If HR <100 or no chest rise: troubleshoot: MR SOPA.

Cord gas
- Obtain up to 1hr from clamped cord.
- BE <- 10 or pH <= 7.15: consider cooling.

Preparedness Tip

Where is your newborn resuscitation equipment cart?
- Keep stocked & locked.

Do you have a warmer?
- Practice finding & turning on now!

Precipitous Delivery and Postpartum Hemorrhage in the Emergency Department

Focused History
PMH, Meds
Estimated Gestational Age/Due date
G?P? (longer labor expected if first vaginal delivery)
Did patient receive prenatal care?
Known OB concerns (placenta previa, multiple gestation)
Prior C section

Call For Help
Obstetrics
(or Telemedicine Obstetrics)
Pediatrics
Anesthesia
Midwifery
Any assistant physician/nurse

Can patient be transferred?
If presenting part is visible at introitus, patient cannot be transferred, must be delivered in present location

If contractions are <2 minutes apart or mom feels urge to push, delivery is fast approaching, likely unable to transfer

Is fetus viable?
If fundus is below umbilicus, fetus may not be viable and complicated delivery is unlikely because of baby's very small size

Uncomplicated Delivery

Reassure mom, develop partnership

Ask mom to push with contractions, rest in between

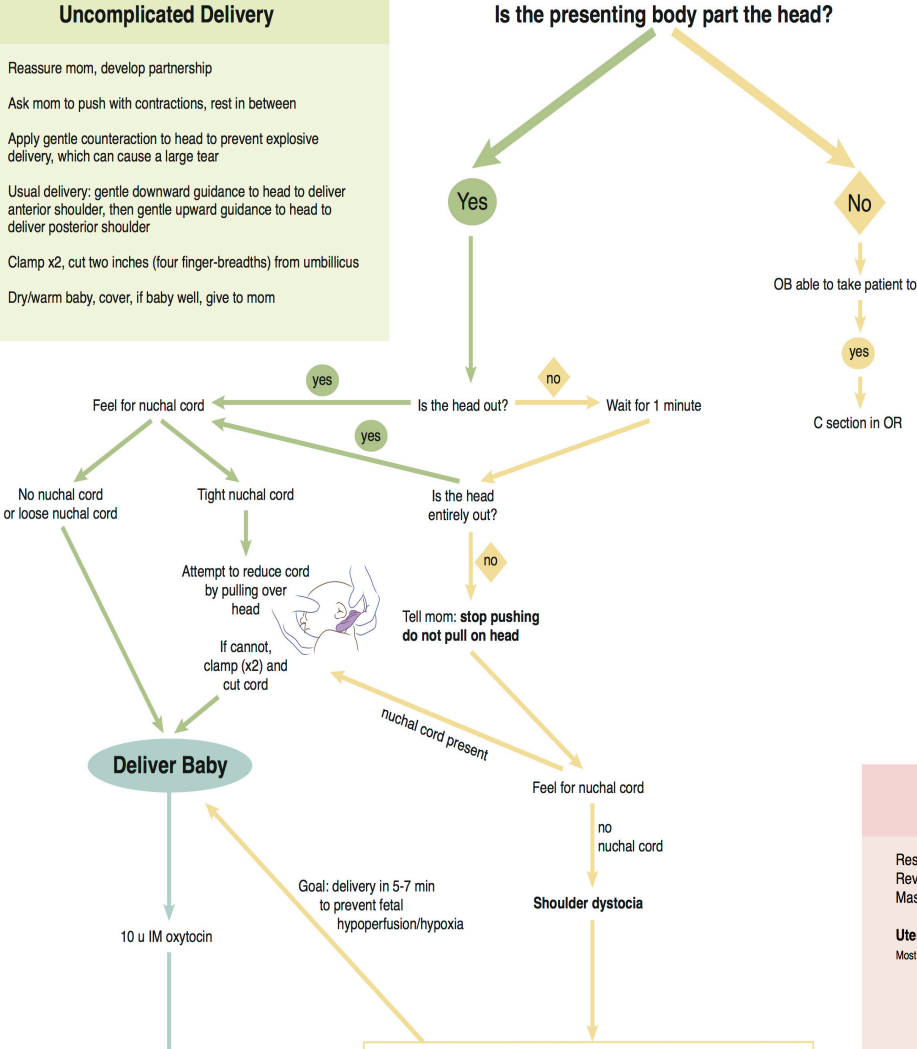
Apply gentle counteraction to head to prevent explosive delivery, which can cause a large tear

Usual delivery: gentle downward guidance to head to deliver anterior shoulder, then gentle upward guidance to head to deliver posterior shoulder

Clamp x2, cut two inches (four finger-breadths) from umbillicus

Dry/warm baby, cover, if baby well, give to mom

Is the presenting body part the head?



Equipment for Emergency Delivery

Sterile gloves
Sterile scissors
2 Clamps for umbilical cord
Bulb syringe/suction
Sterile sponges/4x4 gauze
Towels and blankets (preferably warmed)
Laceration repair kit with absorbable suture (e.g. Vicryl 2-0 or 3-0)
Neonatal resuscitation equipment, most basic elements:
- Neonatal cardiorespiratory monitor
- Neonatal bag valve mask
- Neonatal laryngoscope (sizes 0 and 1)
- Neonatal endotracheal tube (sizes 2.5 through 4.0)

Neonatal incubator/warmer
Medications (oxytocin most important) & blood

Buttock

Encourage mom to push with contractions until axilla/nipple appears

Never pull baby

Support baby's buttocks/emerging body until axilla/nipple appears

Once legs/hips are out, place a towel over them for warmth and better traction, and put mom into McRoberts position

Using two fingers in birth canal, push both arms medially toward baby's midline to deliver arms (goal is to prevent arms from being raised above head)

Assistant applies maternal suprapubic pressure to encourage delivery of head

Continued encouragement of mom to push with contractions, deliver head

Hand/Arm

Is presentation truly hand/arm? More common is hand pressed against face - this will self-resolve and lead to normal vertex delivery

If hand/arm is truly prolapsed beyond head, baby is horizontal/transverse lie in canal and cannot be vaginally delivered, C section required

Foot/Leg

High risk for umbilical cord prolapse/compression. C section is mandatory if baby is still viable

Viability can be established by palpating pulsatile umbilical cord, or by checking sonographic fetal heart rate

Deliver Placenta
Do not pull cord
Wait for lengthening of cord, gush of blood
Mom can push
Usually delivers within 5 minutes, but can take up to 30 minutes

Inspect placenta, should look like a disc
Are there missing parts that may be retained in uterus?

Inspect perineum
Direct pressure or repair if significantly bleeding tear

Dystocia Maneuvers

1. McRoberts: hyperflexion/adduction of both hips (knees against lateral abdomen) - requires an assistant at each leg
+
Apply 30 seconds suprapubic (not fundal - location is significantly inferior to fundus) pressure directed posteriorly and then laterally (not inferiorly)

McRoberts + Suprapubic pressure resolves 90% of dystocia

Gentle posterior-directed (downward) traction on head, never pull

2. Corkscrew: insert hand along baby's back, rotate anterior shoulder toward baby's face, lateral to pubic symphysis, reinsert hand along baby's back to rotate posterior shoulder in opposite direction, away from baby's face, then reattempt delivery (gentle downward guidance on head as mom pushes)

3. Place mom in all-fours position, then gentle downward traction on head (baby's head guided toward stretcher) (Gaskin maneuver)

Postpartum Hemorrhage

Resuscitative vascular access
Reverse coagulopathy if applicable
Massive transfusion protocol may be required

Uterine Atony (80%)
Most PPH will respond to first line atony treatments

Uterine massage
Oxytocin 40 IU in 1 liter IVNS
Drain bladder with Foley

If continued bleeding:
Misoprostol (Cytotec) 400 mcg sublingually or 1 g per rectum
TXA 1 g over 10 minutes, may repeat x1

If continued bleeding:
Methylergonovine (Methergine) 0.2 mg IM (contraindicated in hypertension)
Carboprost (Hemabate) 250 mcg IM q 15 min prn (contraindicated in asthma)

Retained products of conception
Does placenta deliver easily and look complete?

1. Maternal analgesia
2. Using external abdominal hand, push uterus inferiorly (toward intravaginal examining hand)
3. Sweep inside of uterus with hand to gather POC

Trauma to birth canal
inspect vagina and cervix

Direct pressure
Laceration repair with suture (2-0 Vicryl)
Inject with epinephrine prn

DIC/occult coagulopathy

CBC, fibrinogen, PT/PTT
Treat with cryoprecipitate prn
TEG if available

fibrinogen normally elevated in pregnancy
normal fibrinogen concerning for DIC
low fibrinogen strongly suggests DIC

Maneuvers for life-threatening bleeding unresponsive to usual treatments
Intrauterine balloon tamponade with Bakri Balloon or equivalent
Uterine packing with gauze/procoagulants
External aortic compression (using ultrasound if available)
REBOA / Laparotomy / Cesarean section

emupdates.com/ob
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Illustrations + design: @dbaderMedArt

After the simulation day is complete next steps include:

- HUB site to enter data into Qualtrics 48 hours post sim day with link below:

  ImPACTS PRS and Sim Data

- **Learners** to complete post program survey with link or QR code below:

  https://iu.co1.qualtrics.com/jfe/form/SV_42V8bzT1b0X1xEa

- **PECC** to complete post program survey with link or QR code below:

  https://iu.co1.qualtrics.com/jfe/form/SV_8dgnU9FHBwgfVci

- Within two weeks of data entry and final report out will be shared with the PECC

Please contact Erin Montgomery at white20@iu.edu with any data or survey questions!