

American College of Emergency Physicians

The SimBox

RESOURCE BOOKLET: Low fidelity simulation to improve pediatric emergency patient care

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The SimBox

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A	The ACEP SimBox	Overview/Getting Started
<p>This drill is intended to improve your ED's readiness to triage and treat a sick neonate using equipment in your own ED. It highlights what should happen during the first five minutes of a neonatal resuscitation. It will take about half an hour. Go to the website www.acepsim.com to view a brief video that will help you to get started.</p>		
<p>The drill consists of three parts:</p> <ol style="list-style-type: none"> 1) Prebrief: prior to starting the drill you will introduce how the session will go and what the goals are (5 minutes) 2) Drill: you will play video on browser with EMS patch, patient image and vital sign monitor (computer/phone), put infant on bed then state prompts from the scenario script and use the scenario checklist to make notes for discussion/debrief (10 minutes) 3) Debrief: at the end of the drill you will invite the team to reflect on the case and use the debrief script (15 minutes) 		
<p>SESSION AIMS (tailor to your individual ED needs as you repeat the scenario)</p> <p>After this session, participants will be able to:</p> <ul style="list-style-type: none"> • Assemble the necessary staff, equipment and resources to care for neonate in your emergency department. • Recognize a neonate in shock (a neonate with abnormal vital signs and a concerning clinical exam). • Stabilize a neonate in shock with a team-based approach through consideration of at least three potential etiologies with their treatments and activation of systems to escalate care (i.e. transfer center, NICU/pediatrics team assistance). • Demonstrate effective teamwork and communication (i.e. designate leader/roles, directed orders, closed-loop communication, sharing mental model, family communication). • Identify gaps in training, equipment and/or resource needs, strengthen existing knowledge and skills. • Strengthen and reinforce existing knowledge and skills. 		
<p>WHAT'S IN THE BOX?</p> <ul style="list-style-type: none"> • Neonate simulator (inflatable CPR manikin or doll) + Booklet of resource documents (see table of contents) + Peripheral Brain Booklet 		
<p>USING THE BOX</p> <ul style="list-style-type: none"> • BEFORE conducting the drill please watch this short training video that will explain how to use the contents of this box www.acepsim.com • Please review this booklet to help you prepare to lead the drill, how to use the equipment and booklet. 		
<p>WHAT WILL I NEED TO CONDUCT THIS IN MY ED</p> <p>Make sure your team locates actual pediatric equipment in the ED and brings it to bedside-- even they do not open it.</p> <ul style="list-style-type: none"> • Display: computer screen, phone, or tablet with internet connection • Equipment that is appropriate size for neonate <ul style="list-style-type: none"> ○ Monitoring equipment: cardiac leads, BP cuff, oxygen saturation probe, rectal thermometer, scale ○ Airway: nasal cannula, face mask, non-rebreather, neonatal or infant bag with neonatal-sized mask, airway adjuncts (NP/OP airway, infant LMA), suction catheter and set up, advanced airway equipment (laryngoscope, blade, handle, tube) ○ Venous access: 24g IVs, IO set (drill or manual) with smallest needle ○ Warmer: incubator and/or warming lights. • Pediatric resources: cognitive aid for medication dosing and/or equipment sizing (e.g. length-weight based tape) 		
<p>WHERE SHOULD I RUN THE DRILL?</p> <ul style="list-style-type: none"> • The ED resuscitation area or patient room (<i>in situ</i> patient care areas are preferred over sim lab or classroom). 		
<p>WHEN SHOULD I RUN THE DRILL?</p> <ul style="list-style-type: none"> • As often as possible during downtime, scheduled educational time and at shift change • Repeat the drill with different teams, different shifts 		
<p>HOW MANY PARTICIPANTS WILL I NEED?</p> <ul style="list-style-type: none"> • Minimum: physician and nurse • Optional: Technician, advanced practice providers, additional staff. The addition of one person to act as a parent can increase the case difficulty. 		

B	The ACEP SimBox	Pre-brief Guide
Please use this script to introduce your team to the drill. You may adapt it as it becomes more familiar.		
Overview: <ul style="list-style-type: none"> • Explain the purpose of the drill • Clarify expectations 	<p>“The goal of this drill is to improve our department’s readiness to triage and treat a sick neonate. This is an opportunity for our team to practice patient care, teamwork and communication in a supportive environment with our own equipment and resources. The case highlights the team approach to the first five minutes of a neonatal resuscitation. It is not a complete scenario.”</p>	
Explain the time course: <ul style="list-style-type: none"> • Tell your team what to expect 	<p>“The session will last about 30 minutes total: 10 minutes for the drill and 20 minutes in a group reflection and discussion, called a debrief. During the debrief we will discuss opportunities for improvement such as missing or malfunctioning equipment.”</p>	
Establish a learning space that is psychologically safe: <ul style="list-style-type: none"> • Introduce the Basic Assumption* and Fiction Contract <p><i>(*adapted from the Center for Medical Simulation, Boston)</i></p>	<p>“The “Basic Assumption*” of simulation is that everyone is here to do their best so we can learn as a team how to take care of neonates confidently.</p> <p>Fiction contract: “I/We know that not everyone is comfortable with simulation equipment, resuscitation drills, or with care of neonates. I/We know it can also be intimidating to be on display in a situation that may be uncomfortable. Here, you are not being graded on your performance in this case; instead we will focus on how to work as a team. Treating it as a real situation will help everyone get the most out of the session.”</p>	
Give an orientation to the simulator: Many learners may not have had exposure to simulation equipment. <ul style="list-style-type: none"> • Give a stepwise orientation to manikin, display and equipment • Demonstrate limitations of equipment. 	<p>Manikin: “Let’s take a few minutes to discuss the manikin that we are using. She is intended to serve as our neonatal patient. I know that she does not look or feel real, but she can be ventilated with a bag-valve-mask and has been used to practice CPR in developing countries with success. If at any point you are confused by the manikin or have a question please state TIMEOUT and we will pause the simulation to clarify and then restart.”</p> <p>Display: This screen will display her vital signs (show computer, phone, or tablet). Please physically obtain and place actual monitoring equipment on the baby. After we start the case her vital signs will be displayed.</p> <p>Using equipment with the manikin: If you want to administer oxygen, place the cannula, face-mask or non-rebreather on her face. We can’t intubate or use the arms or legs for real IV access, so if you intend to intubate or place an IV or IO, find the equipment and place it next to the baby on the bed. If you want to give meds please communicate both the route of administration and dosing. If you would call for help please do so.”</p>	
Maintain realism in the simulated learning environment	<p>“We know this is not a real situation, but if we treat this as real as possible, we will benefit more. We’d like you to actively perform tasks, and avoid miming actions or stating “I would do this” as the case unfolds.”</p>	
Explain how the simulation starts + ends	<p>When I say: “the simulation will start now”, you will be given information about the case. You will then assign a team leader and communicate with each other as you would in a real case in your typical provider roles. You will then have ONE MINUTE to prepare the room. When you are shown the baby you may begin caring for the patient.”</p> <p>We’ll run the scenario until I say “let’s end the simulation” and then we will start the debrief.</p>	
Give clarifications and how you will keep track of the case	<p>I will serve in the role of the parent. If you have questions about her history or her physical exam such as mental status or capillary refill, please ask. As a team, remember to use closed-loop communication. If at any point you are confused by the simulator or have a question please ask for a TIMEOUT and we will pause the simulation to clarify and then restart. I will be using a checklist and will take notes to help provide feedback during the debrief. Any questions?</p>	

C		The ACEP SimBox	Scenario Guide
	Facilitator **actions** and statements	Vital Signs/trends	Expected actions by team
START	AFTER PREBRIEF COMPLETED ** open video www.acepsim.com	DO NOT PLACE BABY ON BED UNTIL ARRIVAL ON VIDEO	
EMS call	STATE: You have two minutes to prepare the room, please bring equipment and resources to the bedside and assign roles, I will put the baby on the bed when she has arrived	Audio of EMS call: "7 day old, weak cry, grey, cap refill 5 seconds We will arrive in 2 minutes"	<ul style="list-style-type: none"> o Team assembles + assigns roles o Gets equipment: monitor, BVM, mask, warmer, blanket/lights, IO/IV, broselow tape
Patient arrival	** WAIT UNTIL YOU SEE INFANT ON VIDEO, THEN PLACE BABY ON BED/WARMER ** STATE: "Patient has arrived."	MONITOR WITH 120 SECOND COUNT DOWN, THEN SEE INFANT FOR 10 SEC, THEN BLANK VITALS	<ul style="list-style-type: none"> o Team assembles + assigns roles o Gets equipment: monitor, BVM, mask, warmer, blanket/lights, IO/IV, broselow tape
Blank monitor	STATE: "Please place patient on monitor." * Advance video when team attaches monitor by clicking right*	<i>Blank screen without vitals and audio of EMS updated vitals</i>	<ul style="list-style-type: none"> o Team places monitor leads, pulse oximeter, BP cuff on patient
Monitor applied: vitals on screen	STATE: "weak cry, cap refill 6 seconds, rectal temp is 36C(96.8)" <u>If IV:</u> state "cannot get IV on first attempt, baby is unresponsive." <u>If BVM:</u> state "baby is pinking up."	VS on monitor: HR 200 BP 40/20 RR 60/m Sat: 77%	<ul style="list-style-type: none"> o Positions airway o Assists respirations with BVM o Attempts IV or IO o Requests rectal temp
+1 min after monitor applied	STATE: responds with stronger cry, mottled, cap refill 5 seconds <u>If IV:</u> state "cannot get IV on second attempt" <u>If BVM:</u> state "baby is continuing to pink up and is now responding to pain."	VS on monitor: HR 195 BP 40/20 RR 65/m Sat: 83%	<ul style="list-style-type: none"> o Verbalize illness state- pediatric assessment triangle o Estimate weight/verbalize 3 kg
+2 min after monitor applied	STATE: "parent reports not tolerating feeds and fussy for 24 hours, no wet diapers for 12 hours, fussy all night, full term, no meds, allergies or past history" <u>If IV:</u> state unable to start IV after 3 tries and 2 minutes <u>If request IO:</u> state "IO is successful, labs pending." <u>If BVM:</u> state "baby is more responsive to voice."	VS on monitor: HR 190 BP 44/23 RR 67/m Sat: 93%	<ul style="list-style-type: none"> o Stop BV o Suctions airway o Apply cannula or mask o Request IO o Orders POC glucose, labs, o Bolus 10 mL/kg NS via push-pull
+3 min after monitor applied	STATE: "improved spontaneous breathing, cap refill 3 seconds, no palpable liver edge, more pink, warmer to touch." <i>If asked, labs pending, imaging or consult or pediatrics or respiratory "on the way"</i>	VS on monitor: HR 180 BP 49/25 RR 67/m Sat: 93%	<ul style="list-style-type: none"> o Orders POC glucose, labs, o Bolus 10 mL/kg NS via push-pull
+4 min after monitor applied	STATE: family is asking for update on what is going on STATE: the charge nurse is asking for disposition plan	VS on monitor: HR 170 BP 51/26 RR 63/m Sat: 94%	<ul style="list-style-type: none"> o Initiates transfer arrangements (if not done) o Updates family (if not done)
END	STATE: This will end the drill. The baby has stabilized. Thank you for participating. We will now move to the debriefing.		

D		The ACEP SimBox	Scenario Checklist		
Task		Done correctly	Not done correctly	Not done	
Goal: Demonstrate a team-based approach to a critically ill neonate					
Assemble team	Designate team leader and clarify provider roles				
	Call for additional resources/help (i.e. transfer center; NICU/peds)				
Skill: Perform a systematic assessment of a critically ill neonate					
Begin patient care	Verbalize critical illness and severe abnormality of vital signs				
Take SAMPLE history:	Signs/symptoms, allergies, meds, past medical history, last feed, events				
Skill: Select appropriate pediatric resuscitation equipment based on patient age					
Get/locate equipment	Neonate oxygen saturation probe, cardiac leads, BP cuff				
	Rectal thermometer and scale (or method to determine weight)				
	Airway equipment				
	Venous access: 24G IVs, IO set (drill or manual) with smallest needle				
	Glucometer, POC labs tubes, culture bottles				
	Infant warmer and/or warming lights				
	Cognitive aid for medication dosing, equipment sizing				
Knowledge: Identify features of the neonate in shock					
Perform primary assessment:	Assess airway patency, work of breathing, circulation/capillary refill				
	Assess disability (AVPU, tone)				
	Request dextrose level, other labs				
Warm patient	Plug in and turn on warmer or place under warming lights				
Optimize airway and recognize need for airway support	Head tilt, chin lift, shoulder roll and/or other positioning techniques (jaw thrust, oropharyngeal airway)				
	Administer oxygen using clinically appropriate equipment				
	Perform BVM assist (rate of 30-50)				
Order vascular access	24 g IV or proximal tibial IO				
Knowledge: Describe at least three causes of the neonate in shock					
	Verbalize at least three life threatening etiologies of presentation and verbalize next steps in treatment				
Skill: Demonstrate how to use a medication dosing cognitive aid(s)					
Order and administer fluid bolus	Request weight or estimate using tool				
	Set up push-pull or other method at 10-20 mL/kg				
Knowledge: List indications for escalation/transfer of care					
	Verbalize need to escalate care or transfer and activate transfer process				
Attitudes: Utilize team communication skills					
	Demonstrate closed loop communication with team, share mental model and plan				
Attitudes: Discuss the importance of family centered care/interactions					
	Communicate with family (or designate another provider to do so)				

E	The ACEP SimBox	Debriefing Guide
<p>A debrief is used by teams to celebrate areas of great performance and discover opportunities for improvement. If you are not familiar with how to run a debrief session, the following is a recommended framework to help you run one effectively. The purpose is to encourage team members to share their knowledge of the events, and help create understanding toward improvement. This should not be a blame session: follow the basic assumption that “everyone present is here to do their best”. There are many ways to lead a debrief session and you are welcome to adapt this format.</p>		
Setting expectations	<p>Create a safe context for learning. Explain the goal of debrief: “Let’s spend 15-20 minutes to debrief the scenario. The goal is to discuss lessons learned from the case so we can improve how we work together and care for a neonate in the ED. This is not a blaming session. Everyone’s participation is welcome. There are four parts to the discussion”:</p>	
1) Reactions (1-2 minutes)	<p>Solicit reactions and emotions: this should allow participants to blow off steam but not launch into the medicine right away. “First, how did that feel?”</p>	
2) Description (1-2 minutes)	<p>Clarify facts and medicine: develop shared understanding of what happened: “Next, can someone share a short summary of the case?” Ask if everyone agrees or if there are any other perspectives.</p>	
3) Analysis (7 minutes)	<p>Explore performance domains: solicit feedback for improvement from the group. Concentrate on learner experiences of the scenario. Begin discussion by using open-ended questions. Be sure to highlight strengths of the team and individuals. “Now let’s talk about specific areas that went well and opportunities for improvement”: <i>Can use different techniques for eliciting what went well and what could have gone better.</i></p>	
3b) Reinforce learning (2 minutes)	<p>Provide focused feedback and observations. <i>How do you think the team did in identifying priorities in the care of this patient? How do you think the team did in managing priorities in the care of this patient?</i> Can allow repeating the scenario to “re-do” if time permits.</p>	
ELICIT ANY OUTSTANDING ISSUES/CONCERNS FROM THE GROUP		
4) Summary & Application (2 minutes)	<p>Identify take home points & WRAP UP: Learner centered/ Instructor centered: “That was a useful discussion. Please share a take away from our discussion that you hope to apply when you care for a critically ill neonate in the ED.” “Are there any additional comments on (insert topic)? From my perspective (give the take home message), I hope you leave here with XXXXYYYY.” End by thanking your team for participating.</p>	

F The SimBox Debriefing Guide (see more details in the Peripheral Brain Booklet)

The **debrief** is a dedicated time to talk about the objectives of the case and help identify areas of improvement in your ED. This page provides possible questions to elicit teaching points 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: At the end of the drill, our team will be able to demonstrate a team-based approach to a critically ill neonate

PBB G

How did your team prepare for the arrival of a sick neonate?

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

Skill: Perform a systematic assessment of a critically ill neonate

PBB S1a+b

How does your team perform a systematic assessment of a critically ill infant?

PAT Pediatric Assessment Triangle

Appearance: **TICLS**: tone, interactivity, consolability, look/gaze, speech/cry

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

Circulation/capillary refill: **Where and how is this assessed in a neonate?**

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

Don't Forget SAMPLE mnemonic (Sign/Symptoms, Allergies, Medications, Last Meal, Events Preceding)

Skill: Select appropriate pediatric resuscitation equipment based on patient age

PBB S2

Priority: Locating correct sizes of pediatric equipment and resources in your emergency department.

Where is your pediatric equipment located? Is there a warmer? Who obtains the equipment for monitoring/airway/access?

Choreography is important = Specific team members must be designated to retrieve equipment.

Team must practice how to attach monitoring equipment to the neonate.

Knowledge: Identify features of the neonate in shock

PBB K1

What do the patient's vital signs tell you about the clinical status? (see PBC)

Heart rate: Heart rate <60 should prompt CPR at rate of at least 100 BPM.

Additional questions: **What are other challenges to assessing changes in the clinical status of neonates?**

Discussion can include choreography of a team around a small patient, obtaining frequent vitals and being familiar with VS.

What are some differences in shock assessment between infants, children and adults?

Shock: Tachycardia, capillary refill >2 seconds and altered mental status are early surrogate signs.

Knowledge: Describe at least three causes of the neonate in shock

PBB K2

What is could be causing this neonate to be in shock? (Discuss differential diagnosis: THE MISFITS mnemonic)

Additional questions:

What are treatment priorities?

ABCs + Dextrose

How do you select sites for venous access?

IVs: dorsal veins of hands or feet, cubital, saphenous, or scalp veins using a 24g IV

How long should IV access be attempted before escalating to IO access?

PALS recommends 3 attempts in 90sec

How is environmental exposure a threat to a sick neonate?**Skills: Demonstrate how to use a medication dosing cognitive aid(s)**

PBB S3

What cognitive aids or dosing tools are available to help with pediatric dosing?

Weight-based pediatric cognitive aids such as a length based dosing tape, phone/computer apps, color coded carts and/or wall charts are commercially available and can be personalized to your department. All personnel must be familiar with their location/function.

How do you decide on a weight to use for dose calculation if one isn't available?

Measured or parental report of weight is most helpful. Most newborns are 3-5 kgs unless premature.

Knowledge: List indications for escalation/transfer of care

PBB K3

When should transfer/handoff logistics be addressed?**How do you decide when to transport the patient to ICU or other hospital for further management?****How do you decide where to transfer this patient?**

Arrangements for transfer of care need to be considered early in the course unless the ICU is onsite. Depending on the institution, a neonate may be admitted or transferred to a NICU or PICU. Be familiar with internal protocols and transfer arrangements.

Attitudes: Utilize team communication skills

PBB A1

How is a shared mental model helpful to the team?**Was there closed-loop communication between team members?****Attitudes: Discuss the importance of family centered care/interactions**

PBB A2

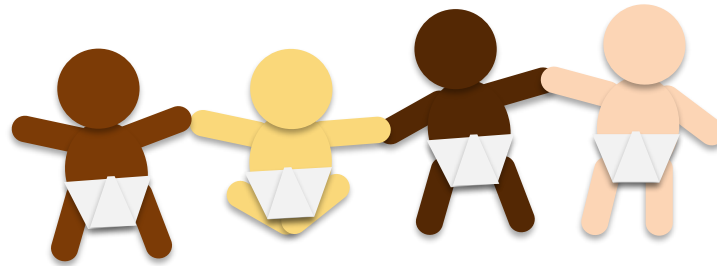
How does the team manage the reactions of family members while you are caring for a seriously ill child?

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.

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