

What Can Sim Do For You?

Using Simulation to Improve Pediatric Trauma Care Beyond the Hospital

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Disclosure

Nothing to disclose.

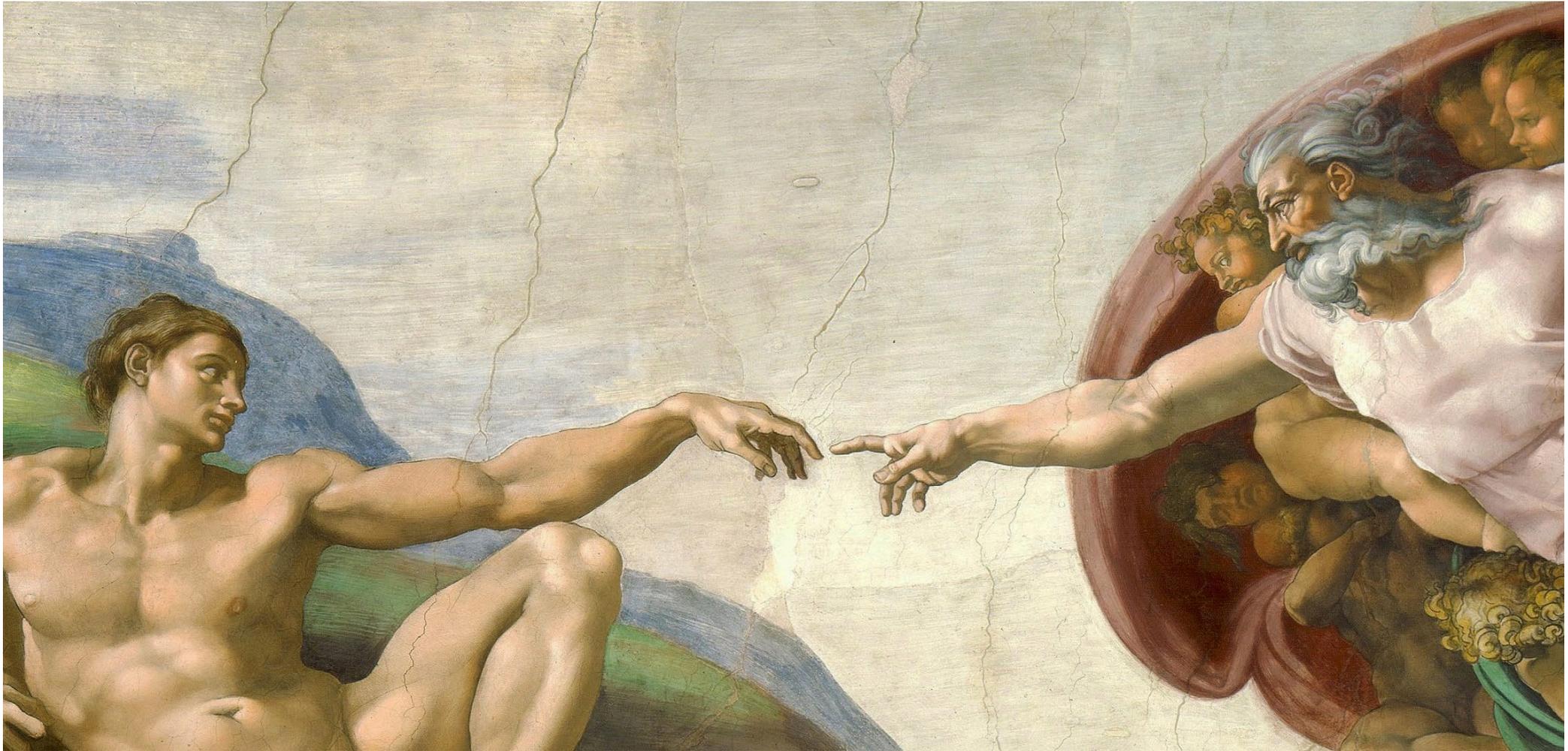
Friday Night...

EMS brings a 2-year-old male involved in a head-on, high speed MVC. He was apparently unrestrained. He is seen at a critical access ED, who is requesting immediate transfer to your facility. They have obtained IV access and have given a NS bolus. He is reported to have a GCS of 10. They have limited diagnostic capabilities. You accept the patient. On arrival, you note the following:

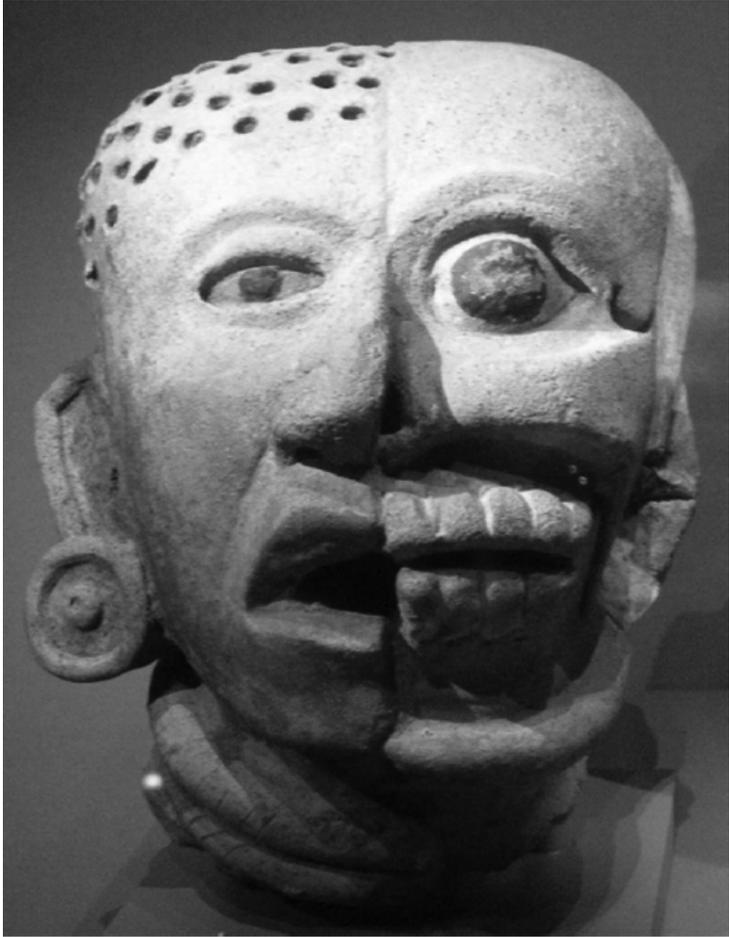
- He has a NRB mask with a flow rate of 5 L/min with agonal breathing.
- He has poor perfusion and a blood pressure of 70/40.
- He has a 24 gauge IV in place with NS running at 30 cc/hr.
- He has a GCS of 4.



In the Beginning...



A Bit of History...





A Bit of History...





A Bit of History...



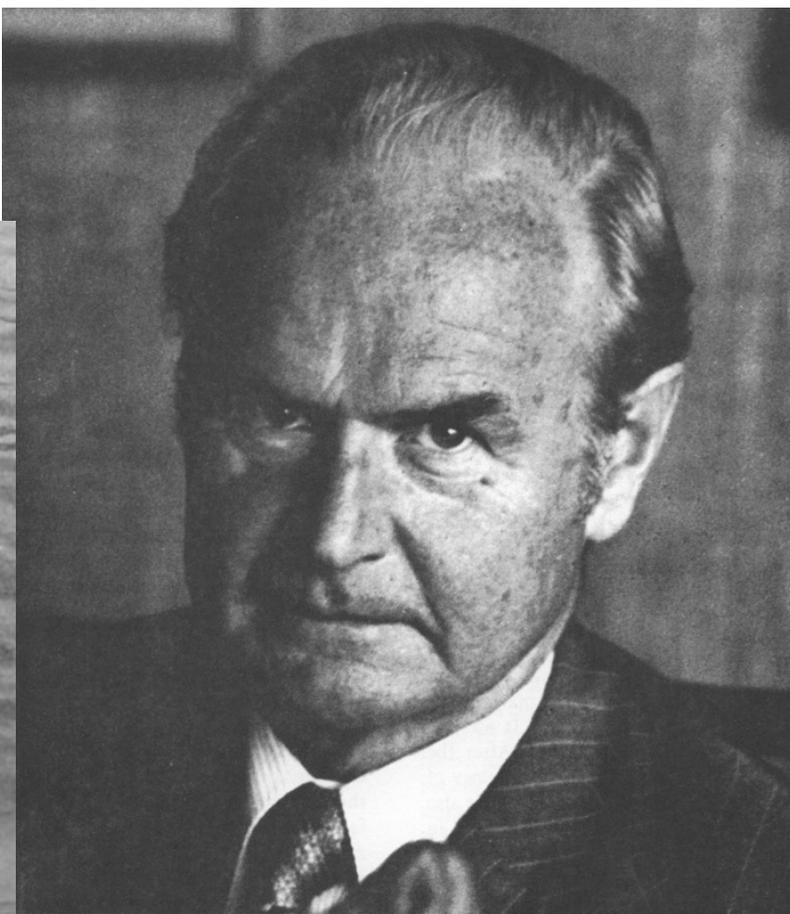
A Bit of History...

...“it will be of infinite use in providing a perfect knowledge of all organs of the human body.”

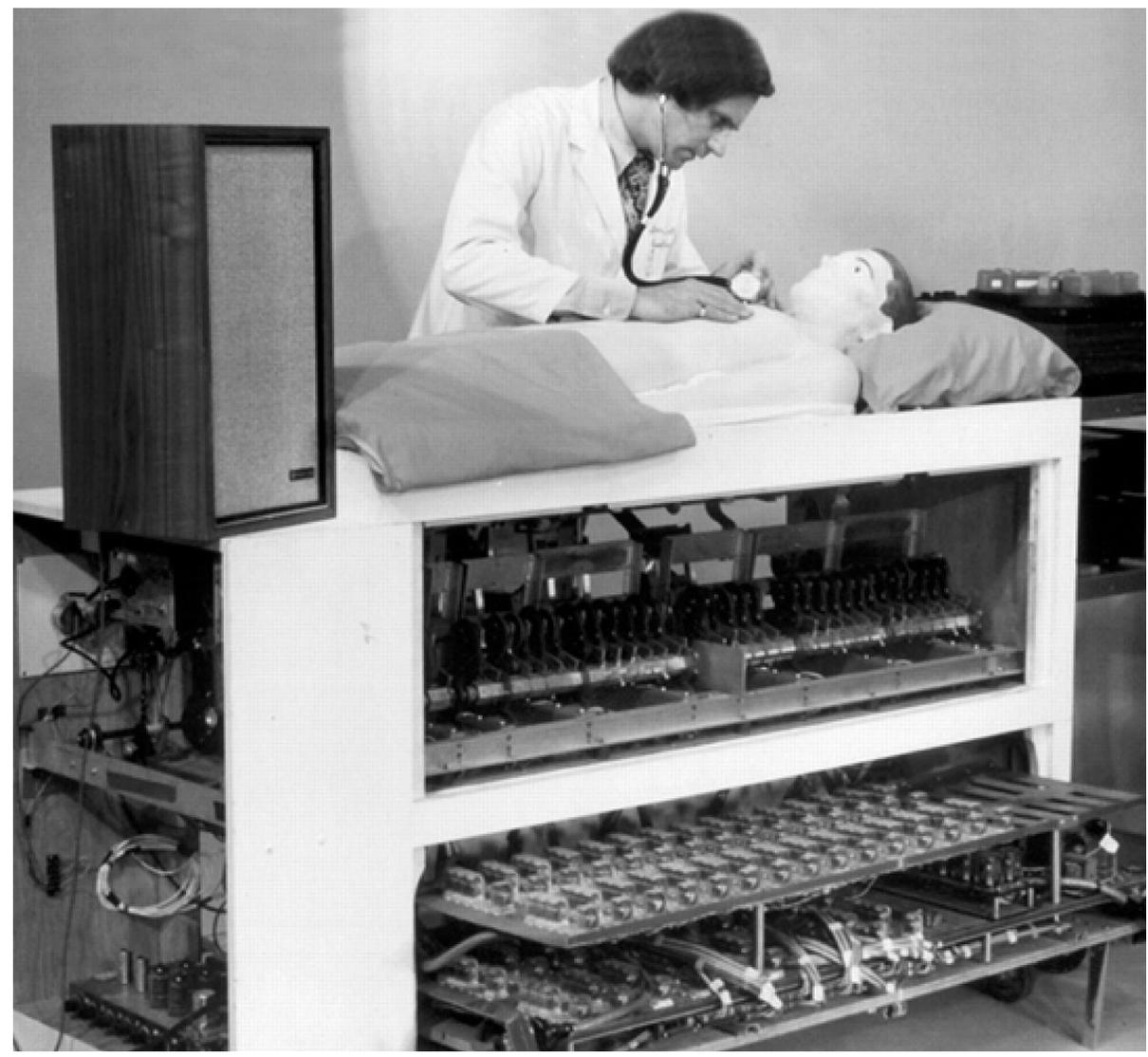




A Bit of History...



Fun Fact: The lyric "Annie, are you OK?" from the Michael Jackson song "Smooth Criminal" actually stems from American CPR training.





American Academy of Pediatrics



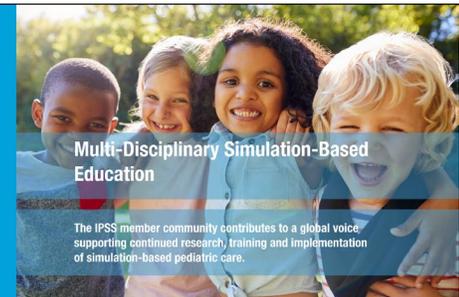
DEDICATED TO THE HEALTH OF ALL CHILDREN™

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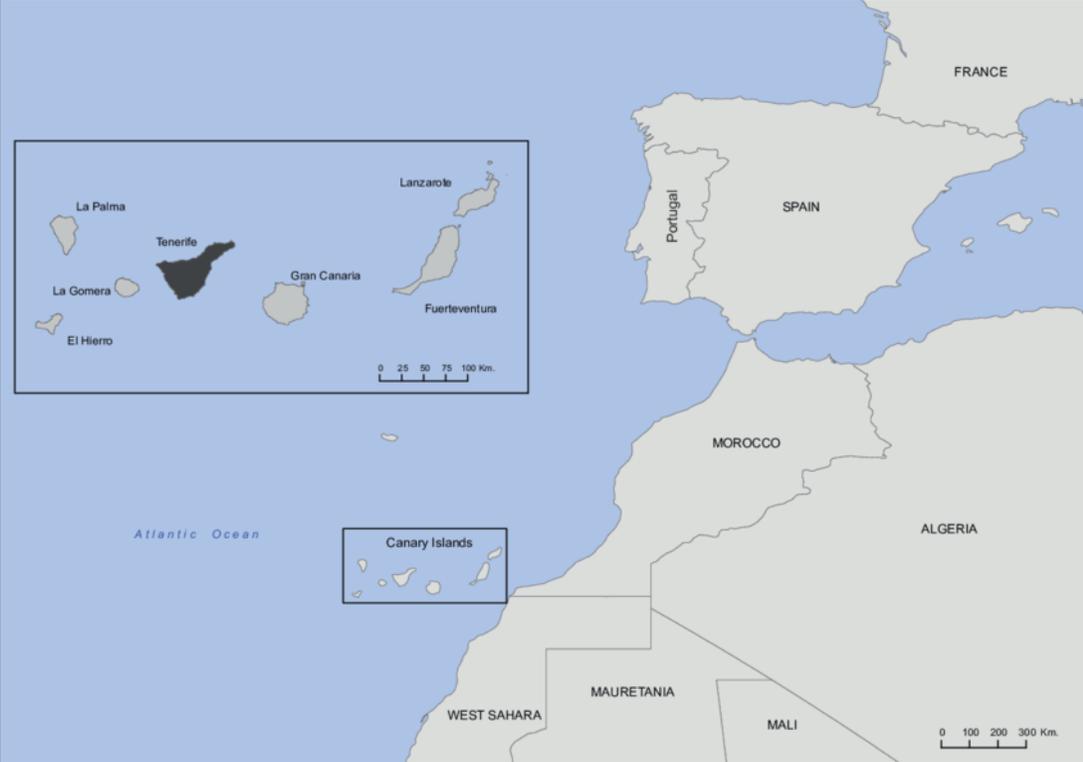
International Pediatric Simulation Society







Tenerife





1658:55.3 APP O.K. KLM eight zero - ah - correction four eight zero five taxi straight ahead - ah - for the runway and - ah - make - ah - back track.

1659:04.5 KLM Roger, make a "back track".

1659:10.0 KLM KLM four eight zero five is now on the runway.

1659:15.9 APP Four eight zero five roger

1659:28.4 KLM Approach, you want us to turn left at Charlie one, taxiway charlie one?

1659:32.28 APP Negative, negative, taxi straight ahead - ah - up to the end of the runway and make "back track".

1659:39.9 KLM O.K., sir

1701:57.0 RDO-2 Tenerife the Clipper one seven three six.

1702:01.8 APP Clipper one seven three six Tenerife.

1702:03.6 RDO-2 Ah- We were instructed to contact you and also to taxi down the runway, is that correct?

1702:08.4 APP Affirmative, taxi into the runway and -ah- leave the runway third, third to your left, (background conversation in the tower)

1702:16.4 RDO-2 Third to the left, O.K. (17:02.18.3)

1702:18.4 CAM-3 Third he said.

1702:21.9 CAM-1 I think he said first.

1702:20.6 APP -third one to your left.

1702:26.4 CAM-2 I'll ask him again

CAM-? ***

1702:32.2 CAM-2 Left turn.

1702:39.2 CAM-1 What really happened over there today?
1702:41.6 CAM-4 They put a bomb (in) the terminal, Sir, right where the check-in counters are.
1702:46.6 CAM-1 Well we asked them if we could hold and -uh- I guess you got the word, we landed here **
CAM-? ***
1702:49.8 APP KLMfour eight zero five how many taxiway -ah- did you pass?
1702:55.6 KLM I think we just passed charlie four now
1702:59.9 APP O.K. ... at the end of the runway make one eighty and report -ah- ready -ah- for ATC clearance (background conversation in the tower).
1703:09.3 CAM-2 The first one is a ninety degree turn.
1703:11.0 CAM-1 Yeah, O.K.
1703:12.1 CAM-2 Must be the third ... I'll ask him again.
1703:14.2 CAM-1 O.K.
1703:16.6 CAM-1 We could probably go in it's ah ...
1703:19.1 CAM-1 You gotta make a ninety degree turn.
1703:21.6 CAM-1 Yeah, uh.
1703:21.6 CAM-2 Ninety degree turn to get around this ... this one down here it's a forty five.
1703:29.3 RDO-2 Would you confirm that you want the clipper one seven three six to turn left at the third intersection? (1703:35.4).
1703:35.1 CAM-1 One, two.
1703:36.4 APP The third one, sir, one; two, three, third, third one (1703:38.3)..
1703:38.3 CAM-? One two (four).
1703:39.0 CAM-1 Good.
1703:40.1 CAM-1 That's what we need right, the third one.
1703:42.9 CAM-3 Uno, dos, tres.
1703:44.0 CAM-1 Uno, dos, tres.
1703:44.9 CAM-3 Tres - uh - si.
1703:46.5 CAM-1 Right.

1705:44.8 KLM Uh, the KLM ... four eight zero five is now ready for take-off ... uh and we're waiting for our ATC clearance.

1705:53.4 APP KLM eight seven * zero five uh you are cleared to the Papa Beacon climb to and maintain flight level nine zero right turn after take-off proceed with heading zero four zero until intercepting the three two five radial from Las Palmas VOR. (1706:08.2)

1706:09.6 KLM Ah roger, sir, we're cleared to the Papa Beacon flight level nine zero, right turn out zero four zero until intercepting the three two five and we're now (at take-off). (1706:17.9)

ca. 1706:13 KLM-1 We gaan. (We're going)

1706:18.19 APP OK.

1706:19.3 RDO No .. eh.

1706:20.08 APP Stand by for take-off, I will call you.

1706:20.3 RDO And we're still taxiing down the runway, the clipper one seven three six.

1706:19.39 - RDO and
1706:23.19 APP communications caused a shrill noise in KLM cockpit - messages not heard by KLM crew.

1706:25.6 APP Roger alpha one seven three six report when runway clear

1706:29.6 RDO OK, we'll report when we're clear.

APP Thank you

1706:32.43 KLM-3 Is hij er niet af dan? {Is he not clear then?}

1706:34.1 KLM-1 Wat zeg je? {What do you say?}

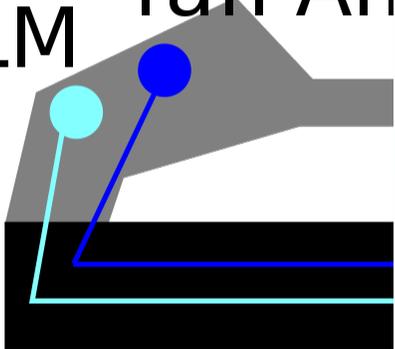
1706:34.15 KLM-? Yup.

1706:34.7 KLM-3 Is hij er niet af, die Pan American? {Is he not clear that Pan American?}

1706:35.7 KLM-1 Jawel. {Oh yes. - emphatic}



KLM Pan Am



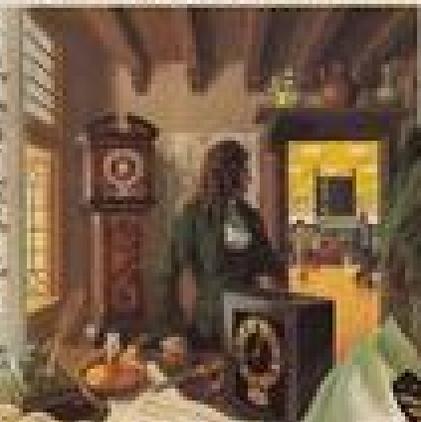
KLM. From the people who made punctuality possible.

Building an airline of KLM's playing requires a special kind of dedication. One making a point of being punctual. A quality that runs through every vein of the Dutch.

A royal Christian Heugtenberg, after all, who gave it and his colleagues - when he founded the young business that made KLM's reputation.

A tradition without which it is impossible to do an airline. The high quality of service that makes it possible to fly with KLM. The KLM team that you can be fully confident in the efficiency, punctuality and friendly attentiveness.

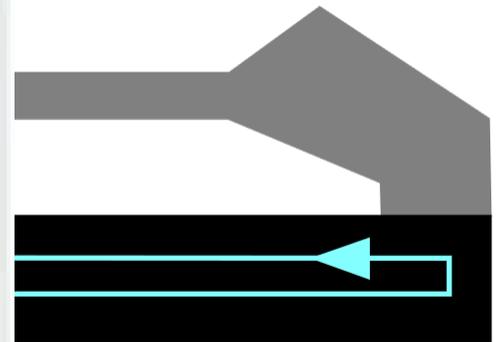
But that is the way the people of Holland are. Their sense of responsibility made KLM a fully international airline. As your local agent will confirm.



What you'll find on board and ground in the cabin, is the same business spirit, the same efficiency, the same attention and courtesy that you'll find in every part of the airline.



A single word from a pilot you hear in KLM's Royal Club Service is punctual, and precise. Chosen for instance, is always repeated all with a choice of seven different suitcases. But that's only in keeping with the spirit that has been the secret to its success for 100 years.



What Happened?

- Misinterpretations and false assumptions before the accident.
 - The KLM captain thought that he had been cleared for takeoff.
 - The Tenerife control tower believed that the KLM 747 was stationary at the end of the runway, awaiting takeoff clearance.
 - It appears that KLM's co-pilot was not as certain about take-off clearance.
- Major factors:
 - Weather conditions.
 - Radio transmission interference.
- Other Factors:
 - Non-standard terminology.
 - Pan Am did not leave the runway at the assigned exit.
 - Crowding of the tarmac/airport.
 - The ATC personnel were listening to a football match on the radio.

What Happened?

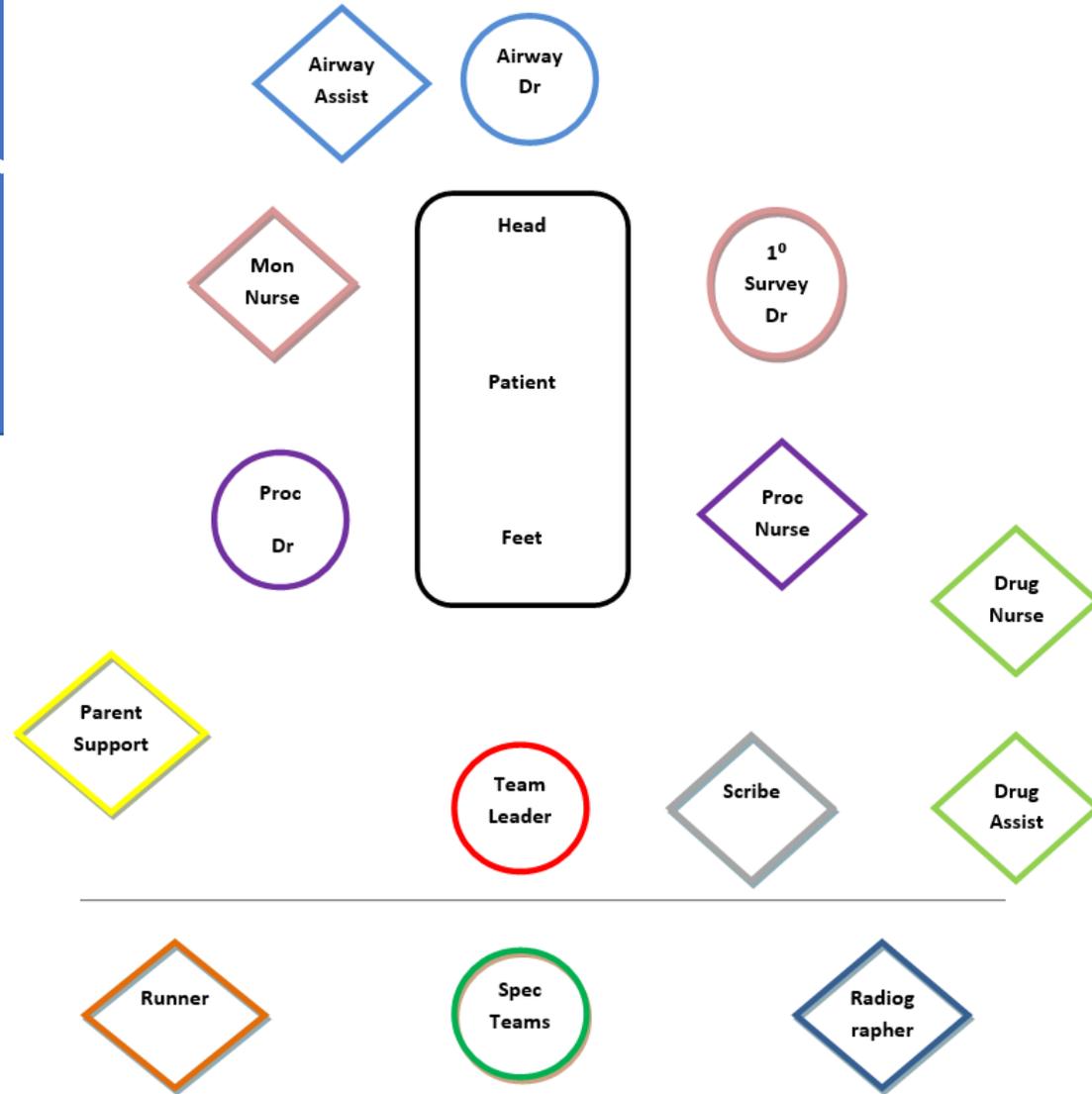
- Specific Human factors:
 - **Personnel.** Captain Veldhuyzen van Zanten, a KLM training captain and instructor for over 10-years working on simulators regularly, had not flown on regular routes for twelve weeks prior to the accident.
 - **Haste.** The KLM crew was concerned about exceeding company duty hours.
 - **Hierarchy.** Apparent hesitation of the flight engineer and the first officer to challenge Veldhuyzen van Zanten further.
 - **Distraction.** The flight engineer was the only member of the KLM's flight crew to react to the control tower's instruction to "report when runway clear"; this might have been due to his having completed his pre-flight checks, whereas his colleagues were experiencing an increased workload, just as the visibility worsened.
 - **Language.** The KLM crew did not realize that the transmission "Papa Alpha One Seven Three Six, report when runway clear" was directed at Pan Am. Previously, the Pan Am had been called "Clipper One Seven Three Six."

Results of Tenerife

- Aviation authorities around the world introduced requirements for standard phrases and a greater emphasis on English as a common working language.
 - Air traffic instruction must not be acknowledged solely with a colloquial phrase but with a readback of the key parts of the instruction.
 - “Takeoff.”
- Flight deck procedures changed.
 - Crew Resource Management (CRM).
 - Situation awareness, fatigue management, assertive communication, team briefings, and debriefings.
 - Mandatory for all flight crews since 2006.
- Resources.

Tener

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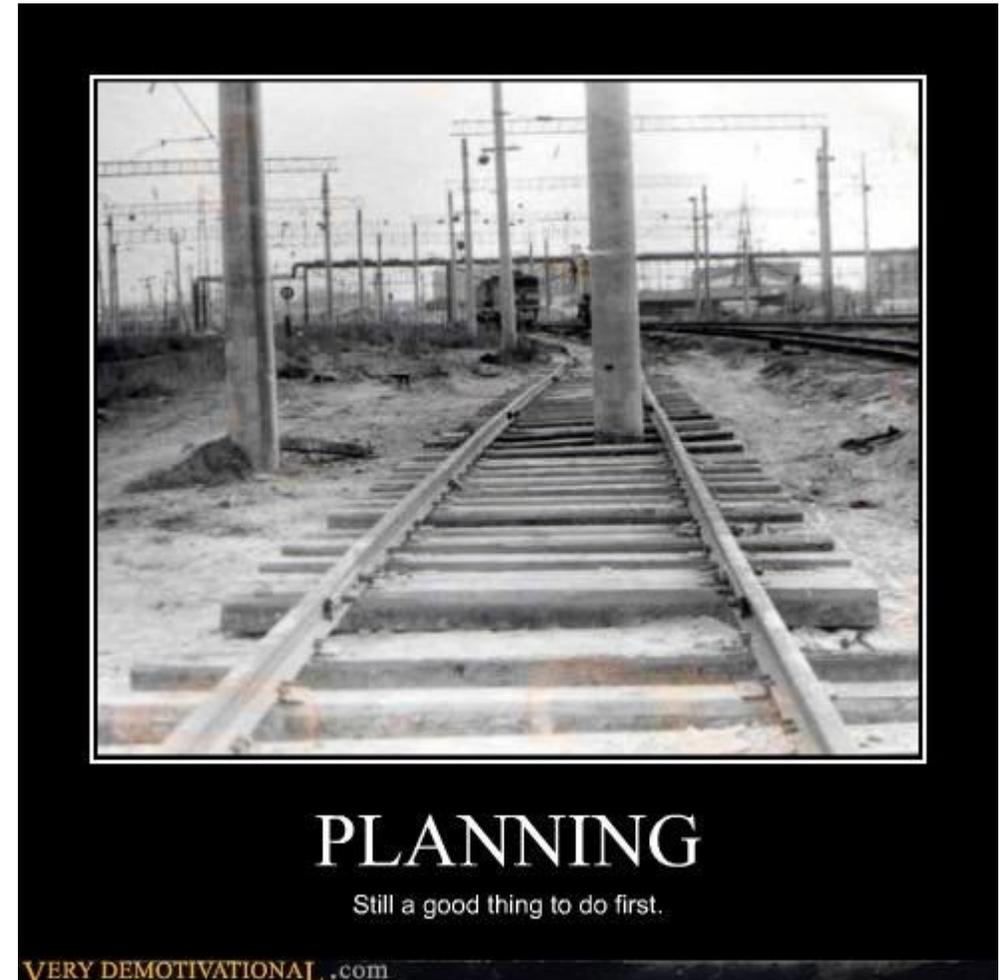


Why Use Simulation?

- Teaching concepts/Education.
- QI initiatives/Assessment.
- Safety Initiatives.
- Process changes.
 - Culture changes.
- Team building.
- Collaboration.
- CME/CNE/Competencies.

Designing a Simulation

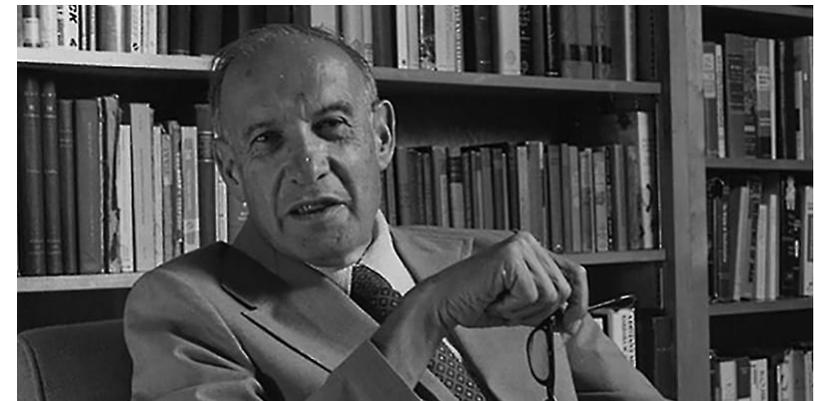
- Planning!
 - Know your learners.
 - Know your goals/objectives.
 - What is/are your outcome(s)?
- Educational Principles.
- Nuts and Bolts:
 - Equipment:
 - Fidelity level.
 - Supplies.
 - Moulage.
- Environment:
 - Safe.
 - Non-judgmental.



Designing a Simulation

Simulation education crosses all fields and disciplines in health care: unit clerks, nurses, techs, administrators, physicians.

- Consider:
 - Learners:
 - What are your desired outcomes?
 - Knowledge/behaviors.
 - What is the purpose of the simulation?
 - Context of the Simulation:
 - Case/patient, fidelity, equipment, and supplies.
 - Goals/Objectives:
 - Goals are what you want the learners to learn.
 - Objectives are what you expect the learner to be able to do at the end of the simulation.
 - Address the domains of learning and ensuring that the objectives correspond to the level of the learner,
 - Are congruent with the overall outcomes,
 - Are evidence-based,
 - Reflect a holistic view of the patient,
 - Are achievable in the given time frame.
 - Adaptability.



Peter Drucker (November 19, 1909 – November 11, 2005)

Designing a Simulation



- Storyboarding.
- Design Template.
 - CASST (California Simulation Alliance Simulation Scenario Template).
 - HPSSDPCT (Human Patient Simulation Scenario Development Patient Care Template).
 - SDT (Simulation Design Template).
 - SIGSST (Special Interest Group Simulation Scenario Template)
 - TSPD (Template for Simulation Patient Design).
- Assessment versus Education:
 - Assessment -> scenarios are at the level of the learner.
 - Education -> scenarios are above the level of the learner.

Flow of a Simulation



Prebrief

Introduction/Orientation/Expectations

Simulation

Debrief



Pediatric Simulation Exercise		Title: G Tube Complication – Sepsis and Progression to Code Blue	
<p>Summary: This child with a G button and history of seizures is admitted for breakthrough seizures and EEG. During the first 24 hours of hospitalization, the G button falls out and is discovered 12 hours later by the child's mother, who, with some difficulty, replaces the button. She tells no one. 12 hours after this event, the child develops peritonitis and sepsis from the misplaced button.</p>		<p>Target Audience: Pediatric Residents</p>	
<p>ACGME Competencies: PC, MK, PBL, ICS, SBP</p>		<p>Duration: 10-15 minutes (SIM) 20 minutes (Dobrie)</p>	
<p>Learning Objectives:</p> <ul style="list-style-type: none"> Evaluate and troubleshoot common problems and complications of feeding tubes including dislodgement and peritonitis. Recognize and manage sepsis. Be familiar with DCMC CRT and Code Blue Activation. 			
<p>Preparation: Location: DCMC Manikin: with GTube capability. Actors: parent. Equipment/Props: Foley catheters (various sizes) to keep stoma open, IV (22 and 24 gauge) with push-pull configuration, suction, oxygen delivery systems (NC, Simple Mask, Non-rebreather Mask), G tube kit, saline flushes.</p>			
<p>Initial Presentation (0-5 minutes):</p>			
CC	Admitted child with G button and breakthrough seizures is febrile, tachypneic, and poorly perfused.	PMH	Global developmental delay, seizure disorder, chronic lung disease, and severe gastroesophageal reflux disease. G button placed for poor weight gain at the age of 3 months. Able to take by mouth ad lib.
HPI	A 9 month old female with G button, chronic lung disease, and complex neurologic/seizure history, admitted for breakthrough seizures 3 days ago. The resident is called to the bedside by the RN secondary to the child developing a fever, tachycardia, decreased mental status, and poor perfusion. A CRT has already been called. The child has been in the hospital for the past 48 hours. She was directly admitted from the DCMC Pediatric Neurology office for an EEG and possible seizure medication adjustment.	SOH	Lives with parents and a 5 year old sibling.
		Med	Trileptal Topamax Keppra Prevacid Albuterol nebs prn Pulmicort
ROS	Breakthrough seizures prior to admission. Hospital Day #3. Has not been febrile during admission until now. No cough, congestion, vomiting, diarrhea, rash. She has had one brief generalized seizure (usual type) upon admission but none since. Has been tolerating bolus feed through the G	All	NKDA

1

Initial Appearance and Actions (0-10 minutes)	Assessment	ACGME Competencies
<ul style="list-style-type: none"> VS T 104F HR 200 BP 70/40 RR 60 Sats 85% RA Lethargic, irritable if stimulated. Tachycardia without murmur or gallop. Mottled cool extremities cap refill 5 seconds, peripheral pulses palpable but weak, dry mucous membranes, AF sunken. Bilateral rhonchi, no wheezing, no stridor; + grunting; equal breath sounds, and good chest rise. Abdomen is firm and distended with decreased BS. Large erythematous indurated area surrounding G button site, tender to palpation. <i>If G button is removed -> pus from stoma site.</i> 	<ul style="list-style-type: none"> Patient already on monitor. Place patient on oxygen: <ul style="list-style-type: none"> If NC -> sats come up to 90%. If Simple Mask -> sats come up to 94%. If Non-rebreather -> sats some up to 97%. Attempt IV placement: <ul style="list-style-type: none"> Choose proper size IV: 22 gauge preferred. Consider placement of 2 IV's. Begin IV fluid bolus NS 20 ml/kg IV push: <ul style="list-style-type: none"> Reassess after 1st Bolus: HR 200 BP 70/40 Perfusion poor with cap refill of 4-6 seconds. REPEAT IV fluid bolus: 20 cc/kg IV push. Reassess after 2nd Bolus: HR 190 BP 75/45 Perfusion improving, but still 3 sec cap refill, cool extremities. REPEAT IV fluid bolus: 20 cc/kg IV push. Reassess after 3rd IVF bolus: HR 170 BP 90/55 Perfusion improving, cap refill 2-3 seconds, cool extremities. <p>A Code BLUE should be called after the first 20-40 cc/kg bolus, or the team may elect to do so prior to fluid administration, since the patient continues to have poor to fair perfusion despite boluses and has a depressed mental status/activity.</p> <p>After third bolus (total of 60 cc/kg): HR improving, BP improving, perfusion improving (see above).</p> <p>Notes:</p> <ol style="list-style-type: none"> The resident should place the oxygen delivery device on the patient. 	

Appearance (10-15 minutes)	Immediate Acceptable Actions	Assessment	ACGME Competencies
<ul style="list-style-type: none"> VS T 101F HR 190 BP 80/45 RR 50 Sats: If NC -> sats come up to 90%. If Simple Mask -> sats come up to 92%. If Non-rebreather -> sats some up to 95%. Perfusion improved, cap refill 2-3 seconds post boluses, cool extremities. Improved mental status – now fussy but if quiet if left alone. 	<ul style="list-style-type: none"> Recognize septic shock. <ul style="list-style-type: none"> Start antibiotics: Vancomycin (15 – 20 mg/kg IV) and Ceftriaxone or Cefepime (50 mg/kg). If not already done: <ul style="list-style-type: none"> Obtain lab work: CBC, CMP, Blood Culture, VBG with lytes/lactate, UA, Urine Cx. Consider imaging: CXR, ABD XR flat/decubitus preferred but because patient is critically ill, only one view of the chest and abdomen are provided. Call Code BLUE. If not already done: <ul style="list-style-type: none"> Tylenol 15 mg/kg(PR, PO) If attempts to give by G button, unable to push meds/fluids through button; If attempts to give by mouth, patient spits it up. Motrin 10 mg/kg. If attempts to give by mouth, patient spits it up; If attempts to give by G button, unable to push meds/fluids through button. Recognize patient will needs transfer to PICU <ul style="list-style-type: none"> Provides concise history surrounding current event to Pediatric Intensivist. Considers consultation with Pediatric Surgery. May consider pressors but do not delay transfer to PICU. 		

General Guideline

Briefly orient participants to debriefing:

1. Remind of safe learning environment and confidentiality.
2. Communicate expectations to be active and vocal in evaluation of their own performance and that of the team.
3. Remind that your role is of facilitator/ guidance, not lecturer.

Potential initial questions:

- What were some of your successes? What would you do differently if given the opportunity?
- How did you perform as a team?

Important Debriefing Points:

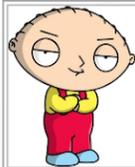
- I. Your patient had fever, tachypnea, and signs of sepsis. What could be some causes of this presentation in this patient?
- II. Often, you don't have time to review a chart in an acutely decompensating patient. Describe how you would obtain a focused history on a decompensating patient: SAMPLE:
 - Signs and symptoms
 - Allergies
 - Medications
 - Past medical history
 - Last meal
 - Events leading up to decompensation
- III. What are some actions to initially take when you suspect sepsis?
 - Ensure ABC's.
 - Obtain IV access (preferably 2 IV's).
 - Send labs if possible, including appropriate cultures.
 - Rapid infusion of NS boluses.
 - Rapid administration of broad-spectrum antibiotics.
- IV. What is the difference between a CRT and Code Blue?
 - Who can activate them?
 - Who responds?
- V. What are some complications of G button replacement?
 - Bleeding, irritation, leakage
 - False tracking can lead to infection and peritonitis, since material is being placed into the abdominal cavity, not the stomach.
- VI. What resources did you use? What resources could you have used to expedite/ facilitate care?
 - CRT/Code Blue Team
 - Broselow Tape
 - Code book/app/code card
 - Code cart

Consultant physicians

- VII. Are there any beside devices or other equipment with which you are not familiar? Did that impact your management of the patient?
- VIII. Other comments, concerns, etc?

Scenario info

Patient data



- Name: Chase
 - Age: 7 year(s)
 - Gender: Male
 - Height: 106 cm
 - Weight: 25 kg
 - Picture
- Include in learner brief

Scenario outline

A 7 year old male is admitted to the floor for vomiting. The team will realize the patient is in a stable SVT rhythm, with no response to either vagal maneuvers or adenosine. The patient will then progress to having an unstable SVT. If the SVT is defibrillated (i.e. - shocked without synchronization), the patient will progress to VT arrest. If the SVT is cardioverted, the patient will clinically improve.

Learner brief

7 year old male with vomiting and diarrhea for the past 5 days. Decreased po intake. Decreased UOP. Low grade fever. Multiple sick contacts at school. Crampy diffuse abdominal pain. No other symptoms. No travel.

PMH: Healthy and immunized.

- Show Learner brief on PM at startup
- Make Learner brief available on PM

Learning objectives

- To review the management of both stable/unstable SVT in an infant.
- Effectively lead a team through PALS algorithms and resuscitation of a child.
- Demonstrate high quality closed-loop communication during resuscitation.

Equipment checklist

- IV access supplies
- Oxygen administration - NC, SM, NRBM
- Adenosine with 3 way stopcock set up
- Defibrillator
- Broselow tape

Support documents

Phases

Phase 1

CORRECT TREATMENT

- Auscultate heart
- Check peripheral pulse Auto Sub
- Check peripheral capillary refill
- Check heart rate
- Check airway patency
- Head-to-toe examination
- Check temperature
- Obtain patient history
- Assess level of consciousness
- Obtain vital signs Auto Sub
- Communicate effectively

Phase 2

Phase 3

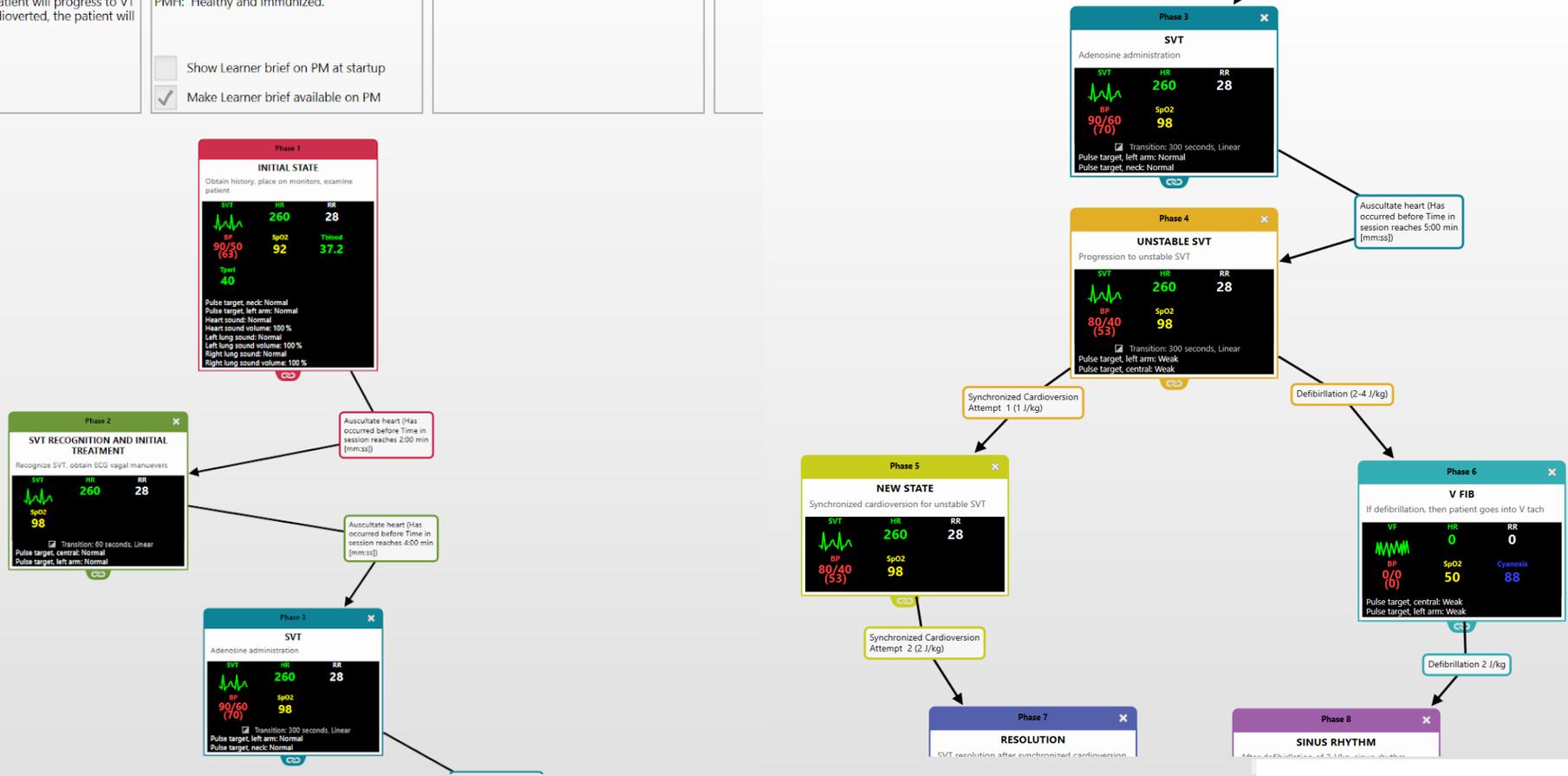
Phase 4

Phase 5

Phase 6

Phase 7

Phase 8

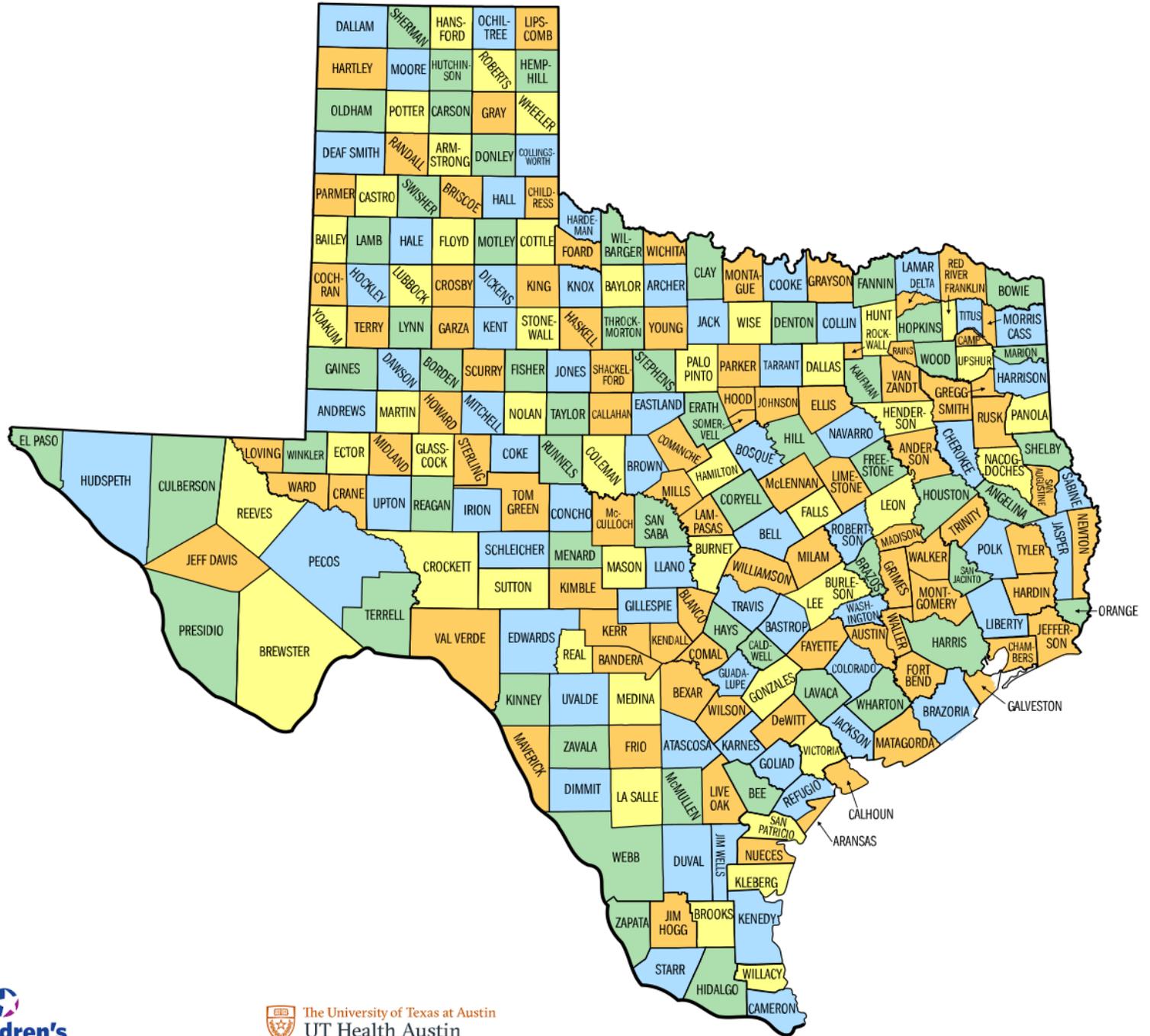


Where to Provide Simulation?

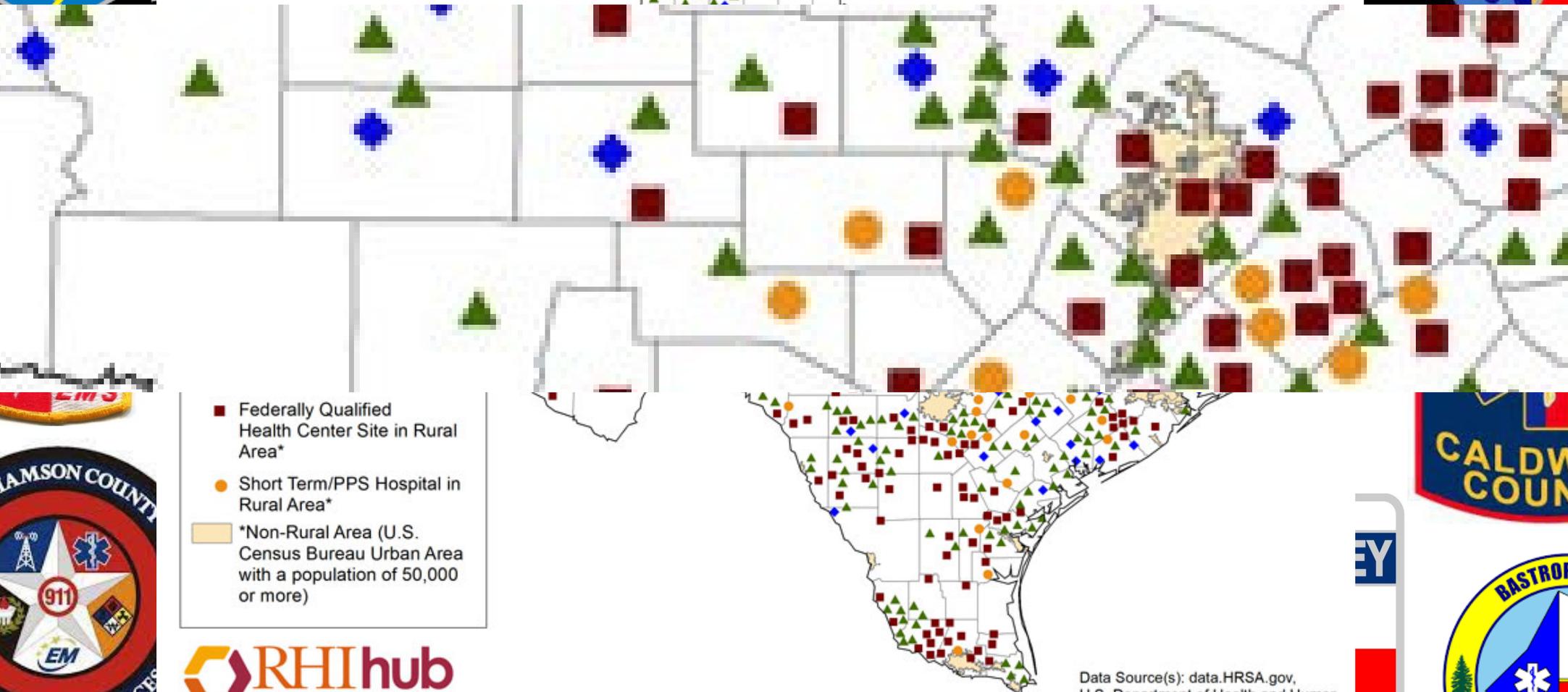
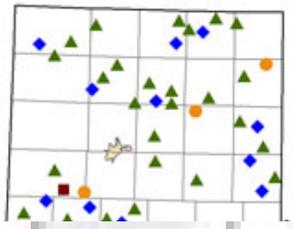
- Depends!
 - Objectives.
 - Audience/Participants.
 - Institution/Resources.

1. DCMC Facilities.
2. EMS.
3. Community/Referral Hospitals.
4. Community Pediatric Practices.

ANYWHERE!



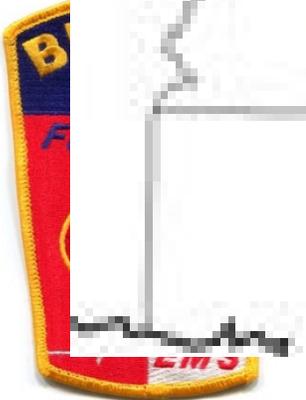
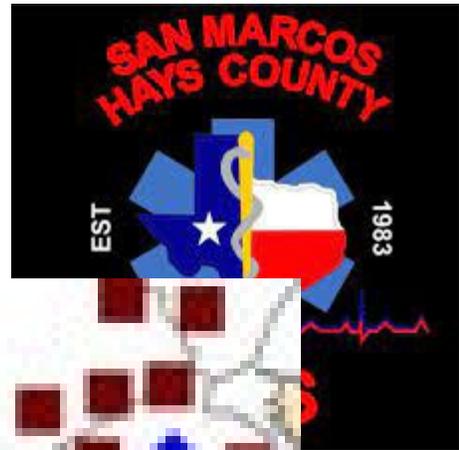
Selected Rural Healthcare Facilities in Texas

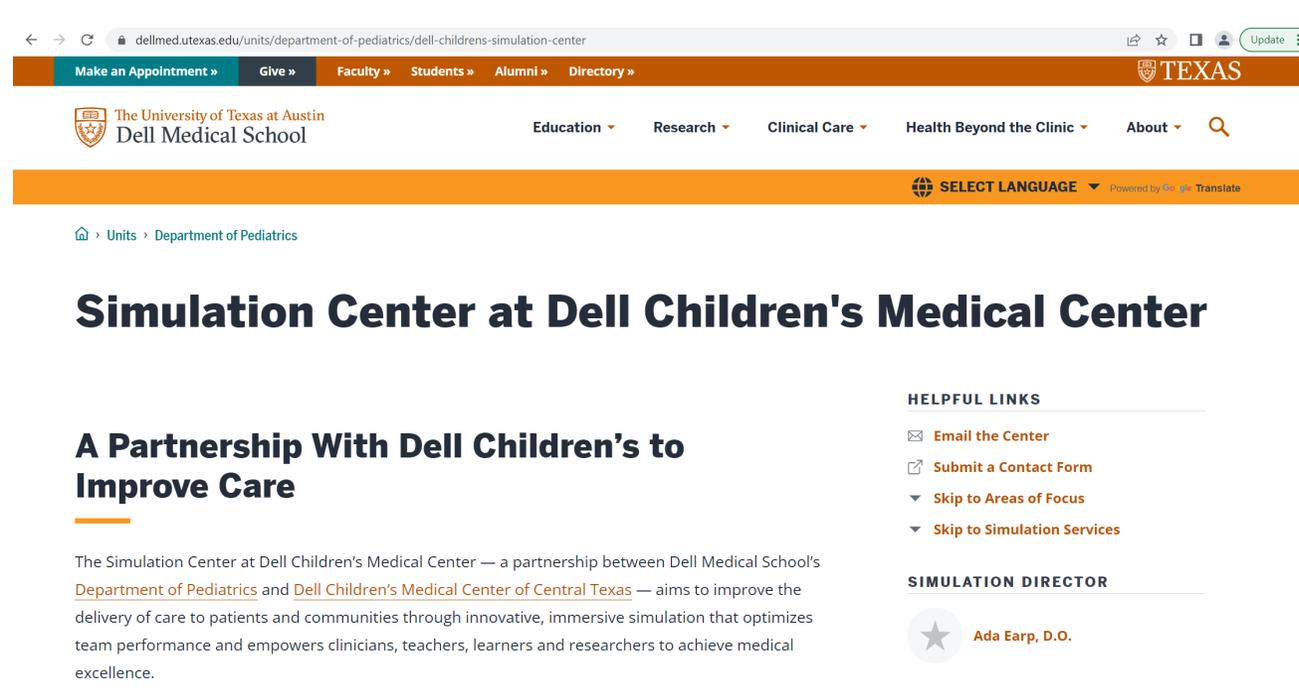


- Federally Qualified Health Center Site in Rural Area*
- Short Term/PPS Hospital in Rural Area*
- *Non-Rural Area (U.S. Census Bureau Urban Area with a population of 50,000 or more)



Data Source(s): data.HRSA.gov, U.S. Department of Health and Human Services, January 2023





Simulation Center at Dell Children's Medical Center

A Partnership With Dell Children's to Improve Care

The Simulation Center at Dell Children's Medical Center — a partnership between Dell Medical School's [Department of Pediatrics](#) and [Dell Children's Medical Center of Central Texas](#) — aims to improve the delivery of care to patients and communities through innovative, immersive simulation that optimizes team performance and empowers clinicians, teachers, learners and researchers to achieve medical excellence.

HELPFUL LINKS

- [✉ Email the Center](#)
- [📄 Submit a Contact Form](#)
- [▼ Skip to Areas of Focus](#)
- [▼ Skip to Simulation Services](#)

SIMULATION DIRECTOR



Areas of Focus

- + [Education & Training](#)
- + [Research](#)
- + [Improved Patient Safety Through Systems Improvement](#)
- + [Community Outreach](#)
- + [Leadership & Advocacy](#)

<https://dellmed.utexas.edu/units/department-of-pediatrics/dell-childrens-simulation-center>

Virtual Reality Simulation

The simulation center's virtual reality point-of-care ultrasound trainers allow users to practice image recognition, transducer placement and scenario integration.

Standardized Patients

Standardized patients are specifically trained to portray the roles of patients and family members. This method of training provides learners with experience in history gathering and physical examination in addition to developing communication skills in a non-threatening environment.

In Situ Simulations

The simulation center provides in situ simulations (simulated scenarios in real clinical environments) in the greater Austin area, bringing simulation-based learning directly to health care providers in their regular clinical practice environment.

Connect & Learn More

To engage with the Simulation Center at Dell Children's or to learn more about its offerings, [submit a contact form](#), or [email the team](#).

[CONTACT THE CENTER](#)



Simulation Services

Specialty areas within the Simulation Center at Dell Children's include general pediatrics, pediatric cardiology, pediatric critical care, pediatric emergency care, routine and high-risk obstetric care, neonatology, transport medicine, and quality and safety.

Immersive, High-Fidelity Training

The simulation center is equipped with more than a dozen full-body, high-technology manikins, ranging in age from infant to adult. High-fidelity training environments include an emergency department room, an intensive care room, and an operating and trauma suite.

The center's training rooms are large enough to simulate full resuscitation events, and observation control rooms come equipped with two-way audio communication. The training rooms also accommodate mobile equipment such as crash carts, ventilators, intubation scopes and more.

Communication equipment includes a large wall monitor for image display and multiple ceiling-mounted pan-tilt-zoom cameras for video-assisted debriefing.

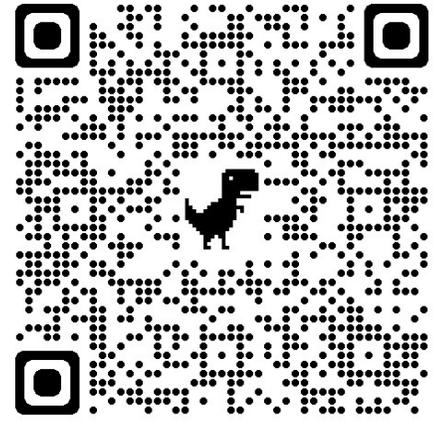
Task Training

The simulation center's range of available task trainers allow practitioners to gain hands-on skills and build competency in the following functions:

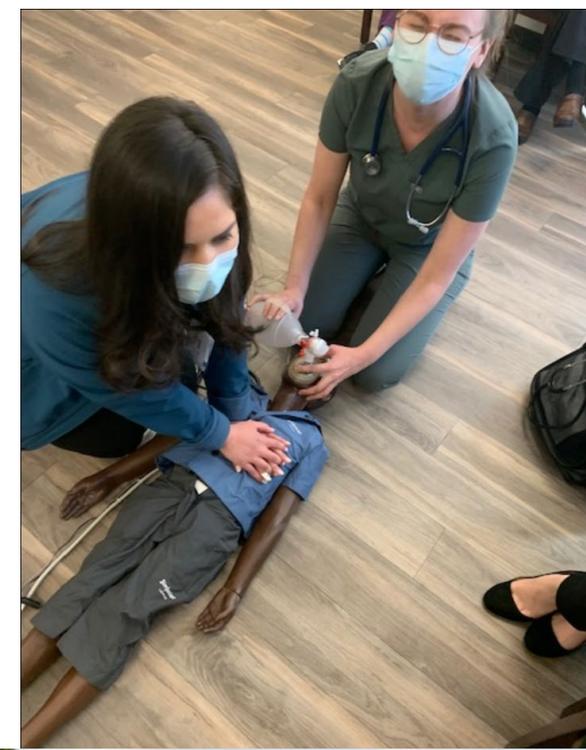
- IV placement.
- Arterial line placement.
- Intraosseous line placement.
- Central line placement.
- Endotracheal intubation.
- Chest tube placement.
- Bag-mask ventilation.
- Lumbar puncture.
- Sterile technique.
- Point-of-care ultrasound use.

Virtual Reality Simulation

The simulation center's virtual reality point-of-care ultrasound trainers allow users to practice image recognition, transducer placement and scenario integration.



Simulation Outreach: Beyond the Sim Center



ImPACTS

IMPROVING PEDIATRIC ACUTE CARE THROUGH SIMULATION

[ASCENSION.ORG](#) > [FIND A LOCATION](#) > [AUSTIN, TX](#)

[PRICE TRANSPARENCY](#) [PATIENT PORTAL](#)

[EMERGENCY CARE NEAR ME](#)



[DEPARTMENTS AND SERVICES](#) ▾

[PATIENT AND FAMILY RESOURCES](#) ▾

[ABOUT DELL CHILDREN'S](#) ▾

[OUR LOCATIONS](#) ▾

[FOR HEALTHCARE PROFESSIONALS](#) ▾

[Dell Children's](#) > [For healthcare professionals](#) > [Evidence Based Outcomes Center](#)

Evidence Based Outcomes Center

Providing best practice resources (guidelines, algorithms, protocols) that are backed by evidence-based research.



Guidelines and algorithms at Dell Children's

At Dell Children's Medical Center, the Evidence Based Outcomes Center's (EBOC) mission is to improve patient outcomes by providing best practice resources (Guidelines/ Algorithms/ Protocols) that are backed by evidence-based research.



In situ pediatric trauma simulation: assessing the impact and feasibility of an interdisciplinary pediatric in situ trauma care quality improvement simulation program

Marc Auerbach¹, Linda Roney, April Aysseh, Marcie Gawel, Jeannette Koziel, Kimberly Barre, Michael G Caty, Karen Santucci

Affiliations + expand

PMID: 25407035 DOI: [10.1097/PEC.0](#)

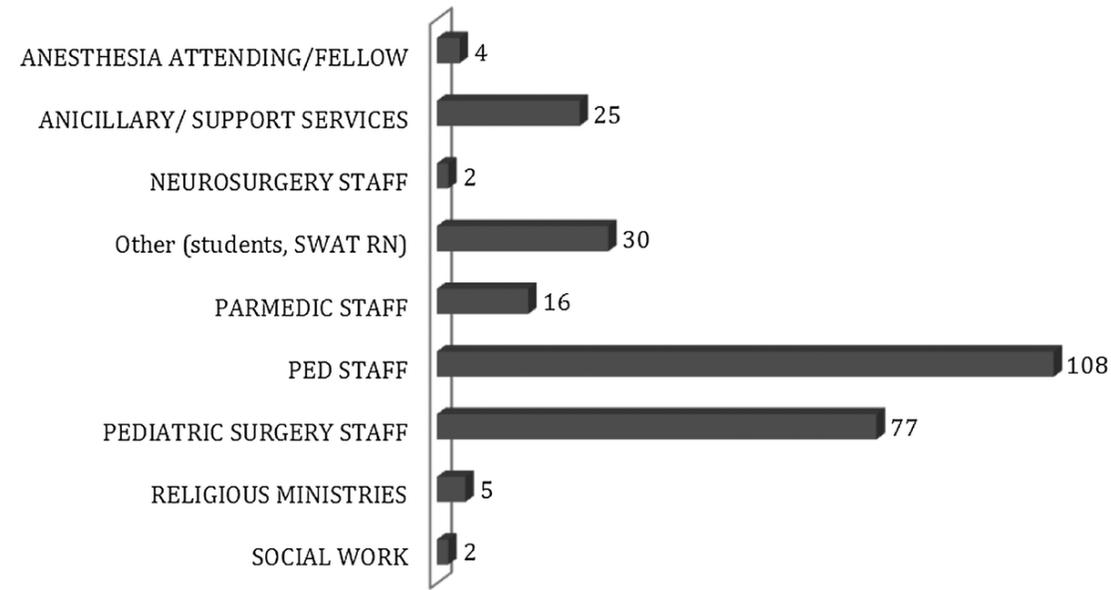
Conclusions: An in situ interdisciplinary pediatric trauma simulation quality improvement program resulted in improved validated trauma simulation assessment scores for overall performance,

Methods: Twenty-two monthly simulation department with the aim of improving teamwork, and intubation. Participants reported high levels of satisfaction with the program, and debriefing was reported as the most valuable component of the program.

2012). Each session included 20 minutes of simulated patient care, followed by 30 minutes of debriefing that focused on teamwork, communication, and the identification of gaps in care. A single rater scored the performance of the team in real time using a validated assessment instrument for 6 subcomponents of care (teamwork, airway, intubation, breathing, circulation, and disability).

Participants completed a survey and written feedback forms.

Results: A trend analysis of the 22 simulations found statistically significant positive trends for overall performance, teamwork, and intubation subcomponents; the strength of the upward trend was the strongest for the teamwork ($\tau = 0.512$), followed by overall performance ($\tau = 0.488$) and intubation ($\tau = 0.433$). Two hundred fifty-one of 398 participants completed the participant feedback form (response rate, 63%), reporting that debriefing was the most valuable aspect of the simulation.



Pediatric Emergency Medicine Disaster Simulation Curriculum: The 5-Minute Trauma Assessment for Pediatric Residents (TRAP-5)

Tavis Dickerson-Young¹, Ashley Keilman², Hiromi Yoshida², Maya Jones², Nathan Cross³,
Anita Thomas²

Affiliations + expand

PMID: 32875090 PMCID: [PMC7449578](#) DOI: [10.15766/mep_2374-8265.10940](#)

Discussion: This educational resource supports the setup, production, and debriefing of a low-fidelity simulation focused on the pediatric trauma assessment for the novice learner. Also included are educational reference materials and a participant evaluation form.

Methods: We developed a simulation-based rapid pediatric trauma assessment curriculum for pediatric residents in the setting of a mass casualty disaster. The patients were 5-year-olds portrayed by mannequins with varying injuries including intracranial hemorrhage, solid organ injury, and open extremity fractures. Critical actions included assigning roles, completing primary assessment within 2 minutes, and giving summary statement and management priorities within 5 minutes using clear communication techniques. We created a badge-sized reference card as well as scenario-specific debriefing tools to facilitate assessment and discussion of learning objectives following the simulation.

Results: We conducted two sessions with a total of 49 participants. The case was rated as highly relevant (session 1, $m = 4.7$; session 2, $m = 4.9$) and realistic (session 1, $m = 4.8$; session 2, $m = 4.4$) by participants on a 5-point Likert scale. During the two sessions participants completed the primary survey in an average of 2.46 and 2.29 minutes, respectively, and the secondary survey with summary statement in an average of 5.08 and 4.27 minutes, respectively.

Preparedness for Pediatric Office Emergencies: A Multicenter, Simulation-Based Study

Kamal Abulebda¹, Matthew L Yuknis², Travis Whitfill³, Erin E Montgomery⁴, Kellie J Pearson⁴, Rosa Rousseau⁵, Maria Carmen G Diaz⁶, Linda L Brown⁷, Robyn Wing⁷, Khoon-Yen Tay⁸, Grace L Good⁹, Rabia N Malik³, Amanda L Garrow¹⁰, Pavan P Zaveri¹¹, Eileen Thomas¹², Ana Makharashvili³, Rebekah A Burns¹³, Megan Lavoie⁸, Marc A Auerbach;
Improving Pediatric Acute Care Through Simulation (ImPACTS)

Results: Forty-eight teams from 42 offices across 9 states participated. The mean emergency preparedness score was 74.7% (SD: 12.9). The mean essential equipment and supplies subscore was 82.2% (SD: 15.1), and the mean policies and protocols subscore was 57.1% (SD: 25.6). Multivariable analyses revealed that independent practices and smaller total staff size were associated with lower preparedness. The median asthma case performance score was 63.6% (interquartile range: 43.2-81.2), whereas the median seizure case score was 69.2% (interquartile range: 46.2-80.8). Offices that had a standardized process of contacting emergency medical services (EMS) had a higher rate of activating EMS during the simulations.

Conclusions: Pediatric office preparedness remains suboptimal in a multicenter cohort, especially in smaller, independent practices. Academic and community partnerships using simulation can help address gaps and implement important processes like contacting EMS.

Creation and Delphi-method refinement of pediatric disaster triage simulations

Mark X Cicero, Linda Brown, Frank Overly, Jorge Yarzebski, Garth Meckler, Susan Fuchs, Anthony Tomassoni, Richard Aghababian, Sarita Chung, Andrew Garrett, Daniel Fagbuyi, Kathleen Adelgais, Ran Goldman, James Parker, Marc Auerbach, Antonio Riera, David Cone, Carl R Baum

PMID: 24401167 DOI: 10.3109/10903127.2013.856505

Results: After two rounds of the modified Delphi, consensus for expected triage level was >85% for 28 of 30 victims, with the remaining two achieving >85% consensus after three Delphi iterations. To achieve consensus, we amended 11 instances of bias toward a specific PDT strategy and corrected 10 instances of noncorrelation between evaluations and simulation.

Conclusions: The modified Delphi process, used to derive novel PDT simulation and evaluation tools, yielded a high degree of consensus among the SMEs, and eliminated biases toward specific PDT strategies in the evaluations. The simulations and evaluation tools may now be tested for reliability and validity as part of a prehospital PDT curriculum.

Randomized Controlled Trial > Prehosp Emerg Care. 2022 Jul-Aug;26(4):463-475.

doi: 10.1080/10903127.2021.1916140. Epub 2021 May 7.

Comparison of Four Methods of Paramedic Continuing Education in the Management of Pediatric Emergencies

Richard L Lammers¹, Maria J Willoughby-Byrwa¹, Duncan G Vos¹, William D Fales¹

Affiliations [+](#) expand



> Front Pediatr. 2022 Jun 14;10:903950. doi: 10.3389/fped.2022.903950. eCollection 2022.

A Statewide Collaboration to Deliver and Evaluate a Pediatric Critical Care Simulation Curriculum for Emergency Medical Services

Caitlin Farrell¹, Kate Dorney¹, Bonnie Mathews², Tehnaz Boyle³, Anthony Kitchen⁴, Jeff Doyle⁵, Michael C Monuteaux¹, Joyce Li¹, Barbara Walsh³, Joshua Nagler¹, Sarita Chung¹

Epub 2021 Jul 20.

Methods Used to Obtain Pediatric Patient Weights, Their Accuracy and Associated Drug Dosing Errors in 142 Simulated Prehospital Pediatric Patient Encounters

John D Hoyle Jr¹, Glenn Ekblad¹, Alyssa Woodwyk¹, Richard Brandt¹, Bill Fales¹, Richard L Lammers¹

testing.**Results:** One hundred forty-seven subjects completed the study. There were no differences in baseline skill levels among the four groups. Only the low fidelity simulation training group demonstrated improvement of combined scenario scores ($p = 0.0008$). Scores for targeted skills improved in one scenario in the high-fidelity group, two in the low-fidelity group, one in the lecture/lab group, and none in the control group.**Conclusions:** Although improvements in those skills included in the training were found in three groups, two hours of training in pediatric emergencies per year was insufficient to produce a substantial improvement overall. Expensive, high-fidelity simulators were not necessary for teaching pediatric resuscitation skills to paramedics; instructive scenarios using low-fidelity manikins and debriefings appear to be adequate. The content delivered by an online refresher course did not provide any improvement in performance as measured by simulated, case-based assessments.



EMS Pediatric Trauma Scenarios

- First: ASK.
- Submersion injury.
 - Head injury.
 - Cervical spine injury.
- Struck by car.
 - Minimal injuries.
 - Hypotensive.
 - Intracranial hemorrhage.
 - Intra-abdominal injury.
 - Femur fracture.
- Penetrating chest injury.
 - Blood/MTP.

Have you previously participated in pediatric resident simulation?

28 responses

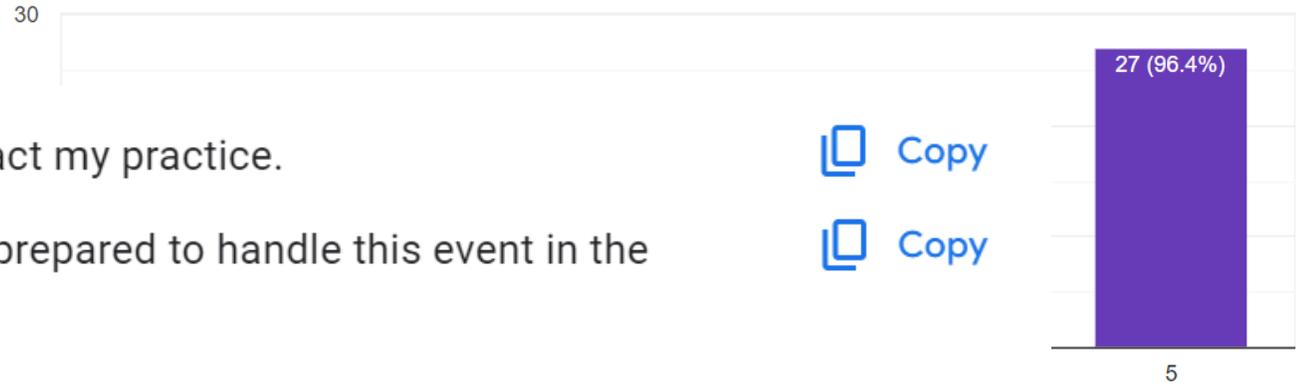


● Yes
● No

The facilitator was effective at conveying concepts and promoting discussion.

28 responses

Copy



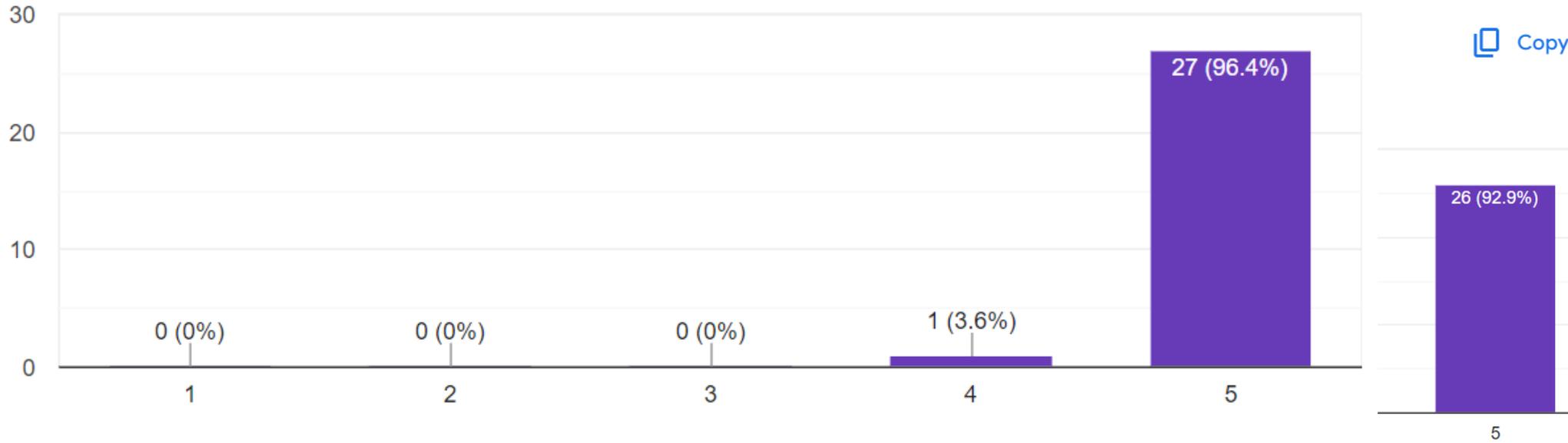
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The information/concepts presented will impact my practice.

After completing this simulation, I feel better prepared to handle this event in the future.

28 responses

Copy



Copy

Scenario: Stop the Bleed

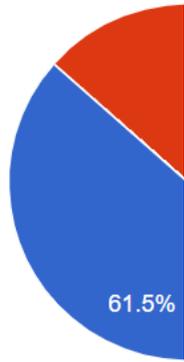


- Issue:
 - Are pediatric residents familiar with Stop the Bleed?
 - Are pediatric residents familiar with Stop the Bleed techniques?
- Solution: Two parts:
 - Teach a Stop the Bleed Course to all DCMC Pediatric Residents.
 - Trauma simulation requiring application of Stop the Bleed principles.
- Goals:
 - Recognition of life-threatening hemorrhage.
 - Appropriate application of Stop the Bleed principles.
- Measured Outcome(s):
 - Improved familiarity with STB techniques.
 - Improved application of STB techniques.



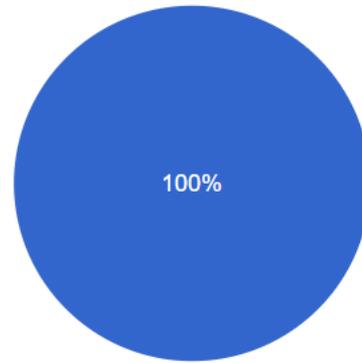
I was familiar with the Stop the Bleed

13 responses



I am comfortable with the use of Stop the Bleed techniques after this session.

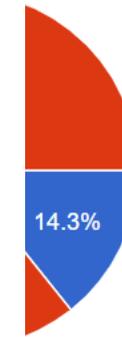
14 responses



● Yes
● No

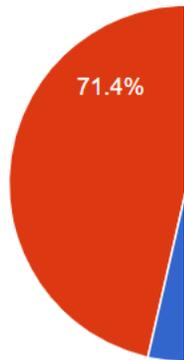
...tourniquets before this session.

● Yes
● No



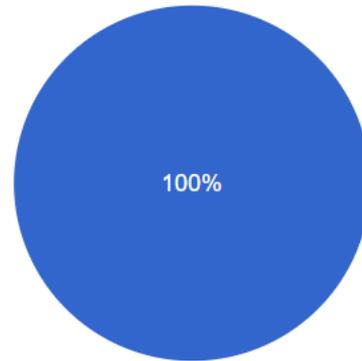
I was comfortable with the use of

14 responses



I am comfortable with the use of tourniquets after after session.

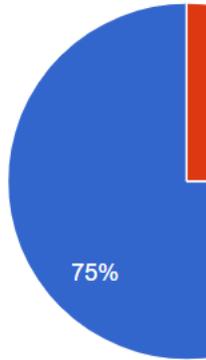
14 responses



● Yes
● No

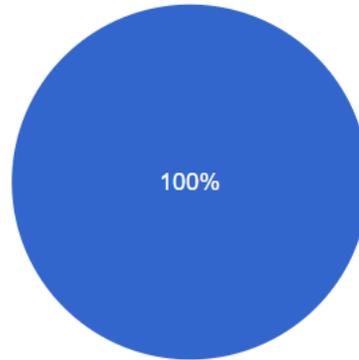
I was familiar with the Stop the Bleed

8 responses



I am comfortable with the use of Stop the Bleed techniques after this session.

8 responses



● Yes
● No

I was comfortable with the use of tourniquets before this session.

● Yes
● No



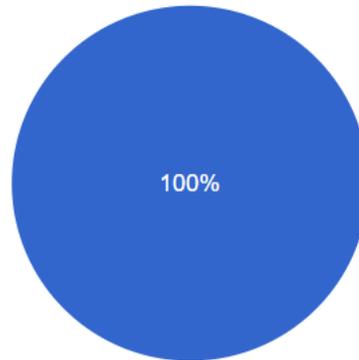
I was comfortable with the use of tourniquets before this session.

8 responses



I am comfortable with the use of tourniquets after after session.

8 responses

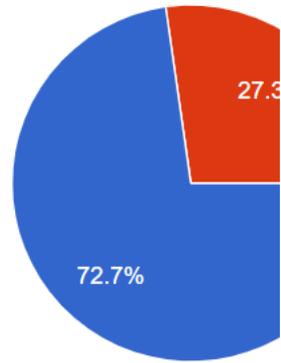


● Yes
● No



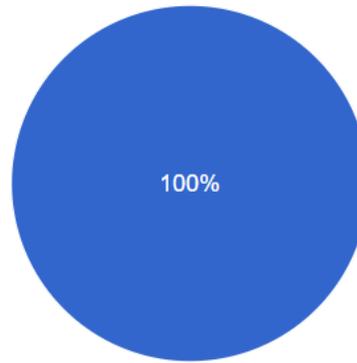
I was familiar with the Stop the Bleed course before this session.

11 responses



I am comfortable with the use of Stop the Bleed techniques after this session.

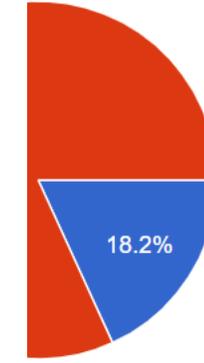
11 responses



● Yes
● No

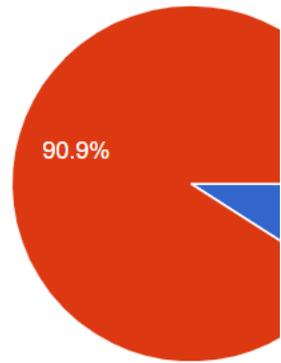
I was familiar with the use of tourniquets before this session.

● Yes
● No



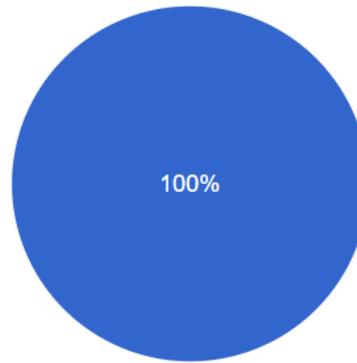
I was comfortable with the use of Stop the Bleed techniques before this session.

11 responses



I am comfortable with the use of tourniquets after after session.

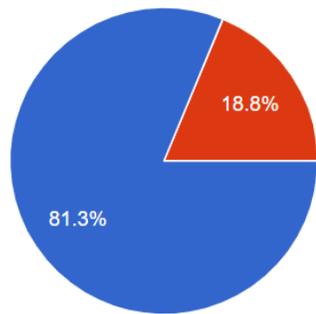
11 responses



● Yes
● No

I was familiar with the Stop the Bleed campaign before this session.

16 responses



I was comfortable with the use of tourniquets before this session.

I am comfortable with the use of Stop the Bleed techniques after this session.

16 responses



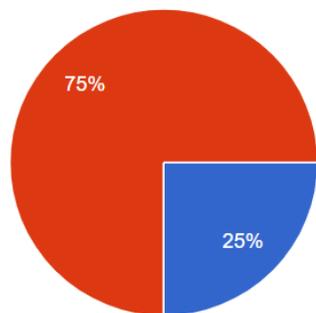
● Yes
● No



● Yes
● No

I was comfortable with the use of Stop the Bleed techniques before this session.

16 responses



I am comfortable with the use of tourniquets after after session.

16 responses



● Yes
● No

Next Step -> To the Community Physicians



Important Points

- Simulation is a time-honored teaching method for medical providers/professionals.
- Simulation does not require high tech capabilities – but these are available and incredible.
- Pediatric trauma care CAN be improved using simulation.
- There are a plethora of resources to support any size simulation program.
- Sim has proven to be an effective, impactful tool for all aspects of pediatric trauma education.

Thanks!



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