How mobile can you go? Making the most of your patient simulator outside of the training facility

Presented By: Lisa Grisham, MS, NNP
David Biffar, MS
# ASTEC Staff

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allan J. Hamilton</td>
<td>Professor of Surgery</td>
</tr>
<tr>
<td>David Biffar</td>
<td>Director of Operations</td>
</tr>
<tr>
<td>Lisa Grisham</td>
<td>Simulation Specialist</td>
</tr>
<tr>
<td>John Jarred</td>
<td>Simulation Specialist</td>
</tr>
<tr>
<td>Hannes Prescher</td>
<td>Research Specialist</td>
</tr>
</tbody>
</table>

Arizona Simulation Technology & Education Center (ASTEC)
University of Arizona, College of Medicine
University of Arizona Health Network

Disclosure information: Research / Education: Karl Storz Endoscopy – America
### Participants and Regular Users of ASTEC

#### College of Medicine
- Medical Students
  - Emergency Medicine Clerkship
  - Surgery Clerkship
  - Internal Medicine Clerkship
  - Pediatric Clerkship
  - Year I and II Societies
  - Year III Intersessions
  - Year III Transition Block
  - Year I Interprofessional CPR
  - CPR Elective
  - Surgery Club

#### University of Arizona Medical Center
- In-Hospital Providers
  - Emergency Medicine Competency Codes
  - In Situ CDU Codes
  - In Situ Diamonds Center PICU Codes
  - In Situ Diamonds Center NICU Codes
  - In Situ Diamonds Peds Step-down Codes
  - In Situ Radiology Code Review
  - In Situ CT Surgery Codes
  - In Situ Emergency Medicine Codes

#### Outside Users
- Residents (UAMC & Kino)
  - Surgery Residents / FLS Testing
  - Emergency Medicine Residents
  - Internal Medicine Residents
  - Family Practice Residents
  - Pediatric Residents
  - OB/GYN Residents
  - Pulmonary Fellows
  - Neurosurgery Residents
  - TMC Residents
  - Resident Simulation Electives

#### Community Outreach
- Neonatal Codes in Nogales
- Neonatal Codes in Sierra Vista
- Office of Outreach and Multicultural Affairs Internship
- ACLS Skills for Mexican Medical Students
- High School and Middle School Programs
- High School Pre-Health Fellowships
- International Fellowships
- Arizona Assurance Students
- Fostering and Achieving Cultural Equity and Sensitivity Pre-Health Program (FACES)

#### Other Groups
- Residents
- First Responder Organizations
- Tucson Fire Department Recertification
- Northwest Fire Department
- LifeNet Aeromedical Evacuation Program
- AirEvac Aeromedical Evacuation Program
- Arizona LifeLine Aeromedical Evacuation Program
- United States Border Patrol (BORSTAR)
- United States Air Force Pararescuemen
- Pima County S.W.A.T.
- Eastern AZ College Paramedics
- UA Campus Health
- Nurse Practitioner Acute Care Students
- Physiology Club
- Med Cats Pre-Health Club
- American Medical Student Association
- Bioengineering Research Rotations
- Undergraduate Pre-Health Independent Study
- Electrical & Computer Engineering Rotations
- Camp Scrubs
- PCCC RN Students
- Telemedicine Programs
In Situ 30%

ASTEC Facility 70%
Objectives

1. Presentation of four simulated case scenarios that are mobilized outside of the facility.
2. To discuss the logistics/outcomes for each case.
3. To discuss what it means to provide in situ training.
4. Discuss strategies for creating a readily mobile simulation environment.
Learner Group: Northwest Fire District, 31 C shift engine and rescue, and an Adaptive Response Unit 342, and Ambulance 831 (12 individuals)
Vehicle 1
Pt 1: 34 yo male driver w/altered LOC & tachycardia
Pt 2: 62 yo NATSO front pass. c/o CP w/ STEMI

Vehicle 2
Pt 3: 38 yo male driver w/ splenic lac / pneumo
Pt 4: 36 yo female front pass part abruption / crowning
Pt 5: 8 yo rear pass compound head injury
Pt 6: 13 mo rear pass minor abrasions
Pt 7: newborn rear pass in distress

Curriculum
http://www.astec.arizona.edu/conferences
Simulation Resource Logistics

Participants:
Northwest Fire Department
Arizona Simulation Technology & Education Center (ASTEC)
Arizona Telemedicine Program
UA Biomedical Communications – TV/Video Production

General Itinerary:

December 14
9:00 AM – 3:00 PM: ASTEC Prep for NWFD La Cholla Station
3:00 PM – 5:00 PM: NWFD arrives with mobile unit to load equipment and return to La Cholla Station

December 15
9:00 AM – 12:00 PM: Setup all simulation equipment
1:00 PM – 5:00 PM: Run practice session
TV/Video to configure all A/V capabilities

December 16
9:00 AM – 12:00 PM: Address any outstanding adjustments to event configuration
1:00 PM – 5:00 PM: Introduction to live event / Run live scenario / Debriefing
Human Resource Logistics

- 5 Sim Technicians
- 3 Operators / 6 mannequins
- 4 Facilitators: 2 NWFD / 2 UA CoM
- 4 TV/AV: 4 UA CoM / 2 NWFD
Distance learning
Strain resources for triage
Sim tech feasibility
Standardized patients
Proof of concept

Outcomes / Lessons Learned
NATSO proceeds with his scheduled robotic CABG procedure.

Develop and test a cardiothoracic (CT) surgical trainer to practice intraoperative conversions from robotic totally endoscopic coronary artery bypass grafting (TECAB) to open coronary artery bypass grafting (CABG) via thoracotomy with the purpose of improving both technical and interprofessional skills.
A NATSO good situation occurs with a Post-Op tamponade
Thoracotomy conversion to address a bleed at the surgical site

Curriculum

http://www.astec.arizona.edu/conferences
Defibrillating the heart
Simulation Resource Logistics

- Develop a procedural trainer that could be used with the da Vinci Robot and for open procedures following a conversion
- Conduct the training in an *in situ* environment
Building the Mannequin
Human Resource Logistics

Scheduling conflicts for in situ
Outcomes / Lessons Learned

- A hybrid of simulation technology
- Confederate / Facilitator Impact
- Specialized kits for conversion
- Significant issues with sterility
- Improved time of performance
- Interprofessional considerations

Measures Based on Time

1. Declaration of code
2. Arrival of code cart
3. Arrival of thoracotomy tray
4. Opening of chest
5. Defibrillation

Overall 96% of all participants reported feeling better about handling this kind of situation in the future.
NATSO
- Post Car Accident
- Post robotic CABG repair
- Post cardiac arrest
- Placed on ECMO
- Need for CT to evaluation neurologic status

NATSO Takes a Trip

Curriculum: http://www.astec.arizona.edu/conferences
Human Factors: Equipment and Elevator
Human Factors: Equipment
Human Factors: Facilities

- Air in the circuit
- Distance from circuit to the machine
- Securing the IV tubing, ventilator, and ECMO cannulas
- Transfer back to the stretcher
Human Factors: Equipment and Elevator
1. Conduct normal start up for your simulator and your computer with MUSE
2. Select the wireless network associated with your simulator (METIman555, iStan1234, etc.)
3. Type the IP address from your browser that is operating MUSE into your browser on the ThinkPad
4. Choose TouchPro Patient Monitor
Human Resource Logistics

Scheduling conflicts

- New adult ECLS staff
- Current PICU ECLS Staff
- Simulation Staff
- CT Scanner
Outcomes / Lessons Learned

• Systems errors/Human Factors
• Interprofessional considerations and scheduling
• Wireless patient monitor
• Operator considerations
• Mannequin considerations
• Realism
NATSO

- Post Car Accident
- Post robotic CABG repair
- Post op complications
- Placed on ECMO
- CT done to evaluate neurologic status
- Transfer to another facility for heart transplant

Curriculum: [http://www.astec.arizona.edu/conferences](http://www.astec.arizona.edu/conferences)
Equipment
- Ventilator
- ECMO machine
- Balloon pump
- IV pumps x 6
- Transport Monitor
Obstacle #1: Ventilator battery dies
NATSO is loaded and last minute checks are completed
Obstacle #3: The ECMO battery dies
Natso settled at the receiving hospital
Human Resource Logistics

Scheduling conflicts

- MOBI Transport Team
- Bariatric Ambulance
- Perfusionist
- Simulation Staff
Define in situ training

Simulations that occur in the actual clinical environment and whose participants are on-duty clinical providers during their actual workday*

What about unannounced?

NIH Summary sheet excerpt:

“in situ simulation isn’t planned and scheduled for the most part—it is a dynamic process that participants are made aware may happen at any time.”

<table>
<thead>
<tr>
<th><strong>Pros</strong></th>
<th><strong>Cons</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>More closely aligned with “actual” work</td>
<td>Difficult to provide equally to all shifts</td>
</tr>
<tr>
<td>Alleviates scheduling issues</td>
<td>Simulation technician challenges</td>
</tr>
<tr>
<td>Excellent for testing human factors</td>
<td>Accounting for medical supplies</td>
</tr>
<tr>
<td>Emphasizes interprofessional skills</td>
<td>Challenging to create universal objectives</td>
</tr>
</tbody>
</table>
Strategies

- Equipment Configuration
- AV Considerations
- Medical Materials
- Planning for availability
Audio-Visual Options
Does this picture show:

a. Good teamwork
b. Group cheer “Go NATSO”
c. 3 people holding the IV tubing up
d. All of the above
Questions?

www.astec.arizona.edu