Gathering of Eagles X

Skills Training and Maintainence with Advanced Patient Simulators

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Pediatric Endotracheal Intubation in the Field

- 2006: TFD's 200 PMs performed 746 intubation. Seven of these were on children aged 4 yrs of less
- Is skill maintainance possible?
- Are some medics better at intubation than others?
- How would one know?
- What's "enough" initial training?
- How often and how to assess skills maintenance?

Pediatric Endotracheal Intubation

- The Good Old Days:
  - Go to the landfill
  - Bag a half dozen stray felines
  - Anesthetize them
  - Spend the afternoon intubating them

Challenges to EMS Skills Training

- Less access to “real patients”
- Less access to “Fluffy” et al
- Competition from
  - Medical students
  - Residents
- Reluctance of MDs and hospital admin to supervise “practice” in elective cases
- Time pressure on MDs and others

Fort Sam Houston
San Antonio, TX

- 2001: Began using advanced patient simulators to train combat medics
- 142 simulators in stock
- Hemorrhage, chest wounds, simulators that deliver babies
- Bad news: $37,000 per simulator
- Also need dedicated space, qualified instructors

Advanced Patient Simulator

- Physiologically real-pulses, breath sounds, heart sounds, etc…
- Generates EKG rhythms, responds to meds
- Chest tubes, crics, needle thoracotomy, intubation, IV starts, NG's
- Respond to different O2/ventilation:
  - BVM, non-rebreather, intubation

ASTEC ARIZONA® SIMULATION TECHNOLOGY AND EDUCATION CENTER

VIRTUAL REALITY CHECK – New Medical Simulation Lab Changes the Way Doctors Are Trained and Patients Are Treated

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ABSTRACT

Pilots spend countless hours in flight simulators prior to flying solo in real aircraft. However, medical students and residents rarely receive the opportunity to practice skills in a safe environment with no human risk, often yielding tragic results. Medical errors are the 8th leading cause of death in the U.S., killing an estimated 44,000-98,000 people and costing $37.6 billion per year.[1]

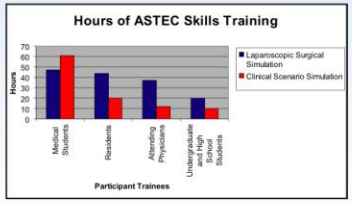
Patient simulation technology has paved the way for students to learn and repeatedly perform complicated procedures. In June 2005, The University of Arizona, College of Medicine opened the Arizona Simulation Technology and Education Center (ASTEC)'s Medical Simulation Laboratory. During the first quarter of operation, this state-of-the-art facility has trained more than 300 medical students, residents and attending physicians in laparoscopic surgery, trauma and critical care, and team building.

INTRODUCTION

Just as flight simulators have made air travel safer, advances in technology have made virtual reality the next step in medical education. The use of simulators and computer-based mannequins in medical training will lead to more efficient and effective learning, potentially reducing complications and ultimately saving lives.

ASTEC's Medical Simulation Laboratory:

- Provides state-of-the-art virtual reality simulation tools for the training of medical students, residents, attending physicians, nurses and emergency medical services professionals.
- Evaluates and expands the use of virtual reality and simulation technology in medicine.



LEARNING OBJECTIVES

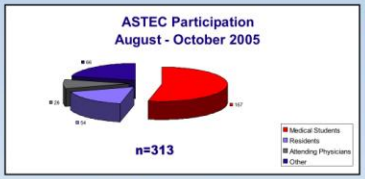
Clinical Simulation

A computer-based mannequin converts to six different physiological conditions and can be programmed to simulate a wide range of medical and emergency scenarios and respond to treatment. The system teaches the students to manage the created scenarios and work as a team to provide appropriate medical care. Students learn not only medical procedures, but also how to assess, diagnose and make critical decisions.

In ASTEC's Medical Simulation Laboratory, students are able to practice over and over again basic and advanced skills, including:

Basic skills — IV insertion, Foley catheterization, airway management, intubation, cricothyrotomy, chest tube, pericardiocentesis, defillibration, cardiac arrhythmias

Assessment, diagnosis and treatment scenarios — anterior myocardial infarction, pneumothorax, Chronic Obstructive Pulmonary Disease with respiratory failure, congestive heart failure, subdural hematoma, asthma with diabetic ketoacidosis, contrast reaction, pulmonary embolism, cardiac tamponade, gunshot wound to the chest, neck fracture.



Laparoscopic Simulation

Minimally invasive surgery requires only small "keyhole" incisions, and offers less pain and faster recovery time. However, most surgeons encounter steep learning curves for using laparoscopic instrumentation. In a simulated operating room environment, participants are able to practice beginning and advanced laparoscopic techniques, including using the equipment, surgical dissection and suturing.

PROGRESS 2005 AUGUST–OCTOBER

Training

During the first quarter of operation, ASTEC's Medical Simulation Laboratory has provided training to more than 300 medical students, residents and attending physicians from all over the College of Medicine. Customized curriculum was developed for clerkship and basic science training in various medical specialties, including: Surgery, Emergency Medicine, Radiology, and Microbiology and Immunology.

In addition to these courses, trainings programs have been developed for organizations outside the College of Medicine, such as LifeNet. Research and training collaborations are being developed with the UA Department of Electrical & Computer Engineering, Arizona Indian Health Service, and U.S. Department of Homeland Security.

Research

ASTEC has started pilot projects on the efficiency and efficacy of using simulation technology in medical education. One study is comparing the learning curves of laparoscopic techniques on various age groups and skill levels. Another project examines the effectiveness of remote training using telemedicine and telepresence technology.

Reference

1AHRQ Focus on Research: Patient Safety. AHRQ Publication No. 02-M021. March 2002. Agency for Healthcare Research and Quality, Rockville, MD

Advanced Patient Care Simulators

- More lifelike
- “Active” give visual, tactile and audio clues
- Permit more skills to be practiced
  - Intubation
  - Crycothyrostomy
  - IV placement
  - Needle decompression pneumothorax

Background on the collaboration

Objective:
Improve skills and judgement of paramedics

- Submitted proposal
  - Cost was determined by a combination of ASTEC staff and our finance and business office
  - Less expensive than building own Sim Lab
  - They cut TFD a Deal
- Trial runs with training captains

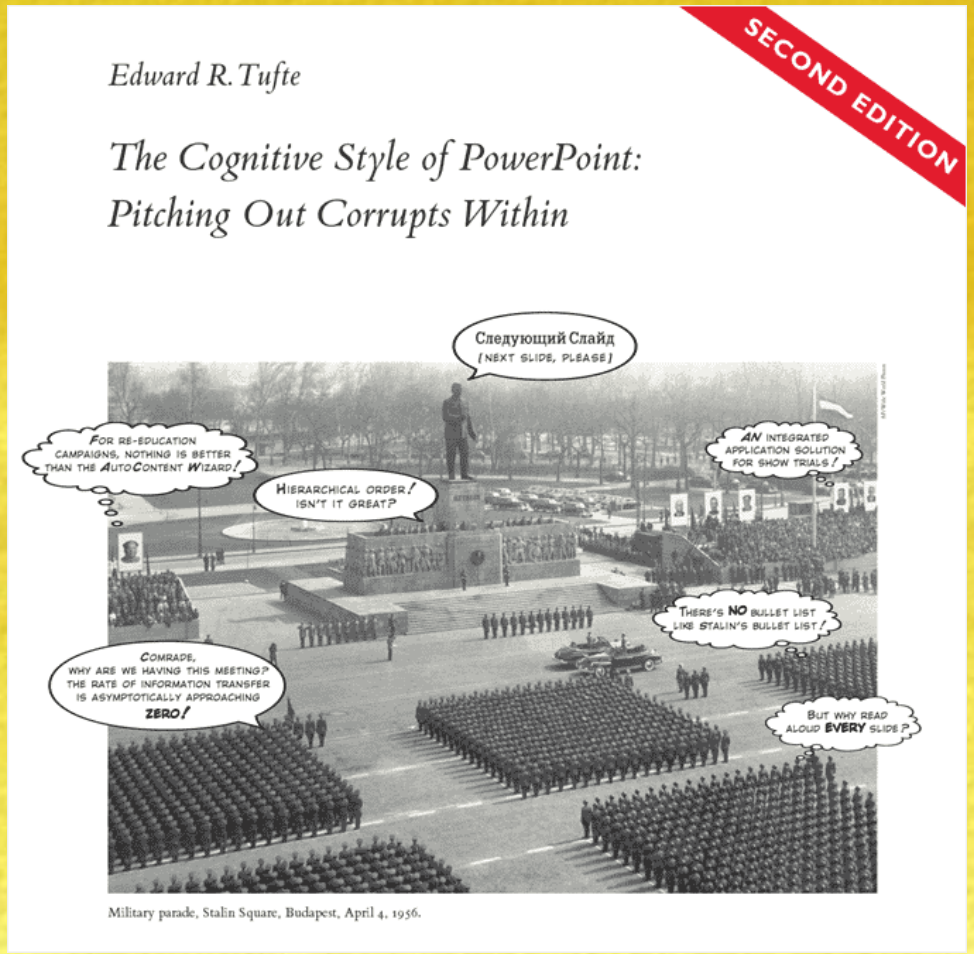
The details

- 260 medics in 3 months
  - 8 weeks
  - Average week ran 12 - 24 hours
  - 1 hour case, 2 medics per group
- Case was identical for each group
- Had to be scheduled in addition to our normal ASTEC classes (20 - 30 hours week)

Prostate exam simulator aka “The Fowler 2000”

Limitless Possibilities

PowerPoint Makes You Stupid



Reference

How to Save A Soldier

"Google" the title and add New York Times