Using healthcare simulation to explore resilience: A novel approach to patient safety
Emergency in the Operating Room
Healthcare Simulation can be used to understand and improve

The technical and non-technical skills of **individuals**
Individual skills

Intubation
Healthcare Simulation can be used to understand and improve

1. The technical and non-technical skills of **individuals**

2. The technical and non-technical skills of **teams**
Manage the trauma team as well as the patient.
Healthcare Simulation can be used to understand and improve:

1. The technical and non-technical skills of **individua**ls

2. The technical and non-technical skills of **teams**

3. The characteristics of **Systems**
   - Local/Micro
   - Department
   - Committee
   - Organization
   - Care cycle
   - Work flow

Patterson, MD
Deutsch, MD
Fairbanks, MD
Jacobson, MD
Wears, MD
PhD

RHCN 2014
3

Systems

Iterative improvement of post-partum hemorrhage protocols and processes

Test and refine before implementing

Patterson, MD
Deutsch, MD
Fairbanks, MD
Jacobson, MD
Wears, MD PhD

RHCN 2014
Healthcare Simulation

Need

Regular/ Irregular threat

?manikin

Scenario / “story”

Learning

Simulator

Simulation

Debrief

PhD

RHCN

2014
Low technology
High technology

Full sized, human manikins

• Breathe, chest wall motion
• Palpable pulses
• Reactive pupils
• Respond to interventions
• Vital signs displayed on monitor in real time
Biologic tissue

Living or Non-living
Virtual

Images:
• Courtesy of Greg Wiet
• https://www.youtube.com/watch?v=7wDMega3Ss accessed 8/1/14
• Simbionix.com
Human!
Debriefing
In situ systems practice: fire in the operating room
Make it Real!

- Real Teams
- Real Equipment
- Real Setting

Video edited by Brian Pio
Resilience: A Texas perspective

“There’s rules to riding a horse
But the horse won’t necessarily know ‘em”

--Texas Bix Bender
Simulation can replicate any part of a system.
Patient Care “Quarterback”

Simulation Practices And Goals

In theory there's no difference between theory and practice. In practice there is."
-Yogi Berra
• Incidents provide indication of adaptive capacity and changes in adaptive capacity

• Simulation provides means to evaluate this

Woods and Cook, Resilience Engineering: concepts and precepts 2006 p69
Habituation

• Don’t notice that which goes smoothly, nor do we think it is necessary to do so.

• Neither is there any motivation to try to understand why things went well

• Because nothing bad happened.

Hollnagel, A tale of Two Safeties, 2012

http://jimtjr.blogspot.com/
Bridging sciences in Resilience Engineering research and training. MINES ParisTech accueille le "Deans Forum, 2nd workshop on Resilience Engineering"
Monitoring
Responding
Responding
Requisite Imagination

- Ability to anticipate when and how calamity might strike
  - Learn from experience
  - Processing “faint signals” - symptomatic events, suspected trends, gut feelings and intelligent speculation
    - Columbia shuttle disaster
    - Simulation?

Westrum, Resilience Engineering Concepts and Precepts. 2006, p59
Learning
Types of Threats

- **Situation 1: regular threat**
  - Occurs often enough to develop a standard response

- **Situation 2: irregular threat**
  - Apollo 13: entirely unexpected but not impossible or unimaginable
  - Tests organization’s ability to self-organize and respond to event (improvisation)

Remaining Sensitive to the Possibility of Failure, 2008 & Westrum, Resilience Engineering: Concepts and Precepts, 2006 p 57
Anticipating
• **Situation 3**: the unexampled event
  – 9/11

  – Tsunami: Southeast Asia 2009

• Requires shift in mental framework
Work as Simulated brings us closer to Work as Done