Practice Makes Perfect
Using technology, simulation, and standardized patients

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Disclosures

None
A Question for You

Your experience…

- How did you learn the skills you use every day?
- And what about skills you only need on rare occasions?
Practice makes perfect: Simulation and more

Objectives

- Understand the challenges with skill practice in health professions education
- Define simulation and identify different simulation modalities
- Describe the use of simulation and related educational strategies in HPE
- List limitations and challenges associated with simulation
Practicing Skills in Health Professions Education

- There is only so much you can read in a book
- Perfection comes from practice
- Experiential learning model
"Whoa! Watch where that thing lands—we’ll probably need it."
“Correct. And in the case of a cardiac arrest, every second counts. Who can tell me why? Anyone? Clock’s ticking.”
Deliberate practice: Path to Expertise

THE FIVE PRINCIPLES OF DELIBERATE PRACTICE

- PUSH BEYOND one’s comfort zone
- Work toward well-defined, SPECIFIC GOALS
- FOCUS intently on practice activities
- Receive and respond to HIGH-QUALITY FEEDBACK
- Develop a MENTAL MODEL of expertise

KANBAR Center
UCSF
Deliberate Practice

- Just Practice vs. Deliberate Practice
See, Bernard? Julia’s approach was just that tad more sensitive. OK—so who wants another crack at breaking the bad news?
Practice on real patients..... 

....Or fake ones?
Simulation for practice in healthcare
What is simulation?

- “To do or make something which looks real but is not real”
  - Dictionary.com

- “An educational modality with which the learner physically interacts to mimic an aspect of clinical care for the purpose of teaching or assessment”
  - Adapted from Cook et al, Med Teach. 2013
Simulation for patient care practice: CPR

Resusci-Anne
THE LIFE-SIZE and LIFE-LIKE MANIKIN for TEACHING and TRAINING of CARDIOPULMONARY RESUSCITATION (CPR)

VENTILATION
- Mouth-to-mouth
- Mouth-to-nose
- Mouth-to-adjunct
- Bag/mask

EXTERNAL CARDIAC COMPRESSION (ECC)
- Trainee learns
  - to feel the carotid pulse
  - to check pupils
  - to locate pressure point for ECC to avoid injury to patient
  - to exert correct amount of pressure on sternum
  - timing and ratio of compressions to inflations with one rescuer, or with two rescuers operating together.

REALISM motivates effective CPR training.

RESUSCI-ANNE features:
- realistic simulation of the human respiratory system
- natural resistance of thorax during ECC
- human appearance with a life-like consistency of skin
- natural mobility of head and jaw
- realistic weight of head and shoulders

Resusci-Anne comes with all necessary equipment contained in one carrying case for ready portability. The body of the manikin can be inflated and all equipment arranged for a teaching and practice session in the course of a few minutes.

Easy cleaning and disinfection makes cross-infection no problem. Furthermore, air exhaled from the manikin after lung inflation is let out through a valve in the neck rather than through mouth and nose, to protect the trainee.

Resusci-Anne is the universally accepted training manikin for CARDIOPULMONARY RESUSCITATION. More than 40 million people in 120 countries have been trained with Resusci-Anne.
High stakes, rare events
History taking and physical exam
Simulation: the mannequins
Simulation: the body parts

Partial Task Trainers
Simulation: the actors

Standardized patients

- Actors trained to portray patients, and give feedback as a patient
Which one is best for what?

Different types of simulation can be used for different educational objectives

Hybrid simulation

- Standardized Patients
  - History taking
  - Communication skills
- Mannequins
  - Clinical reasoning
  - Clinical exam skills
  - Teamwork
- Task Trainers
  - Resuscitation skills
  - Procedural skills
Hybrid simulation
Hybrid simulation
Simulation in health professions education

From admission to post-graduation:

- Mini-medical interviews with actors (standardized patients)
- History and physical exam
- Procedures – basic and advanced
- Clinical reasoning and management
- CPR and advanced life support training
- Crisis management and team work
- Difficult conversations, ethics, etc.
Admission interviews

“Mini-medical interview”

- Brief simulation exercise, typically with actors (SPs)
- Can encompass multiple stations / case scenarios
- Typically focused around ethical decision making, communication skills
History taking and physical exam
Procedural skills
Clinical reasoning and management
CPR and advanced life support skills
Teamwork
Difficult conversations, ethics, more...
Limitations: It is simulated, not real

"Fidelity"

- Equipment
- Environment
- Psychological
Fidelity

Or functional task alignment?
Translation to clinical practice

If you’re competent in simulation, are you competent in real life?
Translation to clinical practice

Evidence from the literature

Use of Simulation-Based Education to Reduce Catheter-Related Bloodstream Infections

Background: Simulation-based education improves procedural competence in central venous catheter (CVC) insertion. The effect of simulation-based education in CVC insertion on the incidence of catheter-related bloodstream infection (CRBSI) is unknown. The aim of this study was to determine if simulation-based training in CVC insertion reduces CRBSI.

Methods: This was an observational education cohort study set in an adult intensive care unit (ICU) in an urban teaching hospital. Ninety-two internal medicine and emergency medicine residents completed a simulation-based mastery learning program in CVC insertion skills. Rates of CRBSI from CVCs inserted by residents in the ICU before and after the simulation-based educational intervention were compared over a 32-month period.

Results: There were fewer CRBSIs after the simulator-trained residents entered the intervention ICU (0.50 infections per 1000 catheter-days) compared with both the same unit prior to the intervention (3.20 per 1000 catheter-days) \( (P = .001) \) and with another ICU in the same hospital throughout the study period (5.03 per 1000 catheter-days) \( (P = .001) \).

Conclusions: An educational intervention in CVC insertion significantly improved patient outcomes. Simulation-based education is a valuable adjunct in residency education.

Arch Intern Med. 2009;169(13):1420-1423
Limitations: Resource intensive

- Time, people, equipment, space
  - How to do this most effectively and efficiently?
  - Can you learn from watching others?
  - What equipment helps achieve the best learning?
UCSF Simulation Center
UCSF has a large SP pool: 150-200 active SPs
Most are professional actors (supplemental income)
For many more than “just a side job”
Regional & national organizations
Number of Learners

- 2011-12: 8,761
- 2012-13: 11,544
- 2013-14: 12,805
- 2014-15: 13,228
- 2015-16: 14,472
- 2016-17: 16,817
Learners by School

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>SOM</td>
<td>School of Medicine</td>
</tr>
<tr>
<td>SON</td>
<td>School of Nursing</td>
</tr>
<tr>
<td>SOP</td>
<td>School of Pharmacy</td>
</tr>
<tr>
<td>SOD</td>
<td>School of Dentistry</td>
</tr>
<tr>
<td>IPE</td>
<td>Interprofessional Education</td>
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</tbody>
</table>

**SOM**

**SON**

**SOP**

**SOD**

**IPE** Interprofessional Education
Utilization

2011-12: 48%
2012-13: 62%
2013-14: 70%
2014-15: 73%
2015-16: 82%
2016-17: 91%
Affiliated programs

- UCSF Benioff Children’s Hospital “Mock Code” Program
  - Every unit in the children’s hospital
  - Interprofessional
  - More than 60 sessions per year
UCSF Simulation and the community

Outreach, research, education

- **Connections within UCSF:**
  - Faculty development, simulation fellowship, research

- **Connections with other simulation centers:**
  - UC consortium, membership in California Simulation Alliance

- **Connections with community:**
  - American Heart Association CPR training (in partnership with UCSF PD)
  - Summer intern program and other outreach
Summary

- Simulation refers to a variety of educational strategies to help learners in the health professions acquire patient care skills.
- Powerful strategy to allow for repeated practice, feedback, gradual increase in mastery.
- Allows for exposure/experience with low frequency, high stakes events.
- Safe for patients, safe for learners.
- Can prepare for, but can’t replace real life practice.
Questions?
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