

State of Simulation-Based Research -What are the problems?

Joshua Hui, MD, MSCR, FACEP



Director of Simulation
UCLA-Olive View Emergency Medicine

Chair,
Research Committee, SSIH
Scientific Contents Committee, IMSH

Disclosure

- none



Preface

- After reviewing over 2000 IMSH abstract submissions in the past 4 years and over 150 research applications in SSIH research grants and US DoD grants, I will discuss common bottlenecks of simulation-based research
- help understand the current state of research in simulation.

Preface

- What is Research?
 - The systematic investigation of objects, events, or phenomena in order to establish facts and reach new and valid conclusions.
 - Results and conclusions have to be communicated in a way that they can be replicated and confirmed by others

Bottlenecks

1. Perception of Simulation Definition

- Pre-determined and fixated concept of what simulation is
- Simulation concept does not revolve around the simulator.
- The concept of simulation is as broad as real life – in that it imitates real life. The benefits of simulation is that researcher can take out one tiny but important aspect of real life, simulate it, explore it and repeat it endlessly with different technology and modality available
- Examples: standardized patients, virtual reality, low/high fidelity simulator, modeling, computer simulation.

- With this fixated mindset of simulation, the broadness of research question is limited.
- The physicality of simulator can serve as a confounding variable in research in terms of construct validity

Research Question

- Lack of novelty
 - DA Cook's meta-analyses
 - Simulation does work and at least non-inferior with other instruction
 - How to make it better in terms of delivery and debriefing is seen very little.
 - Did Dr. Ruldoph use any simulator to study how to debrief better in a difficult situation?

- use of simulation as research tool
 - limited by validity of the construct and reliability of outcome measures when the result is extrapolated into real world setting
 - overall 5-10% of all abstract submitted fall into this category
 - the limit of this research tool is being pushed
 - too many questions that can only be answered by simulation? How to predict the communication error by different personality trait of physicians and nursing? How to explore the cognitive errors of mistake making of senior physicians?

Finances

- driven by major simulation manufacturers
 - developed technology innovation track 2 years ago
 - amazing submissions and concepts developed by end user with limited financial resources
 - democratization of simulation technology. Remember how firefox destroyed the monopoly of Microsoft internet explorer?

- do not always need a one million dollar sim lab to run sim, nor do you need a \$100,000 mannequin to do either simulation research or education

The Future

- Why is aviation simulation a standard?

- And why in healthcare simulation is still not considered a must have or a standard in either training or analyzing?

- Because the studies only could show at best most simulations are only non-inferior to other teaching methods..
- Because your hospital CEO, CMO, and COO think there are other alternatives

- When the demand is still less, and the competition is still small among the companies, why do you think the companies need to make a better and cheaper products?
- Without these cheaper and better products, there will be less people being able to afford coming into simulation, and less new ideas from less research.

- Only more fundamentally sound simulation-based research that shows simulation-based modality is better than other modalities in improving patient outcome can turn things around...
- Simulation in healthcare has just begun, but the research behind it already sees numerous bottlenecks.

Bring Home Points:

- Think outside of the physicality of the simulator
- Redefine what simulation is to you and how it can help the question you have to answered. These questions are either posted by your supervisor, works, or own intellectual curiosity
- Move away from doing research that show simulation is better than no intervention. Use simulation to study something else.

- 2013 Nobel Prize in chemistry went to researchers who uses computer modeling to simulate and study how enzyme and chemical bonding works.
- And that is an example simulation in healthcare outside of the bottlenecks I mentioned.

Questions?

Thank you!