

# Should Healthcare Follow Aviation & Require Periodic Testing?

February 4, 2021 8:00 – 9:00 am

Teresa Gore

Timothy Whitaker

Andrew Spain

SIMULATION:  
BRINGING LEARNING TO LIFE

#IMSH2021

# WELCOME

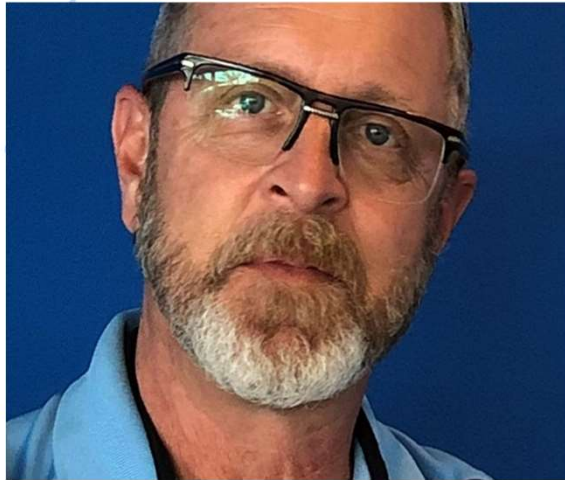


## Teresa Gore

**PhD, DNP, APRN, FNP-BC,  
CHSE-A, FSSH, FAAN**

Dr. Teresa Gore is a Past President of INACSL. Her simulation work focuses on improving patient safety, quality patient care and interprofessional education. Dr. Gore has published on simulation topics, including articles on simulation use, chapters on simulation, and the INACSL Standards of Best Practice: Simulation in along with being an invited presenter nationally and internationally.

# WELCOME



## Tim Whitaker, AS, BS, CHSE, CHSOS, EMT-P

A passionate and highly effective simulation educator certified by the Society for Simulation In Healthcare (CHSE). Excellence in interdisciplinary curriculum development and presentation of education programs for emergency medical technicians, paramedics, nurses, allied health, and physicians. Proven ability to design, measure and provide high fidelity simulation. I maintain the ability to manage, and integrate simulation programs into educational curriculum, which has measurable outcomes. Experience with center management, consulting and construction. These proven skills transcend all levels of education from profession specific to college settings including undergraduate and graduate training, targeting the methodology of the adult learner. Active in associations and study related to education using simulation and most medical disciplines.

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# WELCOME

## Andrew Spain, MA, EMT-P/NRP



Andrew Spain is the current Director of Certification for the Society for Simulation in Healthcare. He has been a Paramedic for over 25 years and has been involved in educating in EMS since the beginning of his career. More recently, he directed the EMS Education program at the University of Missouri. This involved educating existing and future Paramedics and EMTs, and also providing continuing education to many healthcare professions.

He received a Bachelor's Degree in Political Science from the University of Northern Colorado, and a Master's Degree in Political Science from the University of Missouri. He is currently a PhD student at the University of Missouri in the Educational Leadership and Policy Analysis program, where he is now completing his dissertation work.

He continues to educate paramedics and other healthcare professionals as opportunities allow. He is oriented towards educating other healthcare educators and is focused on improving patient safety through the dissemination and promotion of high-quality healthcare simulation activities.

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# Objectives

Upon completion of this presentation, the learner will be able to:

1. Compare and contrast the aviation and healthcare simulation constructs
2. Describe how to integrate aviation concepts and techniques into healthcare simulation for ongoing periodic summative evaluation and training
3. Summarize the potential positive and negative impacts for healthcare requiring periodic simulation evaluation to maintain license and/or certification

# Plan for Today

## Compare and contrast

Aviation and healthcare simulation constructs

## Describe

How to integrate concepts and techniques into healthcare simulation for ongoing periodic summative evaluation and training

## Summarize

The potential positive and negative impacts of healthcare requiring periodic simulation should be required periodically for healthcare providers

# Question

**Do you think simulation should  
be required periodically for  
healthcare providers?**



Why do we care about this?



283



• 113,200-400,000\*

2,600,000\*



# Let's chat about those numbers (briefly)



Do you believe them?



Do you find it fascinating  
that we can only make  
estimates?



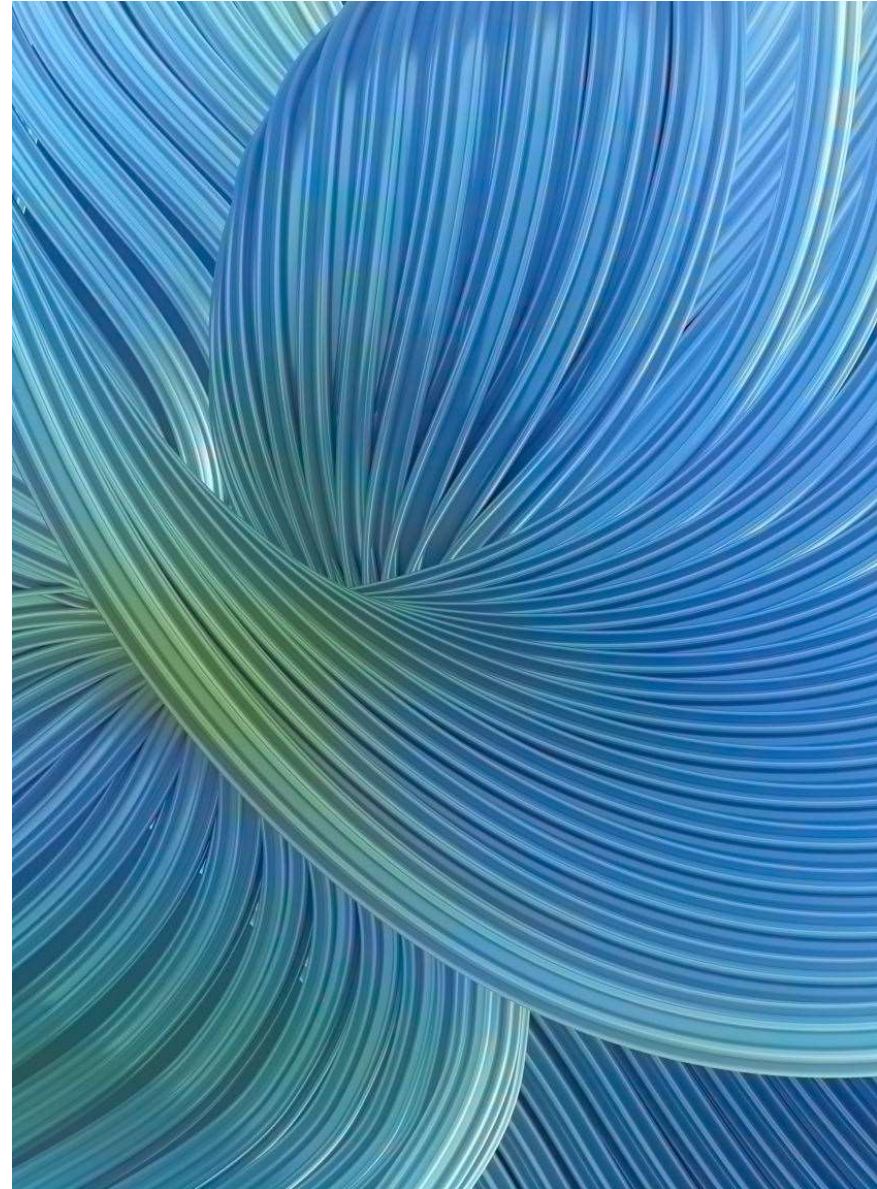
That we do not have  
adverse events well  
categorized?



That we are not  
transparent about our  
errors?



Can we ever have the  
same accuracy in  
numbers?



# Compare/Contrast: Needs Analysis

- Variety of methods
- Data often educator dependent
  - Variable types and sources
- Curriculum driven
  - But how well do the curriculums match?
- Local focus (e.g. one university or hospital)



- Data driven
  - Consistent
- Linked to actual practice
- Often mandated by external agency (FAA)
- Industry wide compilation



# Compare/Contrast: Data Sources

- From individual instructors
- Clinical experiences
- Reconstructed patient records
- Shared resources
  - What is there?
  - What are the limits?
- What does YOUR organization share?



- Robust data collection from pilots, mechanics, ATC, flight attendants... essentially anyone in the industry
- MANDATED reporting and self-reporting of errors and issues
- SHARED BY ALL—Quarterly in joint meetings
- Not used against each other
  - All use it to learn from each other



# Compare/Contrast: Construct Items

- Highly instructor dependent as to which educational model to use
- Theories applied are often as desired
- Limited scope of applicability for items created (very dependent on local goals and objectives as compared to collective ones)



- Often tailored to specific airframes
- ADDIE model typically used
- Individuals involved from many aspects of the industry to create the items that will be used by all
- Results in the FAA stating the one “best” way (out of the 100) to butter the toast



# Compare/Contrast: Method of Operation

- On the fly
- Pre-programmed
- Fully programmed
- Modeling (e.g. physiological)



- Standardized
  - Already programmed in
  - Mathematically modeled



# Compare/Contrast: Educator/Instructor Role



- Often very instructor-centric
  - Adjusting for learner
  - Based on personal experience
  - Where to repeat/what to repeat



- Cannot change the scenarios
- Able to choose more repetitions
  - Based on individual pilot's needs (often found in real-world performance data)
  - Based on organization desire for focus
- Some allowance to tweak for cognitive and affective loads (up or down)

# Compare/Contrast: Structural Elements



- Many instructors just part-time
  - Clinical responsibilities
  - Other teaching etc
- Highly variable about mandates/requirements to do simulation activities
- Ongoing competence?



- Dedicated Instructors
  - Even to the point of “per airframe”
- Mandate to attend
- Included in the cost of business
- Demonstration of ongoing competence
  - Can lose flight privileges

# Compare/Contrast: Simulator Types



- Manikins
- Standardized Patients
- Task Trainers
- Computer-based
- Tabletop
- VR/AR; WAVE/CAVE
- Etc, etc, etc (as technology evolves)



- Generally, the flight simulator
  - Specific to each airframe (e.g. 747)
- Do have other activities
  - Tabletop
  - Simple static models and aircraft



# Compare/Contrast: Setting

- Multiple options
  - Simulation center
  - Mobile
  - In-situ
  - Theatrical
  - ???
- Often has quite a bit of variability and need for “adjustment” or suspension of disbelief compared to real world
- Often adjacent to actual care settings



- Matched to the specifications of the actual airframes and settings that exist in the real world
- Clearly separate from the real-world setting



# Compare/Contrast: Piloting Simulations

- Generally done

- But with what quality?
- How many times?
- To what end point to be considered ready?

- Do we repeat pilot testing?



- Heavily tested to ensure they match known algorithms, flight models, etc

- Includes human element to match realism
- Carefully vetted to ensure realism—think the delay in decision-making re the Miracle on the Hudson (from the movie)

- Simulations are tested four times a year to ensure their validity and reliability is still intact (to know algorithms, flight models, etc)



# Compare/Contrast: Culture of Simulation

- Highly variable

- Funding
- Belief in effectiveness
- Time
- Impact on real-world care





- Mandatory to participate

- Accepted by all
- Not just about the pilots
- **Simulation used to create, impact, and support improving the real-world culture**



# Compare/Contrast: Outcomes Notion

- “We aren’t as invested  because if something goes wrong, it is just the patient who dies.
- And because it is only one at a time and not 250 (like in an airplane crash), we just don’t care as much.” (paraphrase of what is frequently stated)

- Personally invested in the outcomes because if something goes bad, they share the same fate as those sitting in the back... 

# Robust Data

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From the previous slides and your knowledge, what are the connection and disconnections between the two professions in regards to simulation?



# Case Study: Boeing 737 Max and the AHA Scientific Statement on Resuscitation Education Science

- What happened and why
- What theories were involved
- How lessons learned from the 737 Max and AHA Resuscitation Education Science changed practice?
- What would have occurred in the healthcare setting if new equipment resulted in this number of deaths?

## Maneuvering Characteristics Augmentation System

### Activates automatically when:

- Angle of attack is high
- Autopilot is off
- Flaps are up
- Steeply turning

MCAS pushes the jet's nose down to reduce the risk of stalling



### Deactivates when:

- Angle of attack is sufficiently lowered
- Pilots override with manual trim



THE AIR CURRENT

## Ground reality

**May 2017**

First Boeing 737 Max 8 aircraft is delivered to Malindo Air.

**29 Oct 2018**

Lion Air Flight 610 crashes into the Java Sea 12 minutes after take-off in a first major accident involving Boeing 737 Max series of aircraft.

**10 Mar 2019**

Ethiopian Airlines Flight 302, operating 737 Max 8 plane, crashes six minutes after take-off.

**12 Mar 2019**

China becomes the first country to ban Boeing 737 Max operations. European Union, others including India follow.

**13 Mar 2019**

US Federal Aviation Administration suspends 737 Max aircraft operations.

**28 Mar 2019**

Boeing announces software updates to suspected anti-stall system for the aircraft.



Retrieved from <https://www.livemint.com/industry/manufacturing/boeing-plans-software-updates-to-make-its-737-max-planes-safer-1553800177943.html>



Could patient outcomes have been impacted by these devices?

What do you think would have been different if research was conducted prior to widespread implementation?

Do you think professionals were properly trained or wanted training?



First portable defibrillator designed by Frank Pantridge in 1965<sup>1</sup>



Defibrillator MRL AMB-PAK, used in 1970's<sup>2</sup>



ZOLL PD 1400 defibrillator, 1992<sup>3</sup>



ZOLL M Series defibrillator, 1998<sup>4</sup>



ZOLL E series defibrillator, 2007<sup>5</sup>



ZOLL X series defibrillator, 2012<sup>6</sup>

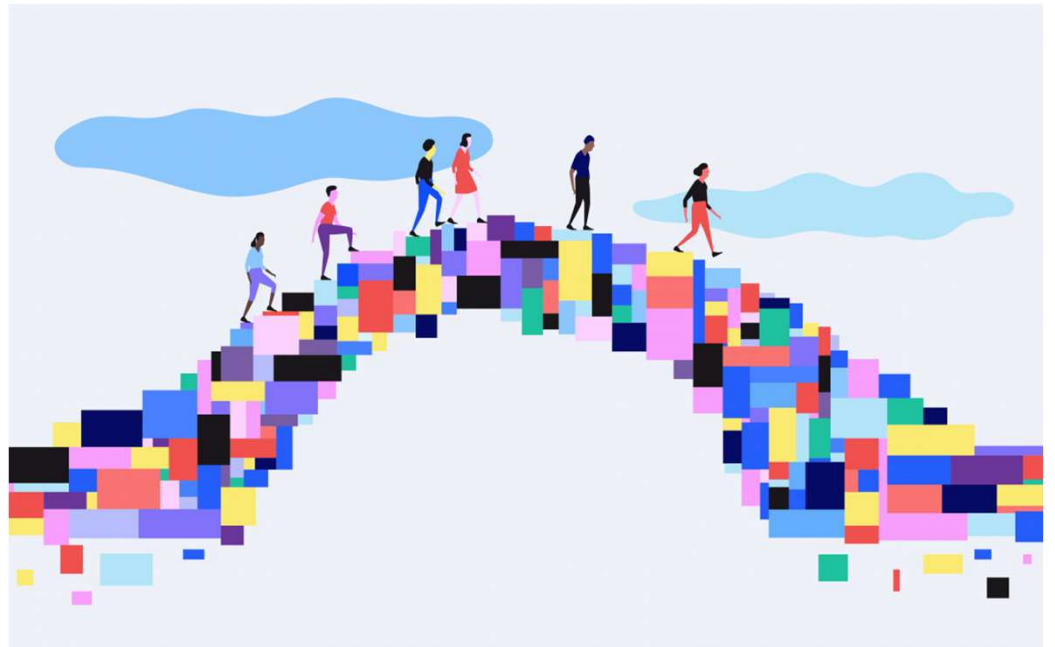


Retrieved from <https://canadiem.org/aha-scientific-statement-on-resuscitation-education/>

So, what are the potential impacts and outcomes for requiring simulation for healthcare providers periodically?



# Culture Change





Practice doesn't make  
perfect. Perfect  
practice makes  
perfect.

Vince Lombardi



We are  
what we repeatedly  
do.  
Excellence, then,  
is not an act  
but a  
habit.  
- Aristotle

# Let's Chat and Questions?



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## THANK YOU!

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