

# VIRTUAL REALITY: USING SIMULATION TO ENHANCE LEARNING IN INFECTIOUS DISEASE

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**IDWeek**<sup>™</sup> 2020

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# DISCLOSURES- BARSOUMIAN

I have nothing to disclose.

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# DISCLOSURES- PERSON

I have nothing to disclose.

# OBJECTIVES

Describe educational scenarios in which simulation is an optimal method to meet learning objectives.

Provide an overview of how to develop simulation curricula in infectious disease.

Demonstrate examples of simulation in infectious disease education.

# OUTLINE

1. Simulation - Why (or Why Not?)
2. How to create a simulation curriculum
3. Anna's Experience at VUMC
4. Alice's Experience at Brooke Army Med Center

# VIRTUAL REALITY- WHY?



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# WHY SIMULATION

Education,  
assessment,  
research, and  
health system  
integration



# WHY SIMULATION?

Real-life learning can be supplemented by simulations

Allow you to see learners perform skills you don't usually get to see

Allows real-time feedback and solidification of learning

Identify knowledge gaps

It doesn't have to be fancy

# WHY SIMULATION?

 OPEN ACCESS | September 9, 2020

## **The Simulated Virology Clinic: A Standardized Patient Exercise for Preclinical Medical Students Supporting Basic and Clinical Science Integration**

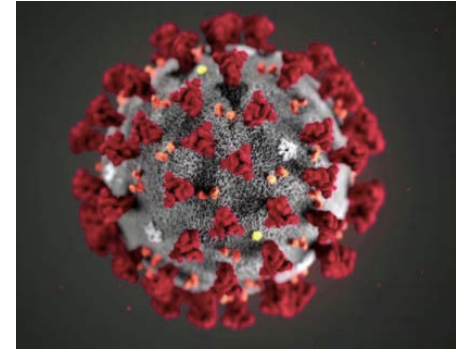
Jennifer M. Jackson, MD , Lindsay C. Strowd, MD, Timothy R. Peters, MD

[https://doi.org/10.15766/mep\\_2374-8265.10957](https://doi.org/10.15766/mep_2374-8265.10957)

# EFFICIENCY AND CREATIVITY

Acute human immunodeficiency virus infection,

- Varicella zoster virus (VZV) infection manifesting as shingles,
- Acute gastroenteritis due to norovirus,
- Acute hepatitis due to hepatitis B virus (HBV),
- Acute encephalitis due to West Nile virus (WNV),
- Acute myocarditis due to enterovirus,
- Acute laryngotracheitis (croup) due to parainfluenza,
- Acute aplastic crisis due to parvovirus B19 in a patient with sickle cell disease.



# WHY SIMULATION

MEDICAL EDUCATION | PATIENT CARE

## Standardized Patients Teach Skills and Empathy

DINAH WISENBERG BRIN, SPECIAL TO AAMCNEWS

NOVEMBER 27, 2017

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From his first month as a student at the University of Arkansas for Medical Sciences (UAMS) in Little Rock, Ark., Grant Cagle learned how to drape a patient, take a medical history, perform physical exams, deliver bad news, and more. And he was able to learn and practice these clinical skills—and make mistakes—without affecting actual patients.

# WHY SIMULATION

American Journal of Infection Control

Volume 48, Issue 6, June 2020, Pages 615-620

Major Article

## High consequence infectious diseases training using interprofessional simulation and TeamSTEPPS

Rachel Marrs DNP, RN, CIC<sup>a</sup>  , Trisha Leann Horsley PhD, RN, CHSE, CNE<sup>b, c</sup>, Diana Hackbarth PhD, RN, FAAN<sup>b</sup>, Emily Landon MD<sup>a</sup>

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<https://doi.org/10.1016/j.ajic.2019.10.007>

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# BECAUSE ACGME WANTS US TO...

- 786 IV.C.3. A minimum of 12 months must be devoted to clinical experience. (Core)
- 787
- 788 IV.C.4. Fellows must participate in the management of outpatient antibiotic
- 789 therapy, including interaction with pharmacy, nursing, and other home
- 790 care services. (Core)
- 791
- 792 IV.C.5. Fellows must participate in training using simulation. (Detail)
- 793
- 794 IV.C.6. Experience with Continuity Ambulatory Patients
- 795
- 796 IV.C.6.a) Fellows must have continuity ambulatory clinic experience that
- 797 exposes them fellows to the breadth and depth of the
- 798 subspecialty. (Core)
- 799

# WHAT CAN'T SIMULATION DO?

Stand in for real-life  
patient experiences

Be a sole means of  
assessment



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# DOWNSIDERS TO SIMULATION?

To record or not to record?

Performance anxiety

Only as good as the feedback you get

Differences in actors/SPs

How to handle practice differences



# HOW TO CREATE YOUR SIMULATION CURRICULUM

# IDENTIFY THE CURRICULAR NEED

## Provider-Patient

HIV, travel, LTBI counseling, OPAT counseling, disclosures

## Interdisciplinary or Population-level care

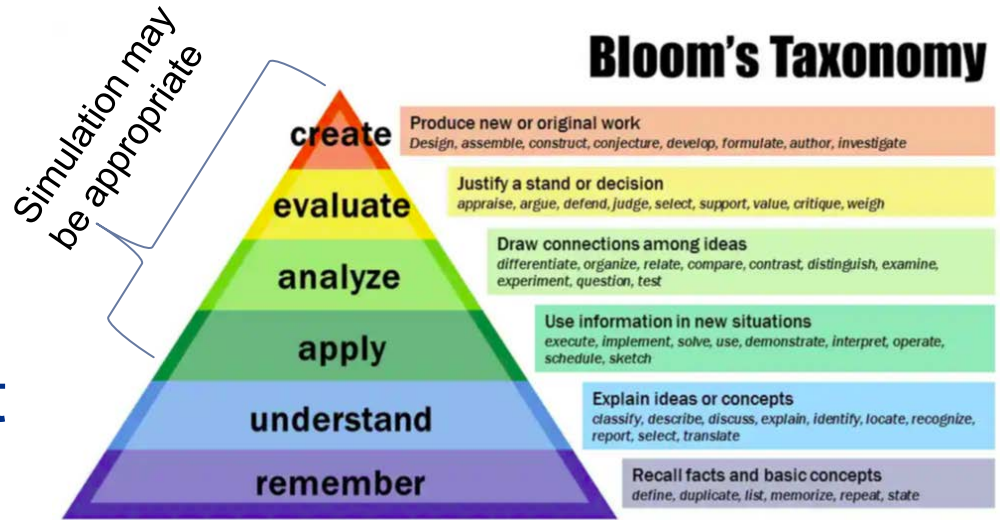
Infection control, antimicrobial stewardship

## Procedural competencies (LPs)

# LEARNING OBJECTIVES

Create your learning objectives

Is simulation the best modality to achieve these objectives?



Vanderbilt University Center for Teaching

# DESIGNING THE ACTIVITY

Chose the method

Video, lectures, simulated patients, prompts

Faculty

Qualifications, instructor to trainee ratio

Structure

Moderated vs unmoderated

# EVALUATION OF THE LEARNER

## Identify key actions

“Elicits the patient’s concerns with the diagnosis”

“Identifies at least two of the following complications of therapy: antibiotic resistance, kidney failure, PICC line infection”

## Individual & Team Competencies

# PRE-BRIEF

Welcome learners & introduce simulation

Orient to the activity/room/equipment

Address realism upfront

“This may seem artificial”

“You will be aware you are observed”

# PRE-BRIEF

Learner preparation

Post/display prompt; simulation flow

No interruptions, respect

Any additional instructions

Moderator interjections

Describe debrief

# MODERATING ACTIVITY

## When to interject

Procedural competencies

Difficulty getting started

“Introduce yourself/ your role” “Ask for introductions”

Learner(s) stumped/ blocked/ at an impasse

“Ask the patient how they feel about the diagnosis”

Reorient to objectives or prompt



# MODERATING ACTIVITY

Have appropriate number of observers

- 1 observer for simulated patient

- Team activities: more than 1 observer may be needed

Record examples of behaviors/approaches

- Discuss during debrief

# DEBRIEF

Leave enough time for the debrief (10+ minutes)

Clarify the purpose of the debrief, and your role

Address any concerns about realism

Allow the learners to describe their approach to the scenario and their observations



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# DEBRIEF

Focus on the objectives and not mistakes

Summarize the observations & relate to your experience or the literature

Allow the discussion to progress naturally

Thank the learners



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# EVALUATION OF THE ACTIVITY

Allow time in debrief for feedback

Anonymous surveys (PEC, APE)

Quizzes for knowledge improvement

Faculty feedback on trainees after activity

Graduate surveys

# THE VANDERBILT EXPERIENCE

**MedEdPORTAL**<sup>®</sup>  
The Journal of Teaching and Learning Resources

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Original Publication

 OPEN ACCESS

## **Four Standardized Patient Cases for the Infectious Diseases Fellow**

Anna Person, MD\*, Cody Chastain, MD, Laura Skaug, MFA, Lisa Rawn, MA, Patty Wright, MD

\*Corresponding author: [anna.k.person@vanderbilt.edu](mailto:anna.k.person@vanderbilt.edu)

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# VUMC CENTER FOR EXPERIENTIAL LEARNING



# EDUCATIONAL OBJECTIVES

1. Obtain an appropriate and complete history for common infectious diseases patient presentations.
2. Perform an appropriate physical exam adapted to the presenting complaint.
3. Generate an appropriate differential diagnosis.
4. Provide counseling regarding disease pathophysiology, natural history, prognosis, and treatment strategies.

4 CASES , 2 EACH YEAR

## Prosthetic joint infection

- Counsel on IV abx/PICC
- Recognize DDI



# 4 CASES, 2 PER YEAR



**Latent TB Infection**



**TB Disease**

## Latent TB Infection

- Screen for risk factors for reactivation
- Discuss treatment options

4 CASES, 2 PER YEAR

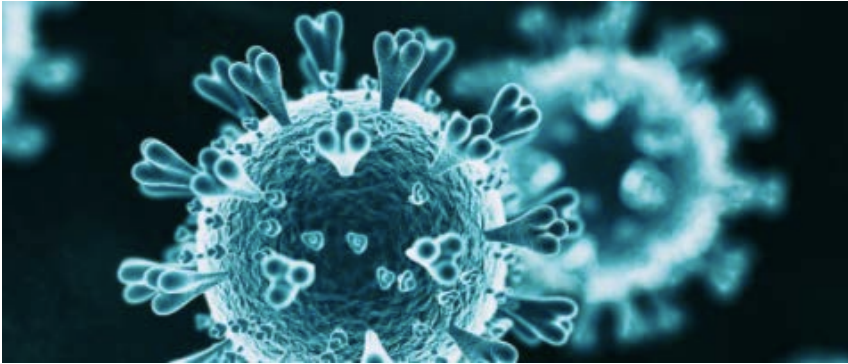
## Fever in a Returned Traveler

- Generate a DDx
- Perform a pertinent PE



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4 CASES, 2 PER YEAR



New Diagnosis HIV

- Counsel
- Discuss treatment

# THE VANDERBILT EXPERIENCE

## Standardized Patient Simulation Can Identify Education Gaps in Infectious Diseases Fellowship Training

Cody Chastain, Laura Skaug, Lisa Rawn, Patty Wright, Anna Person [Author Notes](#)

*Open Forum Infectious Diseases*, Volume 2, Issue suppl\_1, December 2015, 419,

<https://doi.org/10.1093/ofid/ofv133.294>

**Published:** 09 December 2015

# WHAT WE FOUND



# FLEXIBILITY



# ANTIMICROBIAL STEWARDSHIP TEAM SIMULATION

Barsoumian AE, White BK, Yun HC. Teaching Antimicrobial Stewardship to Infectious Disease Fellows Through Simulated Interdisciplinary Scenarios. MedEdPORTAL. 2018 Mar 16;14:10693. doi: 10.15766/mep\_2374-8265.10693. PMID: 30800893; PMCID: PMC6342414.

[https://doi.org/10.15766/mep\\_2374-8265.10693](https://doi.org/10.15766/mep_2374-8265.10693)

# THE NEED

2016 No formal antimicrobial stewardship curriculum in our fellowship program

Graduate surveys identified this curricular gap

Few curricula available for ID fellows

# THE OBJECTIVES

Graduates reported needing more experience in **leading** and **participating** in an antimicrobial stewardship program

# THE OBJECTIVES

Quality-improvement

Population-based strategies

Intervention implementation

Team dynamics

# LEARNING OBJECTIVES

1. Describe the roles and responsibilities of antimicrobial stewardship team members
2. Identify the evidence-based antimicrobial stewardship interventions used to improve antibiotic prescribing pertinent to a structured scenario
3. Design a multidisciplinary solution to a structured antimicrobial stewardship scenario

# FLOW DIAGRAM

## Simulation Pre-Lecture

Topic Overview, Scenario  
Introduction, Assignment of Roles  
*30 minutes*

ID Fellows review primary literature based on the scenario and their assigned team role.  
*1 week*

## Simulation

Introduction/Signposting  
Start Simulation  
Team discussion  
*30 minutes*

## Stop Discussion

Faculty gives notional results of success or failure based on strategies described in the literature  
*10 minutes*

## Unsuccessful Strategies

Faculty advises team to design a different approach to the problem

## Successful Strategies

Faculty redirects discussion to focus on sustainability and patient safety monitoring

Team discussion  
*20 minutes*

## End Discussion

Faculty describes various successful and unsuccessful approaches in the literature  
Debrief  
*15 minutes*



# SCENARIO 1

You are a member of the Antimicrobial Stewardship Team at your facility. You work at an academic medical center set up similarly to your home institution. Your facility's rate of Clostridium difficile infection (CDI) has been slowly increasing over the past five years. Last quarter, your rate was twice that of the previous quarter. Your team is tasked with proposing a solution that will decrease the hospital's CDI rate.

# LEARNER EVALUATION

## Individual Assessment of Information Gathering and Synthesis:

1. Learner is able to find an article in the literature relative to the simulation scenario.

Yes No

2. Learner is able to find an article in the literature relative to their assigned role in the scenario.

Yes No

3. Learner is able to discuss the tactics/strategies in their article in the context of the simulation.

Yes No

# TEAM EVALUATION

## **Multidisciplinary Team Performance:**

1. Successfully designs a solution incorporating best-practices
  - Identifies need to develop a Pre-authorization process or Prospective Audit Process
  - Correctly identifies one a high risk antibiotic category as a target for decrease
  - Considers at least 2 of the following in developing a solution
    - Possibility of an outbreak
    - Targeting highest risk patients
    - Writing facility specific Clinical Practice Guidelines for a disease condition
    - Improving information retrieval from the electronic medical record
    - Optimization of microbial culture collection
    - IV to PO conversion
    - Automatic stop dates
2. Team is successfully able to incorporate the feedback at the mid-point (CHECK of PDCA cycle) and effectively utilizes that information in their next plans.

Yes    No



# TEAM EVALUATION

## 3. Individual and Team Performance (Adapted from Qual Saf Health Care 2004;13(Suppl 1):i57-i64)

The learner shares information effectively

1 (strongly disagree)  2 (disagree)  3 (neither agree nor disagree)  4 (agree)  5 (strongly agree)

The learner asks questions of their colleagues appropriately

1 (strongly disagree)  2 (disagree)  3 (neither agree nor disagree)  4 (agree)  5 (strongly agree)

The learner advocates their views and teaches when appropriate

1 (strongly disagree)  2 (disagree)  3 (neither agree nor disagree)  4 (agree)  5 (strongly agree)

The learner critically evaluates the team's plans

1 (strongly disagree)  2 (disagree)  3 (neither agree nor disagree)  4 (agree)  5 (strongly agree)

The learner effectively manages time and the tasks

1 (strongly disagree)  2 (disagree)  3 (neither agree nor disagree)  4 (agree)  5 (strongly agree)

How did the **team** function overall?

1 (poor)  2 (fair)  3 (good)  4 (very good)  5 (excellent)



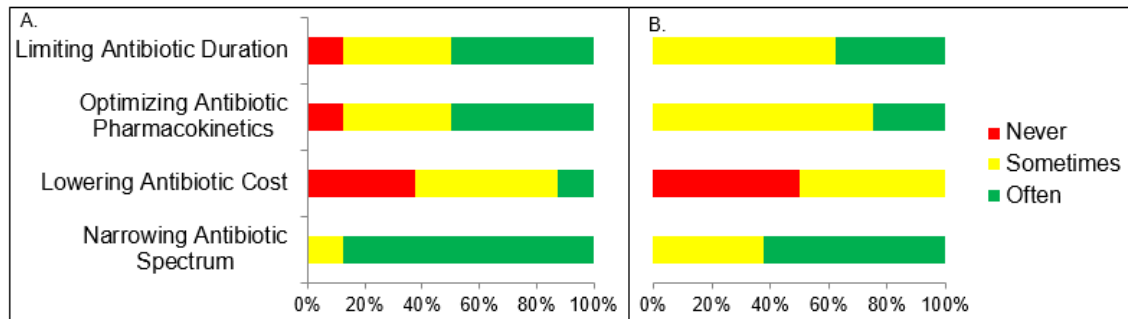
| Simulation Scenario  | Team Member Roles  | Strategies Addressed  |
|--|--|---|
| Design an antimicrobial stewardship strategy to decrease rates of Clostridium difficile infections at an inpatient academic medical center.  | ID Physician*<br>ID Pharmacist*<br>Infection Preventionist*<br>Clinical Microbiologist*<br>Quality Improvement Representative<br>Inpatient Nurse<br>Hospital Leadership Representative<br>Medical Informatics Representative           | Prospective Audit<br>Provider Feedback<br>Restrictive Guidelines  |
| Design an antimicrobial stewardship strategy to decrease outpatient antibiotic prescriptions for acute respiratory illness in primary care clinics affiliated with an academic medical center. | ID Physician*<br>ID Pharmacist*<br>Medical informatics Representative<br>Infection Preventionist<br>Clinical Microbiologist*<br>Quality Improvement Representative<br>Primary Care Physician*<br>Clinic Nurse                          | Antibiotic Restriction<br>Clinical Practice Guidelines<br>Communication Training<br>Decision Support<br>Delayed Prescribing<br>Provider Education<br>Provider Feedback<br>Provider Incentives |
| Design an antimicrobial stewardship intervention to improve antibiotic use in trauma patients with some team-members remotely participating via telehealth.                                    | On-Site Members<br>Trauma Surgeon*<br>Infection Preventionist<br>Nurse*<br>Clinical Microbiologist*<br>Off-Site Members<br>ID Physician*<br>ID Pharmacist*<br>Quality Improvement Representative<br>Medical Informatics Representative | Antibiotic Timing<br>Decision Support<br>Clinical Practice Guidelines<br>Point of Injury Antibiotics<br>Provider Education<br>Telehealth  |

# RESPONSE TO THE SERIES

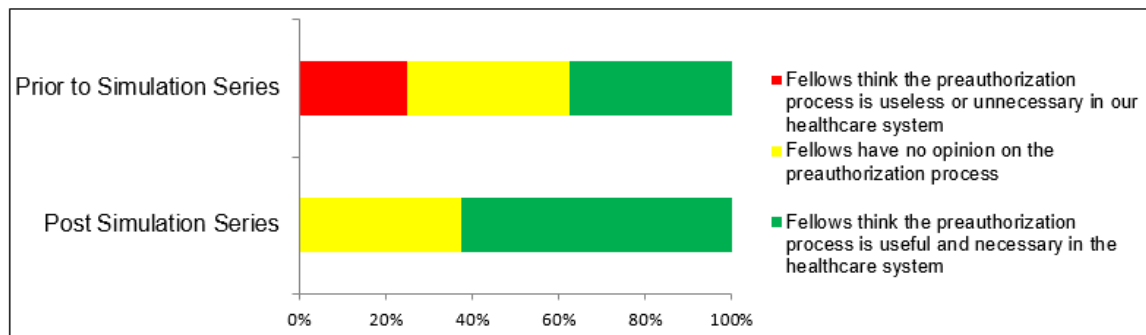
Fellow comments “enjoyed the format,” “engaging,” “gave them confidence;” PEC recommends continuing series every year

Additional tips: senior fellows take more difficult roles (“hospital leadership”), train to evaluate junior fellows

Faculty assessment of frequency of fellow led discussion on key stewardship areas during rounds (a) prior to the simulation series and (b) post simulation series. (n=8)



Faculty's assessment of attitudes on the institution's restricted formulary. (n=8)



# CONCLUSION

Simulation is an adaptable tool which can be used to train learners in higher level competencies.