

**Improving Safety in Pediatric Behavioral Health: A Virtual Simulation Approach in the ICU**

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**Children's Hospital Of Philadelphia**

**Founded in 1855**  
First hospital in the nation devoted exclusively to the care of children

**Three hospitals**  
Over 600 beds, Level 1 trauma center, and comprehensive rehabilitation center

**CHOP Care Network**  
50+ pediatrician offices, specialty care centers, and surgical centers

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**Background**

**25.6%**  
of all serious employee harm at the Children's Hospital of Philadelphia was due to a patient behavioral event.

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**Problem**

Medically complex patients with behavioral needs increase staff risk of harm

Lack of standardized care model

Limited just-in-time training tools



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**Objectives**



IDENTIFY SYSTEM-LEVEL FACTORS

LEVERAGE HUMAN FACTORS METHODOLOGIES

DEVELOP INTERACTIVE VIRTUAL SIMULATION

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**Methods**



Walk-Through Talk-Through (WT3):

- Guided demonstration where staff show each step of a given task while a facilitator asks prompting questions to learn how “work is done”
- Goal:
  - Full understanding how work is done
  - Perspective on the potential challenges, barriers, limiting factors and opportunities for improvement



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### Walk-Through Talk-Through (WT3)



The most frequently encountered practice situations identified were:

- Clarifying the staff members' role
- Safe positioning of staff members
- Safe staff transitions

WT3 Template				
#	Step	Barriers/What would make this step fail?	Facilitators/What is needed to support this step?	Comments
1				
2				
3				
4				
5				

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### Methods



Physical Environment Assessment

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### Physical Environment Assessment



Digital re-creation of the environment:

- Deidentified 360° images
- 3D scan of the environment




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**Methods**



**Virtual Simulation Development**

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**Virtual Simulation Development**



The multidisciplinary team developed an interactive virtual simulation module utilizing a virtual simulation platform:

- Leveraged the digital re-creation of the environment
- Incorporated practice situations identified in the WT3



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**Usability Testing**



UMUX-Lite Survey:

- A brief, validated two-item survey used to assess perceived system usability quickly and efficiently
  - Survey Location: ICU
  - Surveyor Demographics:
    - Registered Nurses
    - Behavioral Health Clinicians
    - Aides

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## Usability Testing Results



UMUX-Lite results showed **strong usability**:

- "Functionality Meets Just-in-Time Requirements": 6.0 (mean)
- "Ease of Use": 5.8 (mean)

Time analysis showed **efficiency**:

- 196 seconds to complete the virtual simulation

Usability Testing Survey			
Years of Experience	Average Ease of Use Rating	Average Functionality Meets Just-in-Time Requirements Rating	Would Consider Using this Modality Again
0-4	6.0	6.5	100% Yes
5-10	5.5	5.5	100% Yes
11+	6.0	6.0	100% Yes

Usability Testing Analytics		
Completion Time	Mean (sec)	Standard Deviation (sec)
Per Step	32.71	43.66
All 6 Steps	196	168

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## Pilot Results



Pilot Results:

- "I understand my role in this scenario": 6.88 (mean)
- "I understand my team members' roles in this scenario": 6.88 (mean)
- "I feel comfortable completing the task safely": 6.75 (mean)

Pilot Testing Survey			
Years of Experience	Understand Role	Understand Team Members' Role	Completing Task Safely
0-4	6.92	6.92	6.75
5-10	6.0	6.0	6.0
11+	7.0	7.0	7.0

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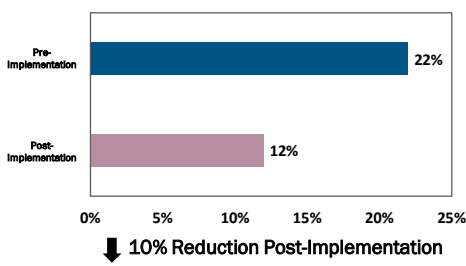
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## Reduction of Patient Behavioral Events

Implementation Stage	Percentage of Behavioral Events
Pre-Implementation	22%
Post-Implementation	12%

↓ 10% Reduction Post-Implementation

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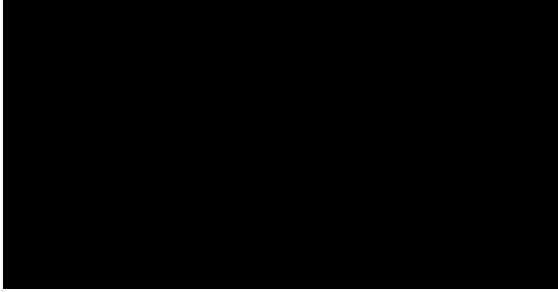
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**Video Demonstration**



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**Summary & Next Steps**



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- The WT3 method enabled the identification of scenarios for the development of an interactive virtual simulation
- The simulation supports anticipatory planning, standardized responses, and enhances staff preparedness to reduce injury risk
- Next steps:
  - Spread and implement the development of a virtual simulation in various locations within the organization

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**Apply It To Your Practice**



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- Consider a scenario in your clinical setting...
- How can you incorporate human factors methodologies, such as the WT3, and simulation development to support anticipatory planning, standardize responses, and reduce injury risk?

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**References**



Scan the QR code to view the references!

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**Let's Connect!**






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