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

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BACKGROUND

- **Patient behavioral events accounted for 25.6% of all serious employee harm events** for the Nursing & Clinical Care Services (NCCS) department at the Children's Hospital of Philadelphia (CHOP) during FY24
- A multidisciplinary team of frontline clinicians, Nursing, Behavioral Health, Employee Safety, Human Factors, and Simulation staff reviewed each patient behavioral event
- Following review, these events were largely preventable and presented a significant opportunity for improvement in CHOP's Breakthrough to Zero Harm campaign

OBJECTIVES

- To reduce staff injuries related to patient behavioral events in a critical care setting by implementing a WT3 process and developing a virtual simulation for the care of medically complex, non-neurotypical behavioral health patients:
  - Identify system-level factors that hinder or support patient care, efficiency, and safety
  - Leverage **human factor methodologies** to create a standardized approach to improve staff and patient safety
  - **Develop an interactive virtual simulation** that enables staff to proactively plan care for medically complex, non-neurotypical patients with behavioral health needs

METHODS

- A **Walkthrough Talkthrough (WT3)** was conducted with frontline staff to describe the current practices for caring for medically complex, non-neurotypical behavioral health patients and identify process improvement opportunities
- A WT3 is a guided demonstration in which front-line workers show each step of a given task while a facilitator asks prompting questions to learn how "work is done", and also acknowledges potential challenges such as time constraints, staff resistance, inconsistent practices, and resource or contextual barriers
- This exercise revealed an opportunity to incorporate human factors principles along with simulation–based training and technologies to aid in minimizing the risk of staff injuries
- The most frequently encountered practice situations identified were:
  - Clarifying the staff members' role for routine safety observation
  - Positioning of staff members to reduce the risk of injury during patient and equipment transitions
  - Performing staff transitions safely to reduce the risk of injury
- The multidisciplinary team developed an **interactive virtual simulation module** utilizing a virtual simulation platform
  - Replicated a typical ICU behavioral health patient room
  - Incorporated seating and staff placement, patient equipment, and just-in-time guidelines
  - **Usability testing** was performed among the roles typically involved in patient and staff transitions

RESULTS

Usability Testing Analytics

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

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

Likert Scale; 7= Strongly Agree, 1= Strongly Disagree

- UMUX-Lite results demonstrated **strong usability**, with mean scores of 6.0 for "Functionality Meets Just-in-Time Requirements" and 5.8 for "Ease of Use" (scale: 1 = Strongly Disagree, 7 = Strongly Agree)
- All participants reported willingness to use the modality again
- Time analysis showed a mean of 32 seconds per step and 196 seconds to complete all six steps, supporting its **efficiency**

CONCLUSION & IMPLICATIONS FOR PRACTICE

- The WT3 method enabled identification of high-frequency scenarios for medically complex patients with behavioral health needs, identified key elements required to ensure patient and staff safety, leading to the **development of an interactive virtual simulation that staff can use proactively or just-in-time**
- 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**
  - Evaluate impact of the virtual simulation
  - Address considerations, including those related to diversity, equity, and inclusion for patients and staff

REFERENCES

VIDEO DEMONSTRATION