

Texas Children’s –Simulation-based Test (SbCST)
Project: WC MPERT Walkthrough COVID-19 PUI
PRELIMINARY Report of Findings with Failure Modes and Effects Analysis (FMEA)

Background/Definitions

High-reliability science is the study of organizations in industries like commercial aviation and nuclear power that operate under hazardous conditions while maintaining safety levels that are far better than those of health care. These organizations have become known as **High-Reliability Organizations (HROs)**. Five key principles of organizational safety culture have emerged as drivers of high reliability (Weick & Sutcliffe, 2007):

- **Preoccupation with failure**
- **Reluctance to simplify observations**
- **Sensitivity to front-line operations**
- **Commitment to resilience**
- **Deference to expertise**

Hospital quality and patient safety departments are increasingly examining the potential of adapting and applying the lessons of HRO science to health care to reach levels of quality and safety that are comparable to those of the best high-reliability organizations.

In situ simulation, a simulation that is physically integrated into the clinical environment provides a method to improve teamwork, communication, and patient safety in high-risk patient care areas. The most valuable benefits of in situ simulation are likely related to the identification of latent hazards, knowledge gaps, and opportunities for clinical teams to rehearse infrequent and/or high-risk clinical scenarios.

Use of Clinical Simulation to Promote High-Reliability in Healthcare

Simulation-based Clinical System Testing (SbCST) is a robust process improvement tool that can be used to proactively test the complex systems (people + physical environment + processes) involved in new patient care settings. By involving front-line personnel in clinical simulations aimed at stressing systems to find potential threats to patient/provider safety (LST – latent safety threats), it applies at least 3 HRO principles: Preoccupation with failure, Reluctance to simplify observations, and Sensitivity to front-line operations.

Failure Modes and Effects Analysis (FMEA) is an established and widely used means of proactively seeking out both latent and active weaknesses and failures in healthcare systems to analyze causes, assess risk, and address resolutions (The Joint Commission, 2005). Joint Commission requires the incorporation of FMEA into patient strategies for hospital accreditation. By adding the optional tool of FMEA Risk Prioritization to the SbCST findings, new hospitals can both prioritize how to address SbCST findings AND meet the Joint Commission requirement before their first accreditation survey.

Overview of this SbCST

A Simulation walkthrough of the WC MPERT location related to COVID-19 PUI was conducted with the WC EC team as participants in the actual simulation. Our goal was to identify potential latent safety threats before the MPERT activation and Go-Live, and 29 issues were identified.

Failure Mode and Effects Analysis Worksheet

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Project Aim/Goal: Identify latent safety threats related to preparedness of MPERT prior to activation

Targeted Units/Departments: WC MPERT

Resources, facilities, processes, and/or personnel to be examined: all

FMEA Scoring Tool:

Risk Priority Number (RPN) is calculated by multiplying **Severity** score by **Probability** score. Issues are considered significant priorities if **RPN** is between 8-16 on the scale of 1-16.

	4 - Catastrophic	3 - Major	2 - Moderate	1 - Minor
Severity of Categories	<p><i>Failure could cause death, injury</i></p> <p><u>Patient Outcome:</u></p> <ul style="list-style-type: none"> Death or major permanent loss of function (sensory, motor, physiologic, or intellectual) <p><u>Visitor Outcome:</u></p> <ul style="list-style-type: none"> A death; or hospitalization of ≥ 3 <p><u>Staff Outcome:</u></p> <ul style="list-style-type: none"> A death; or hospitalization of ≥ 3 <p><u>Equipment/Facility damage:</u></p> <p>Fire beyond the incipient stage; or damages $\geq \\$250,000$</p>	<p><i>Failure could cause high degree customer dissatisfaction</i></p> <p><u>Patient Outcome:</u></p> <ul style="list-style-type: none"> Permanent lessening of bodily functioning (sensory, motor, physiologic, or intellectual); or Increased length of stay or increased level of care for ≥ 3 patients <p><u>Visitor Outcome:</u></p> <ul style="list-style-type: none"> Hospitalization of 1-2 visitors <p><u>Staff Outcome:</u></p> <ul style="list-style-type: none"> Hospitalization of 1-2 staff; or ≥ 3 staff experiencing lost time, or restricted duty <p><u>Equipment/Facility damage:</u></p> <ul style="list-style-type: none"> Damages \$100,000-\$250,000 	<p><i>Failure can be overcome, but there is a minor performance loss</i></p> <p><u>Patient Outcome:</u></p> <ul style="list-style-type: none"> Increased length of stay or increased level of care for 1-2 patients <p><u>Visitor Outcome:</u></p> <ul style="list-style-type: none"> Evaluation, treatment of 1-2 visitors <p><u>Staff Outcome:</u></p> <ul style="list-style-type: none"> Medical expenses, lost time, or restricted duty for 1-2 staff <p><u>Equipment/Facility damage:</u></p> <ul style="list-style-type: none"> Damages \$10,000-\$100,000; or Fire, at/smaller than incipient stage 	<p><i>Failure not noticeable to customer, no effect on the delivery of service</i></p> <p><u>Patient Outcome:</u></p> <ul style="list-style-type: none"> No injury, nor increased length of stay, nor increased level of care <p><u>Visitor Outcome:</u></p> <ul style="list-style-type: none"> Evaluated, but no treatment <p><u>Staff Outcome:</u></p> <ul style="list-style-type: none"> First aid only, no lost time, or restricted duty <p><u>Equipment/Facility damage:</u></p> <ul style="list-style-type: none"> Damages $< \\$10,000$; or Loss of utility without an adverse patient outcome
Probability Ratings	Frequent	Occasional	Uncommon	Remote
	Likely to occur immediately or within a short period (may happen several times in 1 year)	Probably will occur (may happen several times in 1 to 2 years)	Possible to occur (may happen sometime in 2 to 5 years)	Unlikely to occur (may happen sometime in 5 to 30 years)

Outcomes and Results

I. Table 1: Potential Latent Safety Threats Identified with FMEA Hazard Scores (RED=Very High Priority 12-16; YELLOW=High Priority 8-11)

Item #	Potential LSTs Identified During Debriefings By Participants and Observers	Severity of Effect	Probability for Occurrence	Risk Priority Number	Possible Solutions Identified During Debriefings By Participants and Observers
1	Concerns raised if there is overflow of patient in the MPERT, they may go to the EC. Can there be addition MPERT registration areas?	4	3	12	2 separate lines will be placed – 1 for initial arrival and quick registration, 1 for MSE (they are not arriving the patient, they are just sorting) Or another tent for screening outside. Have people line up for MSE– additional influx of patient
2	Separate workstations for provider and RN- challenging to share 1 workstation	3	3	9	
3	Should disposable steth be used?	2	3	6	Everything in MPERT is considered dirty
4	Where are the trashcans?	3	3	9	1 trashcan for each room space
5	Concerns regarding space for medications: - Could they have a mayo stand or bedside table	3	3	9	How about utilize the top of the cart as a workspace for the RN
6	Hand sanitizers and wash stations	3	3	9	There will be 3 mobile wash stations and hand sanitizers available
7	Is carpet an infection control issue?	3	2	6	They can life cycle the carpet if needed
8	Ensure supplies are checked in the cart, they may not need everything in the.	3	2	6	
9	Will there be voaltes to use?	3	3	9	Have an MPERT team in voalte- staff can just log in Amy will take care of that

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10	POCT- optio labels Workstation should be labeled. RNs should have the beaker	3	3	9	Separate and label workstations
11	Questions raised if they will have a runner for MPERT area.	3	2	6	yes
12	Concerns/questions raised regarding who should wear a mask in MPERT. Should the family be masked?	4	3	12	Brent ok with masking everyone going to MPERT
13	Questions were raised on what to do if a mom is with a patient that has been coughing a lot during registration.	4	3	12	Registration should be giving the mom the mask right away Masks will be available at the registration area
14	COVID PUI Patient arrives via ambulance, what's the process?	4	3	12	Ambulance stops at ambulance bay, the "screener" will screen the patient there, put a mask on the patient and the EMS team, and walk back up through the EC waiting room to the vestibule to get sorted. EMS, patients and stretcher will have to go through the vestibule.
15	What is the ideal MPERT flow? Registration, patient gets their folder, triaged, gets their vital signs, go to their room, do tests, and then discharged	4	3	12	Ryan Breaux and his team will make adjustment with the MPERT flow. Re arrange supply areas, treatment room for a better flow
16	Concerns were raised regarding the flow if triage is all the way in the back.	4	3	12	

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17	Questions regarding how to speed up the process if they become backed up with patients.	3	3	9	Give the patients the paperwork and instruction forms in a folder ahead of time so they can read and fill it up.
18	PPE process- are the providers keeping the PPE on for 12 hours Are we donning and doffing for each patient? Double gloving?	4	3	12	Still waiting on recommendations
19	Are they getting the COVID specimens in MPERT? Will this be done in the room space or the treatment room?	4	3	12	
20	Privacy issue. Concerns were raised that everyone in the hallway can hear you.	3	3	9	
21	How can we do the swabs efficiently? If the patient does not need urine- provider and RN can go together, do everything together	4	3	12	The RN outside can help by getting the supplies and get the labs done completed right away
22	Questions were raised regarding the process If a patient is sicker and needs to go back to EC	4	3	12	They cannot go back to the waiting area, they need to go straight to the EC room
23	Should there be separate workstation for the nurses, providers?	3	3	9	
24	Participants questioned if a room space should be turned into a procedure space with the increase in footprints to cover.	3	3	9	

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25	Should there be an actual waiting area or a subwait? They are actually separated in EPIC for tracking. Should they be physically separated? People moving to the end are the ones that are being roomed. Should we have a reverse flow?	3	3	9	Still keep subwait Ideal if subwait is at the end if the treatment room is also there
26	Treatment room-set up and flow, are we utilizing the subwait correctly? Is there a good flow?	3	3	9	
27	How fast can you assemble the outside tent – for influx of people	3	2	6	In an hour
28	PPE training for registration staff	4	3	12	
29	MPERT flow	3	3	9	Educate staff

High Priority Themes:

- Registration Process – make sure to accommodate increase influx of patients
- Re arrange the “MPERT” areas for a better flow- supply areas, subwait
- Workstations for Providers and RNs
- PPE process- still for discussion
- Equipment and supplies – trashcans, wash stations, printer, workstations