

Texas Children’s –Simulation-based Test (SbCST)
Project: Woodlands 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 Woodlands MPERT location related to COVID-19 PUI was conducted with the Woodlands 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 32 latent safety threats were identified.

Failure Mode and Effects Analysis Worksheet

Project Leader(s): Gemma Elegores, NicholeDavis, Brent Kaziny, Cara Doughty, Kasey Davis, Lindsay Day

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

Targeted Units/Departments: Woodlands 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	Questions raised regarding the need for the PCA to help with VS if you are trying to have less people and minimize exposure.	3	2	6	PCA can help with the vital signs, makes triaging a lot faster PCA runs POCT
2	Concerns were raised regarding pens used by patients	3	2	6	Pens, clipboards are wiped down now as a process
3	Separate workstations for provider and RN- challenging to share 1 workstation	3	3	9	
4	If staff are using PPE, should there be a biohazard bin outside?	3	3	9	PPE can go in regular trashcans. There will be a trashcan in each room space.
5	Should there be a big biohazard bin that all trash goes in for 1 pickup location for EVS?	3	2	6	Current process, EVS will be there to service the MPERT location. They can pick up trash from each of the rooms.
6	Concerns were raised regarding space for medications, rovers, labels, and gloves for inside or outside the room.	3	3	9	Have 2 mayo stands available for the entire MPERT Mayo stands can be moved around
7	Concerns were raised regarding the distance from the Supply cart is all the way to the end of the room, then the procedure room is on the other end of the room (by the registration area).				All supplies needed for a procedure should be in the procedure room. Throat saws should be in the treatment room. The metro cart – supply room- will hold diaper.
8	Hand sanitizers and wash stations	3	3	9	There will be mobile wash stations and hand sanitizers available

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
9	What supplies should be readily available to staff? The supply cart should be checked to ensure everything needed is there.	3	2	6	Tongue depressor, swabs, temp covers- can be placed on top/side of the wows
10	Questions were raised if they would use voaltes to communicate in MPERT.	3	3	9	Have an MPERT team in voalte- staff can just log in
11	POCT- optio labels Workstation should be labeled. RNs should have the beaker	3	3	9	Separate and label workstations Make sure that all computers are mapped to a designated printer Designate printers for specific paperwork- prescription, AVS Find a location for a wireless printer inside the care area
12	Questions raised if they would have a runner for MPERT.	3	2	6	yes
13	If patient is fully registered in MPERT, will this be reflected in EPIC?	3	2	6	Yes, Epic should have that capability to show ful MPERT registration
14	What discharge information will the patients receive?	3	2	6	Patients on registration will get folder for COVID and other information (optio labels, consents, discharge papers) to avoid delay when checking out
15	Taking rectal temp, should we take the baby to the procedure room?	3	2	6	Moving the triage space by the window will give you that partition/space. You can get the rectal temp while the baby is on the scale.

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
					The partition gives you a little bit of privacy
16	How to turn-over a room after each patient?				The nurse will wipe down the wow, chairs and everything that's in that space Patient can take the toys home with them. Not reusable, single use
17	The flow does not work – triage all the way at the back	4	3	12	
18	Is there a way to speed up the process if there becomes a backup of 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.
19	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
20	How can we do the swabs efficiently?	4	3	12	Provider and RN can collect the specimen together in the treatment room. Leave the mom in the room Just do everything there
21	How to bundle care?	3	3	9	Do medications, do testing, do discharge instructions all together- may be different from the normal process

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
22	Med log for each meds taken out. There is no omnicell in MPERT	3	3	9	
23	Patient becomes sicker- needs o go to EC	3	3	9	Stretcher/ wheelchair is available in MPERT. Scoop and go situation If patient is stable, they can go to the dirty side of the EC
24	Utilize 2 front desks for registration- to allow social distancing 2 computers at the registration should be enough 1 extra wow-put inside, in case there's a patient influx	3	3	9	
25	Triage area- space is small	3	3	9	Move it out by the window instead, the door and the angle makes it difficult to maneuver inand out of the room "redesign"
26	If triage is moved in front of the desk, is that easy enough to access handwash stations, as there is no purell station there.				Staff may need to walk to the wash station
27	No signage for room spaces (example room 1, 2, 3)	3	3	9	Label the spaces/partitions to keep it clear
28	Ensure there is space available to walk around the chairs as opposed to walking through them.	3	2	6	Since triage will be moved to the last row (where the chairs are) we will lose some of those space for chairs, and now people will be walking along the the edge of the waiting and not in between.

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
29	The room space is small, which is a challenge for social distancing.	3	3	9	Provider can go in first, then the RN comes in to do her tasks. Take turns.
30	Is there a physical subwait location?	3	3	9	There is no physical subwait location. Patient and family can go back to the waiting room and discharged
31	Big kids that we are not cathing, which restroom should they be using?	3	3	9	They can use a trailer bathroom (to be set up)
32	Multiple doors to the MPERT area.				The entrance is by the front desk and the exit is where the outside computers are located

High Priority Themes:

- Arrival/Registration Process
 - a. Make sure to accommodate increase influx of patients
 - b. Designated entrance/exits areas
- Triage area
 - a. Move by the window to have more space
- Assigned workstations for Providers and RNs
 - a. Accessible wireless printers
 - b. Printers for beaker, prescription, AVS, discharge papers
- PPE process- still for discussion

These documents are privileged from disclosure pursuant to Texas Occupations Code 160.007 and/or Texas Health & Safety Code 161.031-161.033 and/or the TRCP.

- Patient room space
 - a. Small space- bundle care, take turns in caring for the patients
 - b. No room numbers- will add signage
- Equipment and supplies – trashcans, handwash stations, printer, workstations, table for the workspace (mayo stands)
- Process when a patient needs to go to EC (emergently)