

Texas Children’s –Simulation-based Test (SbCST)

Project: Mobile Pediatric Emergency Response Team (MPERT) area evaluation
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 in order to reach levels of quality and safety that are comparable to those of the best high-reliability organizations.

In situ simulation, 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. It is likely that the most valuable benefits of *in situ* simulation are 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 in order to analyze causes, assess risk, and address resolutions (The Joint Commission, 2005). Incorporation of FMEA into patient strategies is required by Joint Commission 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 tabletop simulation was conducted by Skype with Emergency Center staff from the Main, West, and Woodlands campuses. Our goal was to identify potential latent safety threats in the Mobile Pediatric Emergency Response Team (MPERT) areas. 21 issues were identified.

Failure Mode and Effects Analysis Worksheet

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Project Aim/Goal: Identify potential latent safety threats in the Mobile Pediatric Emergency Response Team (MPERT) areas.

Targeted Units/Departments: Emergency Center (Main, West, Woodlands)

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 scale of 1-16.

	4 - Catastrophic	3 - Major	2 - Moderate	1 - Minor
Severity 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 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 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 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 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	Potential Solutions Identified During Debriefings By Participants and Observers
1	Zofran (2mg) unavailable <ul style="list-style-type: none"> 4mg pills available, but unable to cut the pill for 2mg. Can they use a liquid dose for 2mg? Can they use a unit dose vial and draw up? 	2	3	6	Checking with pharmacy about liquid/unit dose.
2	Decadron <ul style="list-style-type: none"> Currently listed for croup patients. Can they use for mild asthma? 	2	3	6	It would be ok to use decadron for mild asthma, but if the patient needed albuterol, they would send to EC.
3	Testing swabs <ul style="list-style-type: none"> Where are they being kept? Can we stock all the rooms with some? <ul style="list-style-type: none"> There may not be storage space. Can we stock on the WOWs? <ul style="list-style-type: none"> There are cubbies on the WOWs. 	2	4	8	
4	Labels for patient labs <ul style="list-style-type: none"> POCT needs opti-label. Other testing (cultures and swabs) needs beaker lab label. Concerns with providers taking specimens out of the room without being labeled. <ul style="list-style-type: none"> There are no tables inside the room to place the specimen on. Providers don't have access to the labels. RN has to print label and bring into the room. Can the RN perform the test to ensure it is labeled before taking out of the room? 	3	4	12	RN can perform nasopharyngeal swab. RN at West and Woodlands can perform throat swab and we will verify if Main can as well.
5	Access for ambulatory nurses <ul style="list-style-type: none"> Do they have access to Beaker or use the Rover? Will they have the same view of the MPERT area in EPIC, since their login capabilities may be different? 	3	4	12	They would need training. This is not something that can be done as just in time training.
6	Video for Covid information <ul style="list-style-type: none"> Need a TV for families to view. <ul style="list-style-type: none"> Main and West have one. Woodlands needs one. Need video available on DVD to play. 	1	4	4	It is ok if family does not see video before going home. They will be given a paper with the information.

Item #	Potential LSTs Identified During Debriefings By Participants and Observers	Severity of Effect	Probability for Occurrence	Risk Priority Number	Potential Solutions Identified During Debriefings By Participants and Observers
7	<p>Masks</p> <ul style="list-style-type: none"> • Do all patients and families need to wear a mask? <ul style="list-style-type: none"> ○ Even if no symptoms? ○ Currently only families with symptoms get them. ○ Family may be asymptomatic but still positive. 	3	4	12	All families in MPERT should have on a mask to protect the staff.
8	Can they go to MPERT if no fever, but they have not received their 2 or 4 month shots?	2	3	6	Yes, they can.
9	<p>Moving a patient from triage to a patient care room</p> <ul style="list-style-type: none"> • Who decides where they go? <ul style="list-style-type: none"> ○ Providers may not know process. ○ May need flow nurse. • How do they know which rooms are available? <ul style="list-style-type: none"> ○ In EPIC, there is an MPERT tab and the patient can be placed in a room or in wait. • How do they get there? <ul style="list-style-type: none"> ○ Tech can help walk them to a room. 	2	4	8	
10	<p>Does the RN and provider go in the room together for assessments?</p> <ul style="list-style-type: none"> • It would be ideal, but may not be possible. • Depends on workload. 	1	4	4	
11	<p>Do they chart outside the room?</p> <ul style="list-style-type: none"> • They will be sharing the WOWs. • The patient room space is small and WOW does not easily fit. • The WOW would need to be cleaned in if taking into the room. 	1	4	4	
12	<p>PPE</p> <ul style="list-style-type: none"> • Unsure of the PPE process. • Do they need new PPE for each patient? <ul style="list-style-type: none"> ○ May depend on quantity of supply. • Do they leave PPE on to chart after patient leaves? • Does the registration staff need PPE? <ul style="list-style-type: none"> ○ They will not be going into the rooms. ○ The patient and family will be in masks. 	3	4	12	<ul style="list-style-type: none"> • CAPRS/gown/gloves could be worn the entire shift, then change gloves after each patient. • The registration staff may need minimal PPE. Under the current guidelines, they can voluntarily wear a mask.
13	<p>Urine testing</p> <ul style="list-style-type: none"> • Do they cath the patient in the room or take to the procedure area? 	2	3	6	<ul style="list-style-type: none"> • Take the patient to the procedure areas to cath.

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	<ul style="list-style-type: none"> • Would they place the patient in the procedure area first and do the exam there if they know they will need to test? <ul style="list-style-type: none"> ○ Would need to pull a RN to see the patient there. ○ Should be able to place a patient in the procedure area in EPIC. ○ It would be too much for the triage nurse to decide if needed to cath the patient or not. • Who is collecting the specimen because they will need a second person to help hold the patient? • Will the APP see the urine culture results for follow-up? 				<ul style="list-style-type: none"> • Only use the procedure area if need to cath the patient. It is easy to turn the rooms over and clean if needed. • The nurse will collect the specimen with the help of a PCA. For Main, if PCA is not available, then they will utilize whoever is available. • The APP should still receive the results as they do currently.
14	Viral testing Do we send other viral testing at the same time as urine testing or do we wait on results of the urine test? <ul style="list-style-type: none"> • Depends on what we are seeing in the community. 	2	3	6	<ul style="list-style-type: none"> • If doing surveillance, then send both at the same time. • If not doing surveillance, then only send urine.
15	Nursing assessment <ul style="list-style-type: none"> • If we are trying to make it a short visit, do we need to shorten the nursing assessment by taking away the full assessment and creating a brief head to toe sheet? • Do we still need to do flu vaccine and suicidal ideation screening? 	1	4	4	<ul style="list-style-type: none"> • We do not need to do flu vaccine screening. • We only need to do suicidal ideation screening if presenting as a suicidal patient (would not be done in MPERT).
16	Cleaning process <ul style="list-style-type: none"> • Is it a quick clean or terminal clean for the patient rooms? 	1	4	4	There will be plastic chairs that we can wipe down.
17	Completing registration <ul style="list-style-type: none"> • We are unable to discharge the patient until the registration paperwork is complete. • Is there someone there at the checkout desk to complete the paperwork? 	2	4	8	<ul style="list-style-type: none"> • Patients can wait in holding area. • We can use the same process as super track, which processes them quicker.
18	Screening for MPERT <ul style="list-style-type: none"> • Should the screener auscultate the patient to help decide where the patient should be sent? <ul style="list-style-type: none"> ○ There could be discrepancies between their findings. ○ What findings would exclude the patient from going to MPERT? 	1	4	4	

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19	Transferring a patient to EC <ul style="list-style-type: none"> • In EPIC, they can't go back into waiting area after they have been placed in a room, so we need a room in the EC to place them in. • Do they take the patient to EC triage, directly to the room, or the waiting area? <ul style="list-style-type: none"> ○ Patient has already been triaged in MPERT. • Is there patient satisfaction scripting that we can use? 	3	3	9	<ul style="list-style-type: none"> • They would use the same process as an urgent care bounce back. However, Woodlands does not have urgent care. • Need to communicate with the EC Charge nurse.
20	Discharge prescriptions <ul style="list-style-type: none"> • Who will pick up off the printer? <ul style="list-style-type: none"> ○ Provider will need to sign. 	1	4	4	
21	Waiting Area <ul style="list-style-type: none"> • If patients are sent to the waiting area while waiting on test results, where do they give them the results? <ul style="list-style-type: none"> ○ There are concerns about maintaining confidentiality. 	2	4	8	
	none				

Priority themes identified:

The following general themes were identified as priorities among the LSTs to be addressed in final preparations:

1. Infection control needs to be consulted regarding PPE usage.
2. The team needs to verify availability of certain supplies and medications.
3. EPIC access and functionality needs to be verified.
4. The team needs to evaluate process for patients that need to be transferred to EC.