The Health Care Improvement Foundation
2017 Delaware Valley Patient Safety and Quality Award
Entry Form

1. **Hospital Name**

    Einstein Medical Center Montgomery

2. **Title Of Initiative**

    Quality Improvement Project

3. **Abstract (Please limit this description to 250 words.)**

    In Situ Interprofessional Obstetric Crisis Resource Simulation QI Project

    Rationale: Multiple studies continue to demonstrate that inter-professional teams form the basis of many health care problem-solving and decision-making mechanisms. However, more than 70% of medical errors are attributable to dysfunctional team dynamics. Countless research articles continue to document that health care teams are more complex than nonmedical teams and require more sophisticated knowledge of team dynamics and processes.

    Innovation: This innovative simulation experience positions the organization at the forefront of simulation education, providing In-Situ (in unit) high fidelity patient care scenarios, meets recommendations of The Joint Commission, respective insurance carriers and individual healthcare institution's Quality Committee requirements.

    Plan: The project was a collaborative effort between the organization's maternity unit and a graduate program within a School of Nursing. Both departments demonstrate expertise and a proven track record in the field of simulation education. This project provided multiple deliberate practice opportunities for clinical scenarios including postpartum hemorrhage and shoulder dystocia.In-Situ inter-professional team training in the organization's obstetrical suites enhanced team performance by allowing all providers the ability to master algorithmic treatment protocols, improve practitioner skill sets, reduce errors and improve patient outcomes in the vulnerable neonatal and maternal patient populations.

    Results: See results section in application

4. **What were the goals of your initiative?**

    Our project was designed to evaluate the impact of focused simulation activities on 5 areas including:

    1. team perceptions of the safety of the patient care environment

    2. effectiveness of teamwork

    3. effective management of OB crisis events (post-partum hemorrhage and shoulder dystocia)

    4. OB personnel self-efficacy and satisfaction with the simulation training

    5. identification of system issues related to patient care.

5. **What were your initiative's baseline data and the results of your initiative?**

We conducted a total of 4 days of critical event obstetric simulation sessions and accompanying evaluations over a 6-month period of time (January, 2017 – June, 2017) [Figure 1]. This quality improvement project was approved and coordinated with the organization's QI Department prior to implementation.

Each simulation was followed by a structured debriefing using the American Heart Association Structured and Supported Debriefing (SSD) model and the Gather, Analyze, Summarize (GAS) tool. Given the importance of debriefing as a key factor in stimulating reflection on overall performance and closure of performance gaps, each debriefing session was evaluated with a 360-degree evaluation process to ensure consistency and quality.

Figure 1: Evaluation Plan for Obstetric Simulation training intervention. SEE APPENDICES

Key:
Debriefing Assessment for Simulation in Healthcare (DASH) Student Version (SV), Instructor Version (IV) and Observer Version (RV).
Mayo High Performance Teamwork Scale
Post-partum Hemorrhage (PPH) skill checklist (Adopted from AWOHN and ACOG guidelines)
Shoulder Dystocia (SD) skill checklist (Adopted from AWOHN and ACOG guidelines)
Safety Attitude Questionnaire (SAQ) (with permission of the University of Texas Health Science School of Medicine Center for Healthcare Quality and Safety)

A total of 30 RNs and 13 provider (obstetricians and midwives) employees participated in a total of 13 obstetric crisis simulation events over 4 days of training with representation from OB, NICU and management. Three critical care nurses completing graduate education in anesthesia were trained as raters for the OB crisis events and for evaluation of the debriefing sessions. This represents a significant investment in faculty resources, but it was conceptualized as a parallel OB simulation training event for participants and a simulation faculty development exercise. We believe this process was the most efficient in order to increase the capability of the organization to provide simulation training on an ongoing basis.

6. **Describe the interventions that were instrumental in achieving the results for your initiative.**
Following is an analysis of outcomes of the Organization's OB simulation program.

1) Team Perception of the Safety of the Patient Care Environment
The perception of employees regarding the safety of the care environment has been found to be an effective surrogate marker for actual improvement in patient safety. The University of Texas Health Science School of Medicine Center for Healthcare Quality and Safety developed the Safety Attitude Questionnaire (SAQ) for this purpose. This valid and reliable survey instrument was administered before and after the OB simulation program. Findings at the organization indicated that the simulation training was effective in

improving scores across all 6 categories. A total 40 RN respondents completed surveys in January, 2017 and May 2017 (100% response rate at each time point). As can be seen on Table 1, the baseline campus scores were higher than benchmark mean scores reported by Sexton et. al. (2006)* for teamwork climate, safety climate, job satisfaction, perceptions of management and working conditions.

The largest improvements were seen in the Safety Climate and Stress Recognition categories.

2) Effectiveness of Teamwork (Mayo High Performance Teamwork Scale)

Teamwork during simulation was measured with the Mayo High Performance Teamwork scale. The Mayo tool is a validated observational instrument designed to deconstruct and evaluate the components of teamwork and team performance. This 16-item scale is separated into two sections. Section 1 (items 1-8) are critical evaluation elements and must also be scored. Section 2 (items 9-16) are optional evaluation items which are available to researchers. We evaluated the change in team performance between session 1 and session 8 through evaluation of items 1-8 (Table 2). We found that items 9-16 were frequently not observed or not applicable to our scenarios and thus were excluded from this analysis. Best-practice team performance elements were emphasized during team meetings and pre-shift briefings across the time frame of the project. Team skills were also discussed in all post-simulation debriefing sessions.

All areas on the Mayo Team Performance instrument demonstrated positive change except for item 7 (Team members refer to established protocols and checklists for the procedure/intervention). This item did not demonstrate improvement despite distribution of management protocol pocket cards, placement of posters in patient care areas and active encouragement for use in pre-briefing and de-briefing sessions. This is not an unexpected finding as multiple authors have reported challenges in having clinicians use cognitive aids during management of actual clinical events. We were encouraged that 7/8 teamwork categories (87.5%) demonstrated improvement.

3) Management of OB Crisis Event (post-partum hemorrhage and shoulder dystocia)

Simulation day 1 and 4 utilized shoulder dystocia as the crisis event and day 2 and 3 focused on post-partum hemorrhage (PPH). On each day we conducted 2-3 events with different teams of providers participating. Shoulder dystocia was used for session 1 and 8 to maximize reliability in our evaluation. Session 1 (day 1) was compared with Session 8 (day 4) for the purposes of evaluating performance in provider management of OB crisis events. Shoulder dystocia management was evaluated using a 19 item checklist (validated through referencing to current best practice standards) with performance evaluated on each checklist item as correctly performed, partially performed or not performed. Scores were averaged across three raters and an aggregate total completion score was calculated for team checklist completion (Table 3). Overall, the teams of participants showed slight improvement (7%) from Day 1 to Day 4. It should be noted that the teams were comprised of different personnel and that baseline scores were high

(and thus difficult to improve).

4) Self-Efficacy and Satisfaction Measures

Across the 4 days of simulation training, participants reported a high level of satisfaction across a variety of items. These satisfaction and self-efficacy items are based on numerous examples in the literature and were adopted from tools which have been validated through use at WISER (Pittsburgh, PA). A 5-point Likert scale with 1 = Strongly Disagree and 5 = Strongly Agree was used as the assessment scale with participants demonstrating high ratings in both satisfaction and self-efficacy measures on both day 1, session 1 and day 4, session 8 (Table 4). Our analysis reveals that even with our high levels of satisfaction across all sessions, there was nevertheless slight improvement in satisfaction from Session 1 to Session 8. Across the 9 individual items in the checklist, participants scored higher on 7 of the items. The largest improvement came from item 6 (methods accomplished objectives). Item 1 (was the simulation effective) showed a slight decrease in scores, due to all participants giving this item the maximum rating on Day 1.

5) Debriefing Assessment for SIM in Healthcare (DASH tool)

A validated and reliable instrument was used to assess each debriefing session. The Debriefing Assessment for SIM Healthcare (DASH, Center for Medical Simulation, Harvard, Boston MA) was used with participants, instructors and evaluators who were asked to complete a 6-question assessment after observing/participating in each simulation event. Scores were evaluated on a 1-7 Likert scale with 1 = Extremely Ineffective/Detrimental and 7 = Extremely Effective/Outstanding. Once recorded, scores were aggregated across the three categories of respondents and then compared from Session 1 to Session 8 (Table 5). Overall, the average improvement was 13% across all items. Item 5 (identifying what was done well/poorly) improved by 1.15 points from the Session 1 to Session 4. While there were large raw improvements in scores across items, our sample was too small to show statistically significant improvements across items.

7. **How can this initiative be replicated through the region? (Please limit this description to 100 words.)**

This initiative can be replicated through the region utilizing a Gaumard Veronica OB simulator that is brought to the OB nursing unit for regularly scheduled In Situ simulations in lieu of simulation labs. This effective educational modality is widely supported in the simulation literature as an effective way to educate providers, maintain competence and simulate high acuity low occurrence situations.

8. **Explain how the initiative demonstrates innovation (Please limit this description to 100 words.)**

The majority of simulation education occurs in dedicated simulation labs that require significant capital outlay. Very few nationally prominent health care facilities offer In-Situ (in the unit) simulation. This innovative simulation experience positioned the organization

at the forefront of simulation education by providing high fidelity H.A.L.O. (high acuity, low occurrence) case scenarios. The culmination of this project will yield a multidisciplinary simulation program that can be implemented and replicated through the organization's healthcare network and beyond.

9. How does this initiative demonstrate collaboration with other providers within the continuum of care? (Please limit this description to 100 words.)

> This in situ interprofessional collaboration required the cooperation of multiple departments that participated in this QI initiative. The following department's participated:
> Anesthesia
> Neonatal Intensive Care Unit
> Respiratory Care Unit
> OB Unit
> Obstetricians
> Midwives
> Graduate Nurse (APRN students)
> QI Department Members
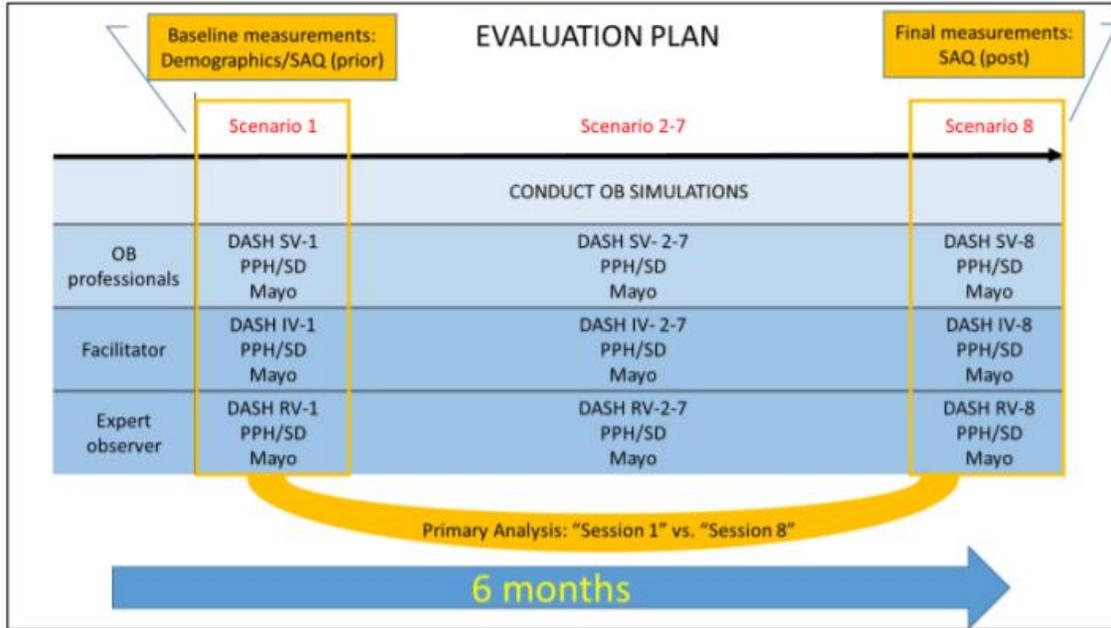> Administration
> Simulation Expert Consultants
>
> TeamSTEPPS training was implemented with this initiative at the prebrief and debrief of each simulation session.

10. Explain ways in which senior leadership exhibited commitment to the initiative (Please limit this description to 100 words.)

> Senior leadership participated in this project from the initial request phase through the results phase. The COO, CNO, Vice President of Healthcare Services supported this program and attended many simulation sessions as observers. This program was made possible through the 50% support of the organization and 50% support of the graduate nursing program.

11. Appendices (i.e., tables and graphs)

Appendices
Figure 1, Table 1 through 5
In Situ OB Simulations

EVALUATION PLAN

Baseline measurements: Demographics/SAQ (prior)

Final measurements: SAQ (post)

	Scenario 1	Scenario 2-7	Scenario 8
		CONDUCT OB SIMULATIONS	
OB professionals	DASH SV-1 PPH/SD Mayo	DASH SV- 2-7 PPH/SD Mayo	DASH SV-8 PPH/SD Mayo
Facilitator	DASH IV-1 PPH/SD Mayo	DASH IV- 2-7 PPH/SD Mayo	DASH IV-8 PPH/SD Mayo
Expert observer	DASH RV-1 PPH/SD Mayo	DASH RV-2-7 PPH/SD Mayo	DASH RV-8 PPH/SD Mayo

Primary Analysis: "Session 1" vs. "Session 8"

6 months

Table 1: Team Perception of the Safety of the Patient Care Environment December to May

Category	*Benchmark Data Mean (SD)	December	May	% Change
Teamwork Climate	68.9 (3.7)	75.0	79.7	4.6%
Safety Climate	66.7 (3.8)	73.4	80.3	6.9%
Job Satisfaction	47.5 (6.4)	73.4	77.0	3.6%
Stress Recognition	64.9 (5.4)	58.4	64.0	5.5%
Perceptions of Mgt.	56.7 (4.5)	67.8	72.4	4.6%
Working Conditions	66.5 (6.8)	69.7	71.3	1.6%
Composite Score	**61.9 (5.1)**	**69.6**	**74.1**	**4.5%**

*Benchmark data for SAQ scores extracted from Table 2, pg. 6 in Sexton JB, Helmreich RL, Neilands TB, et al. The Safety Attitudes Questionnaire: psychometric properties, benchmarking data, and emerging research. BMC Health Serv Res 2006;6:44. Benchmark data based on 10,843 responses across six patient care environments in three countries.

Appendices
Figure 1, Table 1 through 5
In Situ OB Simulations
Table 2: Mayo Team Performance Instrument scores comparing improvement during OB simulation between session 1 and session 8.

Mayo Team Performance Instrument (Mayo)	Change (+, -, or 0)
1. A leader is clearly recognized by all team members.	+
2. The team leader assures maintenance of an appropriate balance between command authority and team member participation.	+
3. Each team member demonstrates a clear understanding of his or her role.	+
4. The team prompts each other to attend to all significant clinical indicators throughout the procedure/intervention.	+
5. When team members are actively involved with the patient, they verbalize their activities aloud.	+
6. Team members repeat back or paraphrase instructions and clarifications to indicate that they heard them correctly.	+
7. Team members refer to established protocols and checklists for the procedure/intervention.	0%
8. All members of the team are appropriately involved and participate in the activity.	+
% of items with positive change	87.5%
% of items with negative change	0%
% of items with no change (0)	12.5%

Table 3: Shoulder Dystocia Checklist performance scores comparing improvement during OB simulation between session 1 and session 8.

	Session 1	Session 8	% Δ Session 1 vs. 8
% of Total Number of Checklist Items Completed	82%	89%	7%

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Table 4: Self Efficacy and Satisfaction Measures: Session 1 vs. Session 8

	Day 1, Session 1	S1- SD	Day 4, Session 8	S8- SD	% Δ Session 1 to 8
This simulation scenario was effective in allowing practice for OB crisis events	5.0	0.00	4.92	0.28	-1.6%
This simulation scenario enhanced my knowledge about OB crisis management.	4.78	0.44	4.85	0.38	1.4%
The facilitators/instructors were effective in conducting the simulation	4.78	0.44	4.85	0.38	1.4%
The objectives of the scenario were clear to me	4.89	0.33	5	0	2.2%
The simulation methods accomplished the scenario objectives	4.78	0.44	4.92	0.28	3.0%
The simulation methods accomplished the scenario objectives	4.56	0.53	4.77	0.44	4.2%
I am confident that I have the skills needed to manage an OB crisis simulation event	4.67	0.50	4.62	0.65	-1.0%
I am confident that I have the skills needed to manage an OB crisis event in real life	4.56	0.53	4.69	0.48	2.8%
This simulation event increased my confidence in working with members of the team during an OB crisis event	4.67	0.50	4.85	0.38	3.6%
Composite Score	**4.74**	**0.41**	**4.83**	**0.36**	**1.8%**

Table 5: Debriefing Assessment for SIM Healthcare (DASH) Session 1 vs. Session 8

Debriefing Assessment for SIM Healthcare (DASH)	Mean Score- 1	Mean Score- 8	Δ Session 1 to 8	% Δ
1. The instructor set the stage for an engaging learning experience.	5.11	5.95	0.84	12.0%
2. The instructor maintained an engaging context for learning.	5.11	5.84	0.73	10.4%
3. The instructor structured the debriefing in an organized way.	4.70	5.64	0.94	13.4%
4. The instructor provoked in depth discussions that led them to reflect on their performance	4.37	5.34	0.97	13.9%
5. The instructor identified what they did well or poorly and why.	4.22	5.37	1.15	16.4%
6. The instructor helped them see how to improve or how to sustain good performance	4.59	5.42	0.83	11.9%
Composite Change	**4.69**	**5.59**	**0.91**	**13.0%**