Stop the Bleed and Seize Control: The Use of Simulation and Video Modules in Educating Emergency Department Staff Regarding Maternal Hypertension and Hemorrhage

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Stop the Bleed and Seize Control: The Use of Simulation and Video Modules in Educating Emergency Department Staff Regarding Maternal Hypertension and Hemorrhage

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Abstract

**Problem:** This quality improvement project aims at Hospital X meeting the new Joint Commission (JC) provisional deadline through the implementation of simulation training and video development as a way of educating emergency department (ED) staff in recognizing and treating preeclampsia (PreE) and postpartum hemorrhage (PPH).

**Context:** This quality improvement project utilizes evidence-based practice, California Maternal Quality Care Collaborative (CMQCC) toolkits, and JC standards to educate ED staff on worsening cases of maternal morbidity and mortality nationwide. Research shows that early recognition and prevention of maternal hemorrhage and preeclamptic emergencies has the highest probability of decreasing maternal complications in the ED.

**Intervention:** This project implemented simulation training and video development in the ED showcasing a fictitious patient scenario with PreE and PPH. The participants involved included staff nurses, medical doctors (MDs), technicians, educators, and clinical nurse leader (CNL) students. A concept map and a plan-do-study-act (PDSA) cycle was also developed by the CNL students to outline project goals with the guidance, input, and approval from clinical educators.

**Measures:** The outcomes for the simulation training were measured through pre-and post-simulation training surveys and debriefing responses completed by ED staff. Measures for the training videos have not been analyzed as they will not be implemented into Hospital X’s online Knowledge Center module until early January 2023. Follow-up data will be collected by clinical educators.

**Results:** Results from the surveys showed that ED nursing staff did not feel confident in recognizing and treating PreE or PPH. The majority of them had little to no experience with labor and delivery patients and were not aware of the current policies and protocols in place at
Hospital X’s ED. However, after participating in the simulation training, it was found that there was an increase in confidence level and educational knowledge among ED staff.

**Conclusion:** The objective of this project was for Hospital X to meet the JC deadline for implementing educational simulation training in the ED on early recognition and treatment of PreE and PPH. Through the project, it was found that ED nursing staff lacked confidence and knowledge in treating obstetric emergencies. After the simulation training was implemented, the staff’s confidence levels, and knowledge increased. This showcased positive results and motivated educators to create a simulation training video with CNL students to incorporate into future annual training sessions.

*Keywords: preeclampsia, postpartum hemorrhage, simulation training, video training, emergency department, Joint Commission*
Stop the Bleed and Seize Control: The Use of Simulation and Video Modules in Educating Emergency Department Staff Regarding Maternal Hypertension and Hemorrhage

In an emergency department (ED), staff are trained and equipped to provide treatment to patients requiring immediate care. Whether it is providing care for trauma victims, heart attack patients, or pregnant/postpartum mothers, emergency room staff are faced with challenging situations with incoming patients having a variety of different signs and symptoms (White, 2006). According to Dr. Pluym, a Maternal and Fetal Medicine doctor at the University of California, Los Angeles (UCLA) who conducted a cohort study evaluating ED use among postpartum women, found that approximately “1 in 20 women will use the ED within the first 6 weeks after delivery for unscheduled medical care” (Pluym, 2021). Dr. Pluym goes on to further explain how this prevalence rises to 1 in 12 women within the first 90 days following delivery (Pluym, 2021). According to the Centers for Disease Control and Prevention (CDC), “about 700 women die from pregnancy-related complications each year in the U.S, and about 3 in 5 pregnancy-related deaths can be prevented (CDC, 2019). Preeclampsia (PreE) and postpartum hemorrhage (PPH) are among the pregnancy-related complications that can lead to death, and both are commonly seen among patients presenting to the ED sometimes days or weeks after delivery.

PreE is defined as a blood pressure condition that develops during pregnancy causing high blood pressure that is usually accompanied by high levels of protein in the urine, more commonly known as proteinuria (Cleveland Clinic, 2021). Due to the high elevation in blood pressure seen in PreE patients, there is an added amount of stress on the heart and other organs which can lead to complications with kidney function, and fluid buildup causing edema. Patients presenting to the ED with PreE can have symptoms such as headaches, blurry vision or light
sensitivity, abdominal pain, edema, and shortness of breath (Cleveland Clinic, 2021). If left untreated, PreE can be fatal for both the mother and fetus leading to HELLP syndrome (hemolysis, elevated liver enzymes, and low platelet count), due to an increased risk for heart attack, stroke, and PreE with severe features which can lead to seizures. (Cleveland Clinic, 2021).

Obstetric hemorrhage is one of the most common complications of childbirth and is defined as the cumulative blood loss greater than 1000 mL within a 24-hour period for either vaginal or cesarean birth, although previously it was defined as greater than 500 mL of estimated blood loss for a vaginal delivery (CMQCC, 2022). While the change was made with the previous knowledge of blood loss usually being underestimated, a blood loss of 500 mL for a normal spontaneous vaginal delivery should be considered abnormal and taken as a sign of further interventions being needed. Obstetric hemorrhage can be categorized into primary PPH, and secondary PPH. Primary PPH occurs in the first 24 hours after delivery, while secondary PPH is bleeding that can occur from 24 hours to 12 weeks postpartum (Wormer, 2022). With high levels of blood loss, postpartum mothers can have an increased risk of complications with infection, hypovolemic shock, and ischemic injury to the liver, brain, heart, kidney, and potentially death (Wormer, 2022).

Due to the potentially dangerous consequences discussed for PreE and PPH, being able to provide immediate care to mothers with pregnancy complications is of high importance in the ED. Effective as of January 1, 2020, the Joint Commission (JC) implemented new Maternal Safety Standards enforcing emergency preparedness and readiness to improve the quality and safety of care provided to women during all stages of pregnancy and postpartum (Joint Commission, 2019). These new standards created by the JC determined that there is an increased
need in promoting preparedness among emergency room staff to reduce the risk of perinatal harm and increase preparedness when responding to an obstetric emergency. With these new guidelines, every hospital with an ED is required to have protocols that are JC compliant to care for ED patients presenting with maternal complications. Specific to this project, a quality improvement team of CNL students worked with a non-profit hospital to meet these new JC standards and educate ED nurses and clinical staff using live hands-on simulation training and online videos to increase preparedness in preeclamptic and PPH maternal emergencies.

**Problem Description**

The JC is a United States-based organization that accredits more than 22,000 US health care organizations and programs (Joint Commission, 2019). Upon evaluating expert evidence, the JC found that “the U.S ranks 65th among industrialized nations in terms of maternal death” (Joint Commission, 2019). This national issue evaluated by the JC found that early recognition and prevention of maternal hemorrhage and preeclamptic emergencies had the highest probability of decreasing maternal complications. With that being said, the JC standards for maternal safety changed in requiring all hospitals in the US to meet new training requirements to improve the quality of care and overall safety of pregnant and postpartum mothers in the ED. This quality improvement project addressed this issue by detailing the new provisions hospitals must meet to maintain accreditation standards.

Hospital X is a not-for-profit facility that has two large medical centers, Hospital A and Hospital B. They are recognized for their centers offering inpatient and outpatient care, as well as their neuroscience center, cancer care, and high-risk-obstetrics. However, while Hospital A is fully equipped with a Labor and Delivery (L&D) unit, Hospital B is not. Additionally, Hospital X does not currently have a policy or procedure in place outlining the treatment and care that
The use of simulation training should be provided to preeclamptic or PPH mothers presenting to the ED. With the new provisions mandated by the JC, Hospital X was fined for being two years behind in implementing a plan of standards of care for preeclamptic and PPH mothers. Their lack of preparedness and failure to meet JC standards jeopardized their accreditation and required them to meet a short deadline. To meet these standards, Hospital X was required to complete a simulation training in the ED showcasing a PPH, and preeclamptic emergency requiring nurses and staff to understand and recognize early symptoms to be able to timely treat and prevent serious complications.

In the design of this project, CNL students worked concurrently with educators in creating a simulation training to meet JC standards. Provisions 2, 3, and 5 required the development of an algorithm for the identification and treatment of PreE, and PPH, as well as a plan to implement annual drills as a part of an on-going quality improvement effort in the ED. Provision 2 specifically discussed the need to use an evidence-based tool for the stage-based management of patients experiencing maternal hemorrhage. This provision outline included the algorithm for the identification, treatment, and emergency response medications that would be needed in an obstetric unit. Hospital X did not have something like this in place and did not have proper medication dosages of Magnesium Sulfate or Pitocin in their Pyxis medication dispensing system. As provision 3 required a dedicated hemorrhage supply kit fully stocked, Hospital X failed to meet this requirement due to missing medications. Lastly, provision 5 required Hospital X to conduct drills annually to determine system issues and improve maternal treatment efforts. Hospital X has urged the importance of this quality improvement project and understands that by implementing change not only would they be meeting JC standards, but they would also provide
evidence-based education to all staff about the quality and safety of care provided to women in the ED.

Available Knowledge

This project focused on understanding the importance of implementing simulation training in the ED to be able to better treat preeclamptic and PPH emergencies. In completing the literature review, it was found that there was lack of research articles discussing the benefits of having simulation training in the ED. However, after data was synthesized, studies were chosen based on the relevance to the PICOT question. The PICOT question is as follows: In emergency department staff (P), will implementing curated maternal hemorrhage and preeclampsia simulation training and recorded simulation video modules (I) improve staff’s knowledge of treatment modalities for preeclampsia and postpartum hemorrhage (O) as compared to prior to simulation (C)?

In a community hospital in Northeast U.S that serves an underserved population, a low-cost simulation was developed for PPH, and PreE (Magee, 2013). This study aimed at assessing the effectiveness of having obstetric emergency simulation training among 20 family medicine residents. Of those 20 residents participating in the study, 10 were randomly assigned to an intervention group simulating PPH and PreE with a debriefing while the other 10 were assigned to a control group being lectured on PPH and PreE. All participants were later given an oral exam after six months, on the respective scenario to which they were assigned. Data was analyzed using the participants’ overall performance on pre-test and post-test results using a Wilcoxon Rank Sum which found a significantly higher examination score in trainee knowledge for those residents who were assigned to the intervention simulation group in comparison to
those who were only lectured (Magee, 2013). Although this study had a small sample group, it demonstrated the benefits of simulation training in increasing trainee knowledge.

In Brazil, gestational hypertensive syndrome is one of the main causes of maternal morbidity and mortality (Nobrega, 2021). Due to this high impact, a methodological simulation study was created to assess the benefits of simulation training on the management of severe PreE in newly graduated students. This study included 10 volunteers who received simulation training at the public university in Brasilia with 20 minutes of pre-briefing and 10 minutes of debriefing. Volunteer performance scores were calculated using a scenario checklist meeting the proper steps on the management of severe PreE. After completing the simulation, volunteers’ scores were divided into two categories, one being newly graduates who have had simulation training in the past, and the second being those who had never had simulation training. Result scores were then analyzed through a Likert scale, and it was discovered that those who had simulation training in the past scored higher than those who did not. Although this study had a small sample size, it validated the study’s objective goals of assessing whether simulation training is effective in educating on the detection and early management of preeclamptic emergencies (Nobrega, 2021).

Another study that was similar to this quality improvement project, utilized in situ PPH simulation training exercises to train physicians, nurses, midwives, and residents. This simulation scenario showcased a PPH scenario requiring staff to activate blood transfusion protocol and deliver neonatal resuscitation using a Noelle obstetric manikin simulator. The simulation took place in an L&D unit and ran over two days with 113 individuals participating in eight simulations and one debrief per day (Lutgendorf, 2017). After the simulation, anonymous post-surveys were conducted regarding simulation experience and comfort in managing clinical
scenarios before and after receiving training. Using a 5-point Likert scale, provider comfort was assessed, and results showed that participants reported having a higher comfort level in managing obstetric emergencies such as PPH after having simulation training in comparison to before training (Lutgendorf, 2017). In conclusion, the results demonstrated that simulation training was a safe and effective educational teaching method.

In a different randomized control trial study, the effects of having a one-day simulation training were assessed to investigate if the effects of teaching declined within one year. This study used 24 obstetric units with 12 units being randomized into a one-day simulation training, and the other 12 units receiving no training (Van De Ven, 2017). The teaching outcomes between both groups were assessed during the first four quarters for changes over time and it was discovered that the benefits of a one-day simulation training seemed to decline after three months. This study goes on to recommend having repetitive training sessions every three months as this would show better improvement and knowledge retention among staff. The literature review found in this study was beneficial to this quality improvement project because of the JC requiring Hospital X to perform annual training sessions. However, if research shows that the benefits of one-day simulation training begin to decline after three months, it would be imperative for Hospital X to perform multiple simulations throughout the year.

In Spain, a quasi-experimental research study using clinical simulation analyzed the effects of obstetric emergencies among a multidisciplinary group responding to a PPH. A PPH scenario was created using a high-fidelity simulation room, control room, and technical skills training room to evaluate the training performance of 30 health professionals with one gynecologist, one midwife, and one nurse working as a team per scenario (Hernandez, 2021). The simulation training experiment was no longer than 10 minutes and was followed by a 30-
minute debriefing phase. To evaluate the effects of the training, participating health professionals took a satisfaction questionnaire comprised of eight items scored on a Likert scale. The results obtained from the satisfaction questionnaire qualified the simulation experience as “very positive” and showcased that learning through simulation training required the use of critical thinking skills, communication, and teamwork. It was also found that after participating in the simulation, health professionals felt their skills significantly improved in a safe effective manner.

To highlight the important components of implementing PreE simulation training, a clinical trial study of 90 midwives divided into three groups of simulation, blended, and lecture-based education, used structured clinical pre-and post-tests to examine performance scores (Tabatabaeian, 2018). Midwives who were in the simulation group received six weeks of training for six hours a day in a clinical skills lab, and the blended group received six weeks of four-hour lecture days, while the lecture group received six weeks of six-hour lecture days. Upon completion of the study, structured clinical tests were performed two weeks after the intervention which were then analyzed using both pre-and post-test results in an analysis of variance (ANOVA). The study results showed that the mean score of midwives’ performance significantly increased after receiving education and was significantly higher in the simulation and blended study group. The results go on to further explain how participants who received simulation experience showed an increase in the management of PreE in comparison to the educational group. Lastly, in this study, it was found that having a safety project using simulation education also helped in team building and communication among midwives.

In conclusion, literature review shows the importance of using simulation training to help educate staff and build a successful patient safety program to improve patient care outcomes. Simulation training has shown how having role specific education can improve knowledge
retention skills, helping with emergency preparedness, recognition, and response time. Quality improvement opportunities recognized by the CMQCC toolkit discussed the effects delay in response from team members can have on maternal hemorrhage. As this project focused on using simulation training to support preparedness in the ED, literature review has outlined the benefits of using hands-on training to educate nursing staff on obstetric emergencies (CMQCC, 2022). For this project in particular, literature supports CMQCC guidelines on the increased emphasis in implementing the best practices to prevent maternal death and complications.

**Rationale**

Implementing change in the workplace is never easy as it can easily interrupt the current workflow and lead to conflict. However, successfully implementing change needs a proper framework. For this Quality Improvement Project, Kotter’s 8-step change model was used to successfully implement change in an organizational manner (Kotter, 2021).

The process starts with creating an urgency (1). In this first step, Hospital X was required to complete simulation training on PreE and PPH education preparedness by a specific time to meet the JC deadline. The guiding coalition (2) for Hospital X was built in reference to nurse educators, ED educators, clinical nurse specialists, nurses, development specialists, and CNL students all coming together in creating proper educational materials to help facilitate this transitional change of simulation training. The strategic vision (3) to create change involved the full process of creating a PreE and PPH scenario where a patient presents to the ED prompting staff to assess, diagnose, and treat in a timely manner. In enlisting volunteers and communicating this vision (4) CNL students created flyers, attended huddles to discuss simulation training, and created pre-and post-surveys. ED nurses and educators communicated among staff about participation, and Hospital X’s Knowledge Center was used as an additional resource for
education. Obstacles are always bound to occur when implementing change. In preparing to remove obstacles (5) a trial-and-error method was used upon observing the first simulation. Staff turnout was great, but responses to surveys were minimal which required more effort from CNL students to promote and disperse survey QR codes throughout unit floors to be able to acquire data. In accomplishing short-term wins (6) simulation training was successful in the number of nurses and providers who participated. The excitement among everyone was clear, and the staff discussed how much fun they had participating. To build on this change (7) Hospital X saw the success of simulation training as not only meeting the JC deadline but also as beneficial to employee knowledge. To anchor this change (8), Hospital X nurse educators and ED educators worked collectively with CNL students in the creation of a simulation training video to be uploaded to the hospitals’ online Knowledge Center to be incorporated in the future as an educational tool. In addition to that, educators learned how yearly simulation training can be successful in increasing awareness and preparedness on obstetric emergencies in the ED.

Specific Aim

By implementing annual simulation training we aim to fulfill one of the JC guidelines necessary for accreditation while increased ED staff comfort in recognizing and responding to maternal hemorrhage and hypertension/preeclampsia by 10% by April 2022, as well as introducing maternal hemorrhage and preeclampsia simulation videos as a new training modality by January 2023.

Section III: Methods

Context

A clinical microsystem is defined as a “small interdependent group of people who work together regularly to provide care for a specific group of patients” (IHI, 2022). The microsystem
that this quality improvement project focused on were the ED units at Hospital A and Hospital B that belong to a larger organization, Hospital X. This microsystem includes nurses, doctors, clinical educators, and administrative support teams who provide treatment services to the presenting population of patients in the ED. As this hospital operates in two different locations, a community health needs assessment (Appendix A) was created to better understand the services being provided and the population being affected. As recent as 2019, in this specific county, population demographics consisted of 1,323,913 patients being served, with more than 59% of patients being white, and 28% being uninsured.

In addition to that, to assess the two ED units, a Root Cause Analysis (RCA) (Appendix B) was created to better understand the defining problem both ED departments were facing in not meeting the JC deadline. The focus project point of this microsystem was to meet the JC deadline in implementing education training in the ED to recognize early symptoms of PreE and PPH promptly. The RCA created, examined the 13 new provisions made by the JC along with the need to conduct annual drills to fulfill requirements and provide role-specific education to all ED staff and providers.

To fulfill JC requirements, CNL students and clinical educators worked collectively in holding simulation training days at both Hospital A and B’s EDs. CNL students worked on creating a Plan-Do-Study-Act Cycle (PDSA) (Appendix C) to better manage and control the process of developing and implementing simulation training in the ED. The PDSA cycle outlined the steps needed to successfully run simulation training in the ED and discussed timelines in the project aim, proposal development, recruitment plans, development of educational material and surveys, and the collaboration needed to conduct simulation training.
A SWOT Analysis (Appendix D) was also created underlying the benefits of collaboration and support among staff during these training simulations, as well as the opportunities to increase readiness in treating obstetric cases presenting to the ED. In addition, there was a further analysis of the possibilities of time constraints, and potential financial threats that could affect participating staff and project follow-through.

**Cost Benefit Analysis**

For this quality improvement project, costs were estimated based on the median wages for RNs ($80/hr.), ED techs ($29/hr.), RN ED director ($99.49/hr.), RN ED manager ($83.60/hr.), and simulation instructors ($53.68/hr.). Although this simulation skills project required the use of a manikin and medical equipment, those costs were not included in the cost-benefit analysis (see Appendix E) as Hospital X already owned the needed materials to be able to perform the simulation at both locations. Participating MDs involved in the simulation were also not included in the cost analysis as their wages are paid through an outside third party and therefore were not considered as part of the costs associated with the development and training of the simulation. Unfortunately, CNL students were not allowed insight into the fine Hospital X received due to not meeting the original JC deadline, but the overall estimated total cost based on policy and simulation development with those involved in the training was $7,574.05.

**Intervention**

To meet the March 4th JC deadline a simulation training focusing on PreE and PPH was created. This was a multi-step process that involved staff RNs, MDs, clinical educators, CNL students, ED technicians, and a simulation tech. JC standards needed to be met with ED staff receiving educational training on how to recognize and treat PreE, and PPH symptoms. CNL students came together with clinical educators in discussing outcome goals and formulating a
layout of the quality improvement project. In researching the JC standards, a Concept Map (Appendix F) was created that outlined the new provisions implemented and what must be conducted to fulfill new standard protocols. This concept map created analyzed both PreE and PPH and assessed the current hospital policy as well as the California Maternal Quality Care Collaborative (CMQCC) guidelines along with outlining individuals involved, and the funding and equipment needed to implement a successful simulation training with debriefing opportunities.

Through weekly meetings, tasks were assigned in which CNL students created flyers (Appendix G) and pre-survey questionnaires (Appendix H) analyzing the staff’s comfort level in recognizing and treating PreE and PPH patients as well as assessing the estimated number of pregnant and postpartum patients seen in the ED weekly. Students also attended morning huddles in voicing simulation training dates to encourage staff to participate and answer survey questions.

For the actual simulation training, ED educators created a fictitious patient simulation scenario (Appendix I) on a postpartum patient being admitted to the ED with a severe headache and increased vaginal bleeding, exhibiting symptoms of PreE and PPH. The curriculum goals included having ED staff successfully identify the signs and symptoms of PreE and PPH, implement the steps needed in performing a fundal massage, administering the correct anti-hypertensive and seizure medications, and administering blood to stabilize and initiate treatment promptly. During simulation training days at both hospitals, the student roles included serving as observers and conducting debriefing questions to gather and collect data on the success and comfort levels of those participants involved.
While working on the development of the simulation, clinical educators decided to assign CNL students a second project in creating a simulation training video (Appendix J) showcasing the steps taken when treating a preeclamptic and PPH patient as seen in the simulation. This training video was recorded and edited to be uploaded to Hospital X’s online Knowledge Center where all employees would have access to view the appropriate teaching steps taken and complete an online module. Unfortunately, although the script and video recording were finalized, due to the hospital starting the project early, this video will not be published until early January 2023. However, it is the CNL students’ recommendation that the video go live as soon as possible to increase staff awareness and preparedness for obstetric emergencies in the ED.

Study of Intervention

The study of the intervention for the PreE and PPH simulation training and video recording was done on a weekly and monthly basis following meetings with clinical educators and CNL students and having post-simulation discussions at both hospitals. The post-simulation discussions provided an opportunity for team members to have an open discussion and receive feedback from participants, answer questions, and assess any barriers contributing to the training. OBGYN and ED specialists also served as an important resource in clarifying medication administration and side effects. It was during this time that ED educators and CNL students became aware of the hospitals’ unpreparedness in not having the correct medication dosage for Magnesium Sulfate, missing Pitocin in their Pyxis medication dispensing system, and ED nurses being unaware of how to perform a fundal massage.

The measure strategies to assess the success of meeting the JC deadline and educating ED staff with simulation training included dispersing flyers with surveys, creating video scripts, and analyzing survey results based on feedback from participating staff. As the training video will
not be implemented until early January 2023, data will be further obtained after staff complete the online Knowledge Center course where the training video will be published. Feedback will then be assessed on the staff’s level of comfort in treating PreE and PPH patients, and overall experiences with having annual educational training sessions at both EDs.

**Measures**

Measures for the PreE and PPH simulation training were aimed at analyzing the staff’s level of confidence and comfort when treating these specific patient cases in the ED. The process used to measure this was through the creation of flyers (see Appendix G) posted at both hospital locations A and B which directed participating staff to take a pre-survey questionnaire (Appendix H) on maternal hypertensive disorders and PPH. Participants taking the survey were asked questions on their level of comfortability in recognizing and treating PPH and PreE on a Likert Scale of 1-10, 1 being totally uncomfortable and 10 being totally comfortable. Other questions asked were on average, how many pregnant or postpartum patients are seen in the ED, and whether or not they were aware of the current policies and protocols Hospital X had in place when patients present to the ED with PPH and PreE.

Following the simulation skills training, participants were also directed to a second post-survey (Appendix K) which questioned their level of comfort in recognizing and treating preeclamptic or PPH patients after having participated in the training. These questions asked were also on a 10-point Likert scale with 1 being totally uncomfortable and 10 being totally comfortable.

CNL students also created a simulation training video (Appendix J) that showcased the common steps taken when treating a preeclamptic or PPH patient in the ED. This video will be uploaded to Hospital X’s Knowledge Training Center to be viewed by all employees following
the completion of an online training course in early January 2023. Data for this is yet to be collected but it is the CNL students’ recommendation to publish the video earlier to assess the success rate of the overall training.

**Ethical Considerations**

The research participants in this study involved RNs, MDs, OBGYN specialists, a sim lab technician, clinical educators, CNL students, and a manikin. The scenario was not based on actual patient information and was created from a fictitious patient scenario therefore there were no HIPAA violations. Staff participants involved in the simulation training were not subjected to any harm, and data collected was through sign-in sheets and survey results. For future considerations, if a patient was to present to the ED with PreE or PPH symptoms, a patient’s religious background such as Jehovah’s Witness, and their refusal of blood products should be taken into consideration. Upon treatment, providers should be aware of a patient’s right to self-determination and be culturally competent as to how other religions and cultures may decline certain medications, food, or blood products. This project was reviewed by the University of San Francisco and was approved as an evidence-based activity that does not require IRB approval (Appendix O).

**Section IV: Results**

This quality improvement project focused on meeting the JC deadline in implementing simulation training using evidence-based practice to educate staff and providers who treat pregnant and postpartum patients in the ED. For this project, simulation training was held at two different hospitals. The participant turnout rate for the simulation training was 12 at Hospital A and 18 at Hospital B. Of those who participated, job positions ranged from ED RNs, ED techs, OBGYNs, MDs, and clinical educators.
To analyze the success of this project, data was collected through pre-and post-surveys, and debriefing questions (Appendix L). Pre-survey results (Appendix M) showed ED nursing staff were not comfortable in recognizing and treating PreE and PPH patients. Participants responded stating there were gaps in their knowledge regarding the treatment of PreE and PPH with not understanding anti-hypertensive medications, crash cart equipment, and having minimal experience with labor and delivery or postpartum patients.

Data collected through post-survey results (Appendix N) was limited as only three simulation participants responded. Of those who responded, participants were asked questions on a Likert Scale of 1 being totally uncomfortable and 10 being totally comfortable, to rate their level of comfortability in recognizing and treating PPH and PreE after having participated in the simulation. Responses recorded showed staff comfort levels being at 6, 8, and 9 on a Likert Scale following the simulation. In addition, all three participants responded as having no prior experience in working directly with labor and delivery or postpartum patients. In an attempt to collect more data results, CNL students made multiple attempts to reach out to ED nursing staff to complete the survey, but the hospital staff was uncooperative and unfortunately unwilling to help assist students in the data collection process.

Simulation debriefing question responses (Appendix L) from both Hospital A and Hospital B showed a successful experience with participating staff acknowledging gaps in their knowledge stating their unpreparedness in requesting blood promptly, inability to perform a fundal massage, and lack of medication knowledge. These debriefing responses also demonstrated ways the staff felt they performed well as nursing staff felt their communication and teamwork allowed them to cooperate and work well with one another during the simulation training. While simulation
deb briefing questions are not direct quantifiable results, these responses showed the positive experience simulation training can have in educating nursing staff.

Based on the literature review, research has shown that simulation and skills training can be an effective method of education and teaching for nursing staff. While data for this project was very limited, the quality improvement team feels that there was a positive outcome in having simulation training in the ED. As this project focused on only a few JC provisions, it is the student’s recommendation that Hospital X implement other provisions of care and treatment to better prepare ED nursing staff on maternal safety and services.

**Section V: Discussion**

**Lessons Learned**

Preparing ED nursing staff on how to efficiently treat incoming preeclamptic or PPH mothers is a necessity to reduce the risk of perinatal harm and increase preparedness when responding to an obstetric emergency. While the JC made mandatory changes requiring Hospital X to implement simulation training at both A and B locations, educators, along with CNL students learned through this quality improvement project about the importance of having annual training sessions.

Key findings in the results found that some ED nursing staff did not feel fully confident in treating a preeclamptic or PPH mother, as the majority had little to no experience with labor and delivery patients and were not aware of the current policies and protocols in place at Hospital X’s EDs. During the simulation training, it was made apparent that many nursing staff lacked knowledge on how to perform a fundal massage. Performing a fundal massage is a key step in reducing the risk of PPH as it assists the uterus in shrinking back to its pre-pregnancy
size. Nursing staff not being able to perform this could put other postpartum mothers at risk of increased bleeding and other complications.

Other important key findings were in the hospital not having an updated hemorrhage kit or the correct dosage of Magnesium Sulfate (2mg instead of 4mg) and Pitocin missing from their medication dispensing system. Magnesium Sulfate is a drug used to prevent seizures in mothers with PreE or elevated blood pressure levels. Not having the correct dosage available can be a life-threatening situation putting expecting mothers at risk for seizures and death. Pitocin on the other hand is a drug that can be very effective in the treatment and prevention of PPH. The hospital not having an updated hemorrhage kit and these drugs available is not only a safety issue in the proper management of care but also puts patients at risk and could lead to developing maternal obstetric complications as Hospital B does not have an L&D unit.

Study limitations and weaknesses found revolved around the rushing of this project to meet the JC deadline. As this project had to be completed by a specific date, educators and CNL students focused on having two single days of training, one being at Hospital A, and the other being at Hospital B. During these training days, only one simulation was done which left other participating RNs serving as observers and outside commentators rather than being physically hands-on doing skills. CNL students felt that by having minimal simulation training dates, there was not a sufficient amount of ED staff who received training despite meeting the JC deadline. Other limitations and weaknesses were due to the fact that the simulation scenario showcased a patient coming in with both PreE and PPH symptoms which nursing staff discussed as being a rare occurrence uncommonly seen in the ED. Lastly, limitations with the collection of data were the staff’s unwillingness to participate in the post-survey questionnaire which affected the overall quantification in measuring the success of this project implemented.
Conclusion

This quality improvement project supports literature research in demonstrating the benefits of using simulation training to educate nursing staff. An ED unit can have patients presenting with multiple different diagnoses as well as pregnant and postpartum mothers. The JC implementing new standards emphasized the importance of ED nurses being prepared to stabilize, treat, and manage any presenting obstetric emergencies. This project showcased the ED nursing staff’s current lack of knowledge and level of comfort in recognizing and treating preeclamptic and PPH patients. As this project progressed, through implementing simulation training, it was found that staff’s confidence levels and educational knowledge increased at both hospitals. Participating staff were openly communicating and working as a team to be a resource to one another and found the training to be educational and fun. In addition to that, the simulation allowed for an open space of communication during the debriefing period where questions were asked and answered by other nurses and participating MDs.

Although the creation of this project was to meet the JC deadline, educators found that implementing annual training sessions can be beneficial as the prevention, early recognition, and timely treatment for PreE and PPH has the highest impact on decreasing maternal complications. Moving forward, the CNL students’ recommended that further JC provisions be reviewed as this project only focused on the provision of conducting drills and providing role-specific education. By focusing on other provisions, staff can be better prepared in providing proper treatment and decrease maternal complications. As the video created by CNL students will not be implemented until early January 2023, data is unavailable. Therefore, CNL students recommended the simulation training video be implemented in the hospitals’ Knowledge Course Training Center as soon as possible to be able to gather data on how effective training can be.
Section VI: References


https://www.cdc.gov/vitalsigns/maternal-deaths/index.html


https://my.clevelandclinic.org/health/diseases/17952-preeclampsia


http://www.ihi.org/resources/Pages/Tools/ClinicalMicrosystemAssessmentTool.aspx#:~:text=Background,embedded%20in%20a%20larger%20organization.


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[https://doi.org/10.1097/01261775-200607000-00011](https://doi.org/10.1097/01261775-200607000-00011)

# Section VII: Appendices

## Appendix A: Community Health Needs Assessment

Community Health Needs Assessment: Population Demographics and Socioeconomic Data

<table>
<thead>
<tr>
<th></th>
<th>Tri-Valley/Contra Costa County</th>
<th>Eastern Contra Costa County</th>
<th>Western Contra Costa County</th>
<th>Northern Alameda County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Population</strong></td>
<td>750,746</td>
<td>318,900</td>
<td>254,267</td>
<td>587,090</td>
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<tr>
<td><strong>White</strong></td>
<td>59.8%</td>
<td>35.9%</td>
<td>23.4%</td>
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<tr>
<td><strong>Asian</strong></td>
<td>18.2%</td>
<td>10.2%</td>
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<td><strong>Hispanic/Latinx</strong></td>
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<td>34.6%</td>
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<tr>
<td><strong>African American</strong></td>
<td>2.4%</td>
<td>13.1%</td>
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<tr>
<td><strong>Pacific Islander/Native Hawaiian</strong></td>
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<td>0.7%</td>
<td>0.4%</td>
<td>0.5%</td>
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<tr>
<td><strong>Native American/Alaska Native</strong></td>
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<td>0.4%</td>
<td>0.3%</td>
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<tr>
<td><strong>Some other race</strong></td>
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<td>0.2%</td>
<td>0.6%</td>
<td>0.4%</td>
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<tr>
<td><strong>Multiple races</strong></td>
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<td>4.7%</td>
<td>5.3%</td>
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<tr>
<td><strong>Living in poverty (&lt;100% Federal Poverty Level)</strong></td>
<td>6.2%</td>
<td>12.7%</td>
<td>14.0%</td>
<td>16.6%</td>
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<tr>
<td></td>
<td>2009</td>
<td>2010</td>
<td>2011</td>
<td>2012</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------</td>
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<tr>
<td>Children in poverty</td>
<td>6.3%</td>
<td>18.0%</td>
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<tr>
<td>Unemployment</td>
<td>3.0%</td>
<td>3.1%</td>
<td>3.1%</td>
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<tr>
<td>Uninsured population</td>
<td>5.5%</td>
<td>9.6%</td>
<td>12.9%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Adults with no high school diploma</td>
<td>5.8%</td>
<td>15.0%</td>
<td>18.2%</td>
<td>12.1%</td>
</tr>
</tbody>
</table>
5 WHYs Root Cause Analysis

Define the Problem:
*Early recognition of maternal hemorrhage and hypertension/preeclampsia in the emergency department.*

Why is it happening?

| **Why is that?** | 1. Prevention and early recognition and timely treatment for maternal hemorrhage and severe hypertension/preeclampsia had the highest impact trying to decrease maternal complications. |
| **Why is that?** | 2. 13 new provisions were made to the Joint Commission standards to improve the quality of care for women in all stages of pregnancy. |
| **Why is that?** | 3. To fulfill new standard protocols, Hospital X must conduct drills annually to determine system issues as part of ongoing quality improvement efforts. |
| **Why is that?** | 4. Review severe maternal hemorrhage and hypertension/preeclampsia cases that meet criteria established by the hospital to evaluate the effectiveness of the care, treatment, and services provided to the patient during the event. |
| **Why is that?** | 5. To provide role-specific education to all staff and providers who treat pregnant and postpartum patients in the emergency department to treat preeclampsia and postpartum hemorrhage patients in a timely manner. |
Appendix C: PDSA Cycle

PDSA Cycle 1 (Simulation)

Plan (Weeks 1-3)
- Week 1: Perform literature review, research, baseline assessments
  - Through observation/analysis, it is evident that maternal morbidity rates are not declining, EDs A and B are not currently meeting the Joint Commission requirements
  - Talk to subject matter experts, other fellow leaders: Collaborate and discuss what should be the priority intervention, in tandem with evidence-based practice/research
    - Aim is established: Meet the Joint Commission’s requirement using simulation
  - Recognizing a source for improvement is to implement an annual maternal hemorrhage and hypertension/preeclampsia simulation training in the ED
- Week 2: Survey staff on proposed idea (physicians and nurses) and inform staff of the upcoming simulation dates
  - This information will allow the CNL to gauge how the unit currently feels about the addition of simulation for education, as well as assess motivation
  - The CNL provides education on the purpose and benefits associated with simulation
  - After providing education, meet with staff about the intervention
  - Gain buy-in from staff and allow time for staff to provide input and ask questions
- Week 3: Meet with nurse manager to discuss implementation of simulation and prepare presentation
  - Bring results to leadership team/nurse manager to see who will support the CNL in implementing simulation
  - A need for change has been shown
  - Explain that you have learned from community (other currently existing hospital-based programs) and want to test it in this microsystem
  - Present the evidence, staff feedback, and explain how the change aligns with community and Joint Commission standards.

Do (Weeks 4-6):
- Week 4: Putting Simulation Training Together
  - Create the simulation scenario, debrief questions, and survey questions
- Week 5: Disperse flyers with QR codes linking staff to pre-simulation survey, disperse flyers and emails regarding upcoming simulation date
- Week 6: Carry out simulation at ED A
  - Announce simulation time in morning huddle
  - Recruit staff to participate
  - Perform a team huddle right before starting simulation to ensure that everyone is clear on roles and scenario
  - Carry out simulation and follow up with debrief

Study (Weeks 7-9):
- Analyze the results
o Review and compare staff survey results from pre- and post-simulation implementation
  ▪ This will allow CNL to identify what is working and what is not
  ▪ Has education been effective?
  ▪ Do they feel it is worth continuing?
  ▪ What changes/improvements would they like to see, if any?

Assess participation

Act (Weeks 10-12):
- CNL collaborates with the leadership team/nurse manager to decide whether the intervention being tested should be modified or abandoned based on the results and feedback attained before, during, and after simulation implementation
  - If feedback from staff was generally positive, EDs A and B may benefit from permanent annual implementation of simulation
  - **Positive feedback was attained
    ▪ Make changes to simulation based on results of the surveys
    ▪ Move on to PDSA Cycle II to collect more evidence (i.e. more surveys to staff, more simulation days, collect maternal outcomes data from microsystem)
      ▪ Is only once annually sufficient? Do we need more participants?

PDSA Cycle 1 (Video)

Plan (Weeks 1-3)
- Week 1: Perform literature review, research
  o Through observation/analysis, a wealth of evidence and resources exist to aid in creating staff education on maternal hemorrhage and hypertension/preeclampsia (data and statistics, signs/symptoms, treatment, etc.)
    ▪ Aim is established: Aid in meet the Joint Commission’s requirement by adding staff education and videos to Knowledge Center
  o Recognizing a source for improvement is to implement annual maternal hemorrhage and hypertension/preeclampsia educational modules in the ED staff’s Knowledge Center
- Week 2-3: Create the video scripts, educational content, and pre-/post-quizzes
  o Assign roles
  o Send script to nurse educators for review and editing

Do (Weeks 4-6):
- Week 4: Film simulation training videos
  o 2 approximately 5-minute videos: 1 on maternal hemorrhage and 1 on hypertension/preeclampsia
  o Utilize 2 separate filming methods
- Weeks 5: Edit simulation video
- Week 6: Work with IT to upload videos, educational content, and pre-/post-quizzes onto staff Knowledge Center

Study (Weeks 7-9):
- Analyze the results
  o Review and compare staff results from pre- and post-quizzes
    ▪ This will allow CNL to identify what is working and what is not
- Has education been effective?
- What changes/improvements would they like to see, if any?
  - Assess participation

**Act (Weeks 10-12):**
- CNL collaborates with the leadership team/nurse manager to decide whether the intervention being tested should be modified or abandoned based on the results and feedback attained before, during, and after Knowledge Center implementation
  - If feedback from staff was generally positive, EDs A and B may benefit from permanent annual implementation of the educational module
  - **Positive feedback was attained**
    - Make changes to module based on results of the quizzes
    - Move on to PDSA Cycle II to collect more evidence
      - Is only once annually sufficient? Do we need more participants?
## Appendix D: SWOT Analysis

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<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>• Hands-on Training</td>
<td>• Time constraints, both in development of training and time given to conduct simulation</td>
</tr>
<tr>
<td>• Faculty committed to develop new critical thinking skills</td>
<td>• Business of ED staff during simulation</td>
</tr>
<tr>
<td>• Collaboration among ED and L&amp;D units</td>
<td>• Low participation</td>
</tr>
<tr>
<td>• Support of all staff during simulation</td>
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</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increased readiness of recognizing and treating preeclampsia and PPH</td>
<td>• Potential budget constraints</td>
</tr>
<tr>
<td>• Positive healthcare outcomes for obstetric cases presenting in ED</td>
<td>• Poor attitudes among ED staff</td>
</tr>
<tr>
<td>• Quality improvement to prepare supplies and medications needed to treat these cases</td>
<td>• Unwillingness to participate in simulation</td>
</tr>
<tr>
<td></td>
<td>• Power dynamics among L&amp;D staff and ED staff</td>
</tr>
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</table>
Appendix E: Simulation and Video Cost Benefit Analysis

Simulation and Video Cost Analysis

Costs are estimated based on Median RN wages within the healthcare system, median ED tech wages within the healthcare system, and median San Francisco Bay area wages for RN ED Directors, Managers, and Simulation Lab Managers. MD wages are paid through a third party contractor and therefore not considered as part of the costs associated with policy development, simulation development, and training. The hospital already owned the simulation mannequin and equipment and thus those equipment costs were not included in the overall cost-analysis. The economic benefits are difficult to quantify, however this chart represents the overall cost to the hospital system to meet current Joint Commission standards.

**Median RN Wage:** $80.00/hr  
**Median ED Tech Wage:** $29.00/hr  
**Median RN ED Director Wage:** $99.49/hr  
**Median RN ED Manager Wage:** $83.60/hr  
**Median Simulation Lab Manager Wage:** $53.68/hr  
**Median IT Wage:** $41.15/hr

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<td>RN ED Director (1)</td>
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<tr>
<td>Simulation Development</td>
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<td>RNs (2)</td>
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<tr>
<td>Simulation Lab Manager (1)</td>
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<td></td>
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<td>$1709.44</td>
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<tr>
<td>Simulation Training</td>
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<tr>
<td>Prep RNs: (2)x 4 hours (x2 simulations)</td>
<td>16</td>
<td>$1280.00</td>
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<tr>
<td>Prep Simlab Mgr (1): 4 hours (x2 simulations)</td>
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<td>$429.44</td>
</tr>
<tr>
<td>Description</td>
<td>Participants</td>
<td>Cost</td>
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<tr>
<td>--------------------------------------------------</td>
<td>--------------</td>
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<tr>
<td>RN Participants (15) (1 hour)</td>
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<td>ED Tech Participants (3) (1 hour)</td>
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<td>MD/Midwife Participants (8) (1 hour)</td>
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<td><strong>Total Cost</strong></td>
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<td><strong>Data Collection + IT involvement</strong></td>
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<td>IT Staff (1)</td>
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<tr>
<td><strong>Total Cost</strong></td>
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<td><strong>$7574.05</strong></td>
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</table>
Appendix F: Concept Map

**Pre-eclampsia**
- Proteinuria
- Headache
- Changes in vision
- RUG pain
- N/V
- Decreased UO
- Thrombocytopenia
- SOB
- Elevated BP
- Impaired liver function
- Edema/weight gain

**Causes/Risk Factors**
- Hx of preeclampsia
- First pregnancy
- Chronic HTN
- Age (35+)
- Race (AA)
- Obesity
- Multipara
- Short interval between pregnancies
- Diabetes
- Kidney disease
- IVF
- Drug abuse
- New Partner

**Treatment**
- Labs: CBC, AST, ALT, Urine dip, UA, Urine Acid, LDH, creatinine
- OB consult
- Meds: Magnesium, Sulfate, Labeladil, Hydralazine, Nifedipine
- Seizure precautions

**Complications**
- GVA
- HELLP
- Eclampsia (seizures)
- Abruptio placenta
- DIC
- Hemorrhage

**Hospital Policy & Procedure**
- Determine patient hx + hx of pregnancy
- Confirm with ultrasound or UA
- OB consultation
- ED crisis response team
- Patient assessment
- Labs
- Medication reconciliation
- Outcome/Stats. from Quality Improvement team

**Early Recognition in the ER**

**Staff**
- ED team: RN's, MDs, PAs, Techs, CNA
- OB/GYN team
- Pharmacist
- Hospital nurse educator
- L&D educator
- Ultrasound/imaging techs
- Blood bank rep
- EVS

**Literature Review**
- Current practices/JCO standards
- Maternal mortality and morbidity rates
- Risk factors + S/S
- Creating prepost surveys to determine ED staff baseline knowledge

**Simulation**

**Equipment**
- SIM room
- Calibrated BP machines with appropriate cuffs
- Manual BP cuffs
- Medicine room
- PPH cart
- EFM ready
- Mannequin
- EHR access
- Crash cart
- Crisis response checklist
- EKG heart monitors
- Supply room
- Video recording

**Debriefing**
- Measurements of success
- Feedback surveys/response
- Post-sim interviews
- Post surveys (do they think they met the JCO standards/level of confidence)
- Treatment tracking
- Video playback

**Funding**
- Hospital funding
- Grants
- Federal
- NGO

**PPH**
- Uncontrolled bleeding
- Decreased BP
- Increased HR
- Low RBC
- Swelling/Pain in the vagina
- Boggy fundus

**Causes/Risk Factors**
- Vaginal/uterus tears
- Blood clotting disorders
- Placenta problems
- Placenta abruption or previa
- Retained fragments
- Overdistended uterus
- Multipara
- HTN
- Prolonged labor
- Infection
- Obesity
- Assisted delivery
- Race (Hispanic or Asian)
- Hematoma

**Treatment/Interventions**
- Uterine massage
- Retained fragments removal
- Repairing tears or lacerations
- Foley catheter
- OB consult
- Bakri balloon
- Hysterectomy (last resort)
- Blood transfusion
- IV fluids
- Meds: Oxytocin, Misoprostol, Methylergonovine
- Ultrasound

**Complications**
- Shock
- Sepsis
- Anemia
- DIC
- Death
- Sterility
- Cardiovascular disease
- Sheehan’s syndrome

**Implementation**
- CMOCC PERT (print and add to the badge reeis)
- Accessible checklists in rooms
- Patient education pamphlets
- Possible addition of future simulations for education purposes
Appendix G: Flyers

HELP US!

PLEASE TAKE OUR SURVEY

DID YOU PARTICIPATE
IN THE PREECLAMPSIA & POSTPARTUM HEMORRHAGE SIMULATION?

TAKE OUR SURVEY!

How comfortable are you in treating Preeclampsia or Postpartum Hemorrhage patients?

for more information visit the link
Appendix H: Pre-survey Questions

Maternal Hypertensive Disorders and Postpartum Hemorrhage Emergency Department Staff Survey

We are a group of Master's Clinical Nurse Leader students from University of San Francisco examining the recognition and treatment of maternal hypertensive disorders and postpartum hemorrhage in the emergency department. We hope that you will complete this brief survey to help gauge the emergency department staff's evaluation of their readiness to recognize and treat maternal hypertensive disorders and postpartum hemorrhage.

This survey is completely voluntary and should take less than five minutes to complete.

Thank you for your time and consideration.

1. On an average, how many pregnant and/or postpartum patients do you see in the ED? *
   - 0-1 Patients per day
   - 2-4 Patients per day
   - 5-6 Patients per day
   - 7+ Patients per day
2. How often do you see postpartum hemorrhage patients in the ED? *

- 0-1 times per week
- 2-4 times per week
- 5-6 times per week
- 7+ times per week

3. How often do you see maternal hypertensive disorder patients in the ED? *

- 0-1 times per week
- 2-4 times per week
- 5-6 times per week
- 7+ times per week
4. How comfortable are you in recognizing and treating postpartum hemorrhage? *

1  2  3  4  5  6  7  8  9  10

Totally Uncomfortable  ○  ○  ○  ○  ○  ○  ○  ○  ○  Totally Comfortable

5. How comfortable are you in recognizing and treating preeclampsia? *

1  2  3  4  5  6  7  8  9  10

Totally Uncomfortable  ○  ○  ○  ○  ○  ○  ○  ○  ○  Totally Comfortable

6. How comfortable are you in recognizing and treating preeclampsia with severe symptoms? *

1  2  3  4  5  6  7  8  9  10

Totally Uncomfortable  ○  ○  ○  ○  ○  ○  ○  ○  ○  Totally Comfortable
7. Do you have prior experience working directly with labor and delivery or postpartum patients on an obstetric unit?

☐ Yes

☐ No

8. Are you aware of the current JMH policies and protocols in place when a patient presents with postpartum hemorrhage in the ED?

☐ Yes

☐ No

9. In your opinion, how effective is the ED staff in recognizing and treating a patient presenting with postpartum hemorrhage in a timely manner?

1 2 3 4 5 6 7 8 9 10

Highly Ineffective  ☐  ☐  ☐  ☐  ☐  ☐  ☐  ☐  ☐  Highly Effective
10. In your opinion, how effective is the ED staff in recognizing and treating a patient presenting with preeclampsia in a timely manner?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Highly Ineffective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Highly Effective</td>
</tr>
</tbody>
</table>

11. Can you identify gaps in your knowledge base regarding the treatment of postpartum hemorrhage and/or preeclampsia?

Long answer text

12. What is your job title at [ ]

Short answer text
### Scenario Title:
**Emergency Department – Preeclampsia and OB Hemorrhage**

| Original Scenario Developer(s): | Jamie Vincent, MSN, APRN-CNS, RNC-OB, C-EFM |
| Date – original scenario       | 1/20/2022                                   |
| Validation                     |                                            |
| Revision Dates                 |                                            |
| Pilot testing                  |                                            |
| QSEN revision                  |                                            |

**Estimated Scenario Time:** 20-30 minutes

**Debriefing time:** 45 minutes

**Target group:** ED staff RN’s and Providers

**Core case:** Postpartum patient admitted to ED with severe headache and increased vaginal bleeding

**QSEN/IOM Competencies:**
- Patient Safety
- Quality Improvement
- Teamwork & Communication

**Brief Summary of Case:**
A 27 year old woman 5’5”, 173 pounds, G3P2L2, with history of spontaneous vaginal delivery a week ago at 39.1 weeks presents to the ED complaining of a severe headache, epigastric pain, and increased vaginal bleeding.

OB History is unremarkable.

Medical History: HPV at 17 years old; h/o appendectomy (06/2005); Pap test normal during prenatal studies.

Current History: Patient is 1 week postpartum.

This scenario is appropriate for novice through experienced labor and delivery nurses skilled at circulating during cesarean section. It can be made more complex by making the patient unstable, e.g. hemorrhage and/or having the Surgeon refuse to participate, interrupt the learner or undermine new nurse.

---

### Evidence Based References

SECTION II: CURRICULUM INTEGRATION

A. SCENARIO LEARNING OBJECTIVES

Learning Outcomes
1. Provide patient care that promotes safety and minimizes risk of error.
2. Apply nursing process in clinical decision making.
3. Apply principles of good interpersonal communication.

Specific Learning Objectives
1. Identify signs and symptoms of preeclampsia and obstetric hemorrhage upon clinical assessment.
2. Continuously monitor maternal well-being.
3. Communication occurs effectively between team members.
4. SBAR communication to provider.

Critical Learner Actions
1. Introduce self and role to patient.
2. Investigate history of symptoms. Take vital signs and check deep tendon reflexes.
3. Call or designate someone to call doctor using standardized communication tool (SBAR).
4. Initiate treatment plan promptly.
5. Administer IVP anti-hypertensive.
6. Recheck vital signs.
7. Designate someone to get and start Magnesium Sulfate for infusion.
8. Offer comfort and support to patient through education.

B. PRE-SCENARIO LEARNER ACTIVITIES

Prerequisite Competencies

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<thead>
<tr>
<th>Knowledge</th>
<th>Skills/ Attitudes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing process</td>
<td>Identify signs and symptoms of preeclampsia</td>
</tr>
<tr>
<td>Situational awareness</td>
<td>Identify signs of obstetric hemorrhage</td>
</tr>
<tr>
<td>SBAR communication</td>
<td>Prioritization of tasks (e.g. administer IVP anti-hypertensives then Magnesium sulfate)</td>
</tr>
<tr>
<td>Patient-centered care</td>
<td>SBAR communication to team members</td>
</tr>
</tbody>
</table>

SECTION III: SCENARIO SCRIPT

A. Case summary
Mrs. Ashley Jones is a 27-year-old woman 5’5”, G3P2L2, with a history of spontaneous vaginal delivery a week ago at 39.1 weeks, admitted to ED with severe headache, epigastric pain, and increased vaginal bleeding. Headache began about an hour ago and epigastric pain within the last 30 minutes.

**Medical History:** Asthma; HPV at 17 years old; Pap test normal during prenatal studies; s/p vaginal delivery 1 week ago

**Surgical History:** Appendectomy (06/2005)

**Social History:** Married; Works as an accountant; Lives at home with husband and newborn infant boy; no history of smoking or drug use. Occasional ETOH use.

**Current assessment:** Alert and oriented x4. Rates headache as 8/10, c/o epigastric pain, and soaking periapad with vaginal bleeding every hour. Blood pressure 176/102, RR 20, HR 93, T 99.3, SpO2 99% on room air.

### B. Key contextual details

ED Triage RN at patient bedside to assess patient status, collect medical history, and take vital signs. Objectives for the learners include identifying signs and symptoms of preeclampsia and obstetric hemorrhage, demonstration of clear communication with nurses, and proper SBAR with provider to initiate treatment.

### C. Scenario Cast

<table>
<thead>
<tr>
<th>Role</th>
<th>Brief Descriptor (Optional)</th>
<th>Confederate/Actor (C/A) or Learner (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED Triage RN</td>
<td>Assess patient status</td>
<td>Learner</td>
</tr>
<tr>
<td>ED RN</td>
<td>Prioritize patient care</td>
<td>Learner</td>
</tr>
<tr>
<td>ED Provider</td>
<td>Implement treatment plan</td>
<td>Learner</td>
</tr>
<tr>
<td>ED Tech</td>
<td>Monitor patient vital signs</td>
<td>Actor</td>
</tr>
</tbody>
</table>

### D. Patient/Client Profile

<table>
<thead>
<tr>
<th>Last name: Jones</th>
<th>First name: Ashley</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender: Female</td>
<td>Age: 27 Ht: 5’5” Wt: 78.5g</td>
</tr>
<tr>
<td>Spiritual Practice: Non-denominational</td>
<td>Ethnicity: African American</td>
</tr>
<tr>
<td>Code Status: FULL</td>
<td>Primary Language spoken: English</td>
</tr>
</tbody>
</table>
1. **History of Present Illness**
A 27 year old woman with history of spontaneous vaginal delivery a week ago at 39.1 weeks presents to the ED complaining of a severe headache, epigastric pain, and increased vaginal bleeding.

| Primary Medical Diagnosis | Preeclampsia and obstetric hemorrhage |

2. **Review of Systems**

<table>
<thead>
<tr>
<th>System</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNS</td>
<td>Anxious; Alert &amp; oriented x4</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>BP 172/90; no bruits or murmurs heard</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>Lungs clear to auscultation</td>
</tr>
<tr>
<td>Renal/Hepatic</td>
<td>WNL</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>WNL</td>
</tr>
<tr>
<td>Endocrine</td>
<td>WNL</td>
</tr>
<tr>
<td>Heme/Coag</td>
<td>No bruising or bleeding</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>Normal gait with good balance; Moves all extremities equally</td>
</tr>
<tr>
<td>Integument</td>
<td>WNL</td>
</tr>
<tr>
<td>Developmental Hx</td>
<td>WNL</td>
</tr>
<tr>
<td>Psychiatric Hx</td>
<td>None Reported</td>
</tr>
<tr>
<td>Social Hx</td>
<td>Denies drug use; no history of tobacco use. Occasional ETOH use</td>
</tr>
<tr>
<td>Alternative/ Complementary Medicine Hx</td>
<td>None</td>
</tr>
</tbody>
</table>

Medication allergies: None  Reaction: 
Food/other allergies: None  Reaction: 

5. **Home medications**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albuterol inhaler</td>
<td>2 puffs</td>
<td>Inhaler</td>
<td>Every 4 hours prn</td>
</tr>
<tr>
<td>Prenatal Plus</td>
<td>1 mg</td>
<td>p.o.</td>
<td>Daily</td>
</tr>
</tbody>
</table>

6. **Current medications**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 4. Laboratory, Diagnostic Study Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na:</td>
<td>10.7</td>
</tr>
<tr>
<td>K:</td>
<td>7.6</td>
</tr>
<tr>
<td>Cl:</td>
<td>103</td>
</tr>
<tr>
<td>HCO3:</td>
<td>22</td>
</tr>
<tr>
<td>BUN: 10</td>
<td>Cr: 0.7</td>
</tr>
<tr>
<td>Ca:</td>
<td>8.4</td>
</tr>
<tr>
<td>Mg:</td>
<td>1.6</td>
</tr>
<tr>
<td>Phos:</td>
<td>0.4</td>
</tr>
<tr>
<td>Glucose: 83</td>
<td></td>
</tr>
<tr>
<td>Hep. Bs antigen: Non-reactive</td>
<td></td>
</tr>
<tr>
<td>Hgb: 10.7</td>
<td>Hct: 32%</td>
</tr>
<tr>
<td>Plt: 220</td>
<td>WBC: 13</td>
</tr>
<tr>
<td>PT: 12.7s</td>
<td>PTT: 30.0s</td>
</tr>
<tr>
<td>ALT: 42</td>
<td>AST: 27</td>
</tr>
<tr>
<td>ABG-pH:</td>
<td></td>
</tr>
<tr>
<td>paO2:</td>
<td>98</td>
</tr>
<tr>
<td>paCO2:</td>
<td>35</td>
</tr>
<tr>
<td>HCO3/BE:</td>
<td></td>
</tr>
<tr>
<td>SaO2:</td>
<td></td>
</tr>
<tr>
<td>Rubella, IgG:</td>
<td>GBS: Negative</td>
</tr>
<tr>
<td>Immune</td>
<td>Herpes: HIV: Negative</td>
</tr>
<tr>
<td>Syphilis: Non-reactive</td>
<td></td>
</tr>
<tr>
<td>RBC: 4.2</td>
<td>Uric Acid: 5.6</td>
</tr>
</tbody>
</table>

### E. Baseline Simulator/Standardized Patient State

(This may vary from the baseline data provided to learners)

#### 1. Initial physical appearance

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
</tr>
<tr>
<td>Attire</td>
<td>Patient laying on gurney wearing blue t-shirt and black pants</td>
</tr>
</tbody>
</table>

**Alterations in appearance (moulage):**

- X ID band present, accurate
- X ID band present, inaccurate
- X ID band absent or not applicable
- X Allergy band present, accurate
- X Allergy band present, inaccurate
- X Allergy band absent or N/A

#### 2. Initial Vital Signs Monitor display in simulation action room:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP: 176/102</td>
<td>HR: 93</td>
</tr>
<tr>
<td>RR: 20</td>
<td>T: 99.3F(37.4C)</td>
</tr>
<tr>
<td>CVP:</td>
<td>PAS: PCWP:</td>
</tr>
<tr>
<td>AIRWAY:</td>
<td>ETCO²: FHR:</td>
</tr>
<tr>
<td>Lungs: Sounds/mechanics</td>
<td>Left: Clear Right: Clear</td>
</tr>
<tr>
<td>Heart: Sounds:</td>
<td>ECG rhythm: NSR</td>
</tr>
<tr>
<td>Other:</td>
<td>Bowel sounds: Normal</td>
</tr>
</tbody>
</table>

#### 3. Initial Intravenous line set up

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saline lock #1</td>
<td>Site: RA</td>
</tr>
<tr>
<td>IV patent (Y/N)</td>
<td></td>
</tr>
</tbody>
</table>
## THE USE OF SIMULATION TRAINING

### IV #1
- **Site:** CVC
- **Fluid type:** Initial
- **Initial rate:**
- **IV patent (Y/N):**

### IV #2
- **Site:**
- **Fluid type:**
- **Initial rate:**
- **IV patent (Y/N):**

### 4. Initial Non-invasive monitors set up

<table>
<thead>
<tr>
<th>Monitor Type</th>
<th>Site</th>
<th>First lead</th>
<th>Second lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIBP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse oximeter</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5. Initial Hemodynamic monitors set up

<table>
<thead>
<tr>
<th>Site</th>
<th>Catheter/tubing Patency (Y/N)</th>
<th>CVC Site</th>
<th>PAC Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-line</td>
<td>Catheter/tubing Patency</td>
<td>CVC</td>
<td>PAC</td>
</tr>
</tbody>
</table>

### 6. Other monitors/devices

<table>
<thead>
<tr>
<th>Device</th>
<th>Site</th>
<th>Amount</th>
<th>Appearance of urine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foley catheter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epidural catheter</td>
<td></td>
<td>Infusion pump</td>
<td>Pump settings:</td>
</tr>
<tr>
<td>Fetal Heart rate monitor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 7. Equipment, supplies, monitors

<table>
<thead>
<tr>
<th>Item</th>
<th>Site</th>
<th>Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedpan/Urinal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foley catheter kit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigation Solution</td>
<td></td>
<td>(1000 mL)</td>
<td>Scale</td>
</tr>
<tr>
<td>IV Infusion pump</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding pump</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simulated Amniotic Fluid</td>
<td></td>
<td>(250 mL)</td>
<td>Wall suction</td>
</tr>
<tr>
<td>Neptune Suction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETT suction catheters</td>
<td></td>
<td></td>
<td>Kidney basin</td>
</tr>
<tr>
<td>Kidney basin</td>
<td></td>
<td></td>
<td>Chux (1 pack)</td>
</tr>
<tr>
<td>Defibrillator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code Cart</td>
<td></td>
<td></td>
<td>12-lead ECG</td>
</tr>
<tr>
<td>PCA infusion pump</td>
<td></td>
<td></td>
<td>Blue lap bag</td>
</tr>
<tr>
<td>Epidural pump</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central line Kit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV fluid Type:</td>
<td></td>
<td></td>
<td>Blood products: ABO Type: # of units: Simulated blood (80mL on peripad; 1 in. blood clot)</td>
</tr>
<tr>
<td>IV fluid additives:</td>
<td></td>
<td></td>
<td>Simple Face Mask</td>
</tr>
<tr>
<td>Nasal cannula</td>
<td></td>
<td></td>
<td>Non-rebreather mask</td>
</tr>
<tr>
<td>BVM/Ambu bag</td>
<td></td>
<td></td>
<td>15 laps</td>
</tr>
</tbody>
</table>

### 4. Documentation and Order Forms

<table>
<thead>
<tr>
<th>Form</th>
<th>X</th>
<th></th>
<th></th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider orders</td>
<td></td>
<td>Med Admin Record</td>
<td>Hx &amp; Physical</td>
<td>Lab Results</td>
</tr>
<tr>
<td>Progress Notes</td>
<td></td>
<td>Graphic record</td>
<td>Anes/PACU record</td>
<td>ED Record</td>
</tr>
<tr>
<td>Med Reconciliation</td>
<td></td>
<td>Transfer orders</td>
<td>Standing orders</td>
<td>ICU flow sheet</td>
</tr>
<tr>
<td>Nurses’ Notes</td>
<td>Dx test reports</td>
<td>Code Record</td>
<td>Prenatal record</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------</td>
<td>-------------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>Actual medical record binder</td>
<td>X</td>
<td>Electronic Medical Record (Delivery Summary)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5. Medications (to be available in sim action room)

<table>
<thead>
<tr>
<th>#</th>
<th>Medication</th>
<th>Dosage</th>
<th>Route</th>
<th>#</th>
<th>Medication</th>
<th>Dosage</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Appendix J: Simulation Video Script

Postpartum Hemorrhage

Primary RN, Secondary RN, and ED Tech enter room

Primary RN
Hi Maria my name is Raquel, and I’m going to be your nurse today.

Secondary RN
My name is Gabe, and I’ll be helping Raquel.

ED Tech
And my name is Mayra. I’ll be your ED Tech.

Primary RN
So, can I ask you: what brings you in today?

Patient
Yeah. I’ve been bleeding a lot recently.

Primary RN
And how much is your bleeding?

Patient
I changed my pad right before I got here, but I would say at least one pad every hour starting today.

Primary RN
Oh ok. And are you being followed by an OBGYN?

Patient
No. I haven’t had any contact with them
Any history of hypertension during your pregnancy or before your pregnancy?

Patient
Um... No history of hypertension during pregnancy, but I do have asthma.

Primary RN
Ok, so we're going to go ahead and assess your bleeding area. Ok?

ED Technician
I'm going to place your cardiac monitor on right now, and I'm going to take your blood pressure.

Secondary RN
I'm going to check your temperature really quick.

Primary RN
Ok. She is bleeding a lot. Ok Maria. I'm going to go and do a fundal massage. Your fundus is soft and boggy. I'm going to make sure to get your fundus firmed up.

ED Technician
Ok. Her blood pressure is 85/65, pulse is 115, her oxygen is 98, and her respirations 20, and her temperature is 36.9.

Secondary RN
Alright, I'll go ahead and call the ED physician. Hi Dr. Talsky. This is Gabe calling from the ED. I have Maria in room 35. She's a 27-year-old female complaining of increased vaginal bleeding. She's soaking 1 peripad every
hour. She’s a G3P2. Has a history of spontaneous vaginal delivery a week ago at 39 weeks. Her BP is currently 89/58, heart rate is 114, respiration rate is 20, temp 36.9 Celsius, and she’s sating at 98%. I think she may be hemorrhaging based on her spontaneous delivery one week ago. She has no history of hypertension but does have asthma. I am concerned about her bleeding and vital signs. Are you able to come in soon and evaluate her?

ED Physician
Yes, I’m right around the corner. I’ll be right in.

Secondary RN
Thank you.

ED Physician enters room

Primary RN
Gabe, can we start an IV access as well?

Secondary RN
Yes.

ED Physician
Hi Maria. My name is Max Talsky. I’m the ED Doc here. I’ll be helping you out today, ok?

Patient
Ok.

ED Physician
Can you tell me what brought you in today?
Patient
Yeah. I've just been bleeding a lot recently.

ED Physician
Bleeding a lot? When did it start?

Patient
The bleeding started a couple of hours ago.

ED Physician
How much have you been bleeding? How many pad changes have you done?

Patient
At least 4 or 5 pads.

ED Physician
Have you noticed any clots or anything like that on the pads?

Patient
No, I haven't.

ED Physician
How about any dizziness or light headedness right now?

Patient
I definitely feel woozy and a little dizzy.

ED Physician
Ok. Do you have any complications during your pregnancy or during your labor or right after?

Patient
No. no complications.
Have you had any kind of history of asthma or hypertension or anything like that?

Patient
No history of hypertension, but I do have a history of asthma.

ED Physician
Alright so, we're going to get a CBC, type and screen for possible transfusion, also going to get a CMP, and Gabe I'm going to have you start 10mg Pitocin IM.

Secondary RN
Ok. I'll start the 10mg Pitocin.

ED Physician
We're also going to start monitoring the estimated blood loss, and I'm going to call the OB provider.

OB Physician
Hi this is Dr. Kelsey.

ED Physician
Hi This is Dr. Talsky in Emergency. I have a 27-year-old 1-week postpartum patient. She's soaking a peripad about every hour. I've started her on Pitocin IM. She had a spontaneous delivery at 39 weeks and has been bleeding at home and has a history of asthma. I'm worried about blood loss from postpartum hemorrhage. I'm requesting a consult and direction.

OB Physician
You will need to order Methergine 0.2mg IM every 2-4 hours. Do not give Misoprostol due to the asthma history, and also initiate bimanual massage of the fundus and keep getting vitals every 15 minutes.
**ED Physician**

Alright, so we're also going to do 0.2mg of Methergine IM and initiate bimanual fundal massage. We're also going to do vital signs every 15 minutes and recycle those right now.

**Secondary RN**

I'll go ahead and get that started.

**Tech**

I've recycled the blood pressure.

Recycling blood pressure.

**Primary RN**

Do you want to do the bimanual massage?

**ED Tech**

Blood pressure is 59/39, Pulse 115.

**ED Physician**

We'll also call blood blank and activate mass transfusion protocols or the "Keep Ahead" in Concord. Let's take a look and do the bimanual. Alright, Maria I'm going to have to reach inside you to do a bimanual fundal massage to try to stop the bleeding ok?

*15 minutes later*

**ED Technician**

Recycling blood pressure. It's 62/42, Pulse is 113, temperature 36.9, oxygen pulse ox is 100%, respirations 20.

**Secondary RN**

Alright. I'll go ahead and call the blood bank.

**END**
**Preeclampsia**

*Primary RN, Secondary RN, and ED Tech enter room*

**Primary RN**
Hi Maria. My name is Raquel and I’m going to be your nurse today.

**Secondary RN**
My name is Gabe, and I’ll be helping Raquel. I’ll be checking your legs.

**ED Technician**
And my name is Mayra. I’ll be your ED Tech.

**Primary RN**
So, can I ask you: what brings you in today?

**Patient**
I’ve had such a bad headache.

**Primary RN**
Can you rate your pain from your headache from a 0-10 for me?

**Patient**
Probably around an 8 or 9.

**Primary RN**
Ok, and when did your headache start?

**Patient**
For a couple of hours now.

**Primary RN**
Have you had any changes in your vision or any light sensitivity?
Patient
Yeah. I have some spots in my vision.

Primary RN
Have you taken any medication for your headache?

Patient
I've taken over-the-counter Advil, but it hasn't helped much.

Primary RN
Are you currently having any stomach pain or abdominal pain?

Patient
No. No stomach pain.

ED Technician
I'm placing you on a cardiac monitor right now.

Primary RN
I'm going to go ahead and start your IV access.

Secondary RN
Do you mind just relaxing your legs really quick?
She has +4 pitting edema and +3 DTRs and clonus.

Primary RN
Ok Gabe. Can you start some NS?

Secondary RN
Maria, do you have a history of hypertension or any pregnancy related complications?
Patient
No. I don’t have any history of hypertension or any complications.

ED Technician
Her blood pressure is 189/114, pulse is 113, respirations 20, pulse ox is 97, and temperature is 36.7.

Secondary RN
And have you taken any blood pressure medications while you were pregnant?

Patient
No. No blood pressure medication while I was pregnant or now.

Secondary RN
Ok, and lastly, have you gotten in contact with your OBGYN since you’ve given birth?

Patient
No, I haven’t been in contact with them. I just have this headache,

Primary RN
Ok, Maria. I’m going to go ahead and call the ED doctor, ok?
Hi Dr. Talsky. This is Raquel calling from the ED. I have Maria in room 37. She is a 27-year-old female complaining of a severe headache. She took Ibuprofen 800 mg for severe headache prior to coming into the ER. She rates her headache an 8/10 with nausea. She has a history of spontaneous vaginal delivery at 39 weeks, BP currently is 189/114, heart rate 114, respiration 20, O2 at 98, temp 98.4. No history of hypertension, she has no history of asthma.
She has a history of GERD post vaginal delivery 1 week ago. She also complains of visual changes along with her dangerously high blood pressure. +3 DTR, pitting edema present in the lower extremities. I am concerned about her vital signs and her physical complaints. Are you able to come evaluate her? And what blood pressure medications would you like me to start?

ED Physician
Yeah, let’s start Labetalol 20mg IV push over 2 minutes, and I’ll be right in.

Primary RN
Confirming Labetalol IV push 20mg.

ED Physician enters room

ED Physician
Yes. Hi Maria, I’m Dr. Talsky. I’m a doctor in the ED here. Can you tell me: when did your headache start?

Patient
I’ve had this headache for a couple of hours and it hasn’t been relieved with Advil or anything. It hurts.

ED Physician
Ok. Do you have any changes in your vision or dizziness or are you seeing any stars or anything like that?

Patient
No, I don’t have any abdominal pain but I have had some spots in my vision.
Ok. So no abdominal pain. No kind of any upper right side pain or chest pain or anything like that?

Patient
No. I don't have any trouble breathing or any abdominal pain.

ED Physician
Have you taken any medications for your headache and any kind of antihypertensive medications or anything like that?

Patient
No. No meds.

ED Physician
Did you have any complications during your pregnancy, did you have preeclampsia or hypertension during your pregnancy or any complications during your labor?

Patient
No. No complications.

ED Physician
Do you have asthma or a history of asthma or anything like that?

Patient
No history of asthma.

ED Physician
Let's recycle her vital signs and I'll call the OB for a consult.

Primary RN
Ok. Recycling blood pressure.

**ED Technician**
Ok her blood pressure is 162/106, pulse is 94.

**ED Physician**
Hi this is Dr. Talsky, down in the ED.

**OB Physician**
Hi, this is Dr. Kelsey.

**OB Physician enters room**

**ED Physician**
We have a 27-year-old woman complaining of a persistent 8/10 headache. It’s been unresponsive to over-the-counter medications. She came in with a BP of 189/114, I’ve started labetalol and it’s come down to 160/105. She gave birth uncomplicated labor one week ago. She has no history of hypertension. She is showing signs of Preeclampsia with severe features, changes in her vision. I’m requesting OB consult and some more direction.

**OB Physician**
Yeah. So you’ll need to order magnesium sulfate loading dose of 4mg over 30 minutes with a maintenance dose of 2mg per hour. This will be for prophylactic measures to help prevent seizures. You’ll also want to order labetalol 40mg IV push over 2 minutes and keep having the vitals obtained every 15.

**ED Physician**
So Raquel, we’re going to start mag sulfate 4gm over 30 minutes and then go to 2mg every hour
as a maintenance dose, and we're going to do another dose of labetalol to bring her hypertension down. 40mg over 2 minutes IV push.

Primary RN
I'm going to go ahead and put the magnesium loading dose. Ok Maria, I'm also going to give you another dose of labetalol. This is a blood pressure medication that's going to help to decrease your blood pressure, ok?

Patient
Ok.

*15 minutes later*

Primary RN
Can we recycle the blood pressure?

ED Technician
Recycling blood pressure. Ok. Blood pressure is 147/97, pulse is 89.

Primary RN
Ok. Looks like our blood pressure is now reduced and patient is stabilized.

ED Physician
Alright Maria. We're going to transfer your up to the L&D floor now that you're stabilized, ok?

Patient
Ok.

**END**
Appendix K: Post-survey Questions

Maternal Hypertensive Disorders and Postpartum Hemorrhage Emergency Department Staff Post-Survey

We are a group of Master's Clinical Nurse Leader students from University of San Francisco examining the recognition and treatment of maternal hypertensive disorders and postpartum hemorrhage in the emergency department. We hope that you will complete this brief survey to help gauge the emergency department staff's evaluation of their readiness to recognize and treat maternal hypertensive disorders and postpartum hemorrhage.

This survey is completely voluntary and should take less than five minutes to complete.

Thank you for your time and consideration.

How comfortable are you in recognizing and treating postpartum hemorrhage after having participated in the training?

1 2 3 4 5 6 7 8 9 10

Totally Uncomfortable 〇 〇 〇 〇 〇 〇 〇 〇 〇 〇 Totally Comfortable
How comfortable are you in recognizing and treating preeclampsia after having participated in the training?

1  2  3  4  5  6  7  8  9  10

Totally Uncomfortable  □ □ □ □ □ □ □ □ □  Totally Comfortable

How comfortable are you in recognizing and treating preeclampsia with severe symptoms after having participated in the training?

1  2  3  4  5  6  7  8  9  10

Totally Uncomfortable  □ □ □ □ □ □ □ □ □  Totally Comfortable

Do you have prior experience working directly with labor and delivery or postpartum patients?

□ Yes

□ No
Can you identify gaps in your knowledge base regarding postpartum hemorrhage and preeclampsia? *

Long answer text

What is your job title at *

Short answer text

Did you attend the Maternal Hypertensive Disorders and Postpartum Hemorrhage Simulation

- Yes
- No
Appendix L: Debriefing Questions

Notes from 3.3.22 CMC Maternal Hemorrhage and HTN Skills

**Hospital A:**

1. Did you have the knowledge and skills to meet the learning objectives of the scenario?
   - One thing everyone noted was that until the OB provider entered the scenario no one provided a fundal massage to the hemorrhaging patient
   - Overall the team was well prepared to address preeclampsia and hemorrhage and ask for the necessary consultations in a timely and effective manner.

2. What GAPS did you identify in your own knowledge base and/or preparation for the simulation experience?
   - Did not know we had Mag Sulfate and Ptocin readily available and two give two 2mg doses of MagSulf to begin

3. How would you handle the scenario differently if you could?
   - Would have treated the mannequin closer to a real patient

4. In what ways did you feel the need to check ACCURACY of the data you were given?
   - As discussed in the debrief, the likelihood of having a preeclampsia patient who is also hemorrhaging one week after

5. In what ways did you perform well?
   - Great communication and teamwork
   - Everyone was willing to pickup a job and was on standby ready to help each other

6. What communication strategies did you use to validate ACCURACY of your information or decisions with your team members?
   - Communicating throughout the simulation with supporting nurses and healthcare provider teams

7. What three factors were most SIGNIFICANT that you will transfer to the clinical setting?
   - The use of the new order sets to guide clinical decision making
   - The use of the algorithms for preeclampsia and hemorrhage
   - The knowledge that pregnant and postpartum patients are very good at compensating for blood loss and then crash quickly.

8. Discuss actual experiences with diverse patient populations.
   - Hospital A location asks for assistance in the ED from the L&D unit if patients are admitted with other complications that would require further specialized help

9. Discuss roles and responsibilities during a crisis.
   - The team was well-suited and prepared to address the peripartum crisis presented. One area which caused confusion and was addressed during debrief was the improbability of a postpartum patient presenting with preeclampsia and a hemorrhage.

10. Discuss the nurses’ role in design, implementation, and evaluation of information technologies to support patient care.
• Creating a specialized clear plan in how to triage and treat patients presenting into the ED with preeclampsia or postpartum hemorrhage symptoms to be able to provide care in a timely manner before calling the L&D unit for backup.

Hospital B:

1. Did you have the knowledge and skills to meet the learning objectives of the scenario?
   • Any knowledge and skills participants did not have were able to be filled through having a primary and secondary RN in the room and the ED Provider and OB provider readily available.

2. What GAPS did you identify in your own knowledge base and/or preparation for the simulation experience?
   • The unpreparedness of requesting blood in a timely manner
   • Not knowing the importance of immediate fundal massage in a hemorrhage situation
   • Checked for lacerations in a massively hemorrhaging 1 week postpartum patient as opposed to addressing the more likely scenario of uterine atony.

3. How would you handle the scenario differently if you could?
   • Possibly having the scenarios split into two different cases one being preeclampsia and the other scenario being postpartum hemorrhage
   • Having more than one scenario so instead of people voicing their ideas from outside others could have an opportunity to be hands on in participating
   • Having less people in the room as the scenario quickly shifted from a simulation to a discussion
   • Ensuring spectators are not participating in the simulation scenario but rather in the debrief.

4. In what ways did you feel the need to check ACCURACY of the data you were given?
   • Vital signs were unstable and medication was not reliving the patients headache

5. In what ways did you perform well?
   • Great communication and teamwork
   • Everyone was willing to pickup a job and was on standby ready to help each other

6. What communication strategies did you use to validate ACCURACY of your information or decisions with your team members?
   • Multiple check-ins with ED and OB to ensure the care we were providing was appropriate and effective.

7. What three factors were most SIGNIFICANT that you will transfer to the clinical setting?
   • Using the algorithm information from the simulation in the ED

8. Discuss actual experiences with diverse patient populations.
   • Not having an L+D floor in Hospital B we don’t see very many pregnant or postpartum patients as they are typically brought directly to Hospital A.

9. Discuss roles and responsibilities during a crisis.
   • Having a clear algorithm and working as a team increases the knowledge of role-specific actions. Through the simulation we established the roles of ED tech, Primary
RN, Secondary RN, ED Healthcare Provider, and OB Provider. The team worked well together with easy, concise, and open communication.

10. Discuss the nurses’ role in design, implementation, and evaluation of information technologies to support patient care.
   - Creating a new order set specific to postpartum hemorrhage and preeclampsia within the EHR/MAR will help expedite clinical decision making and increase the timeliness of care in urgent and emergent situations.
Appendix M: Pre-survey Question Results

1. On an average, how many pregnant and/or postpartum patients do you see in the ED?

<table>
<thead>
<tr>
<th>Value</th>
<th>Percent</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 Patients per day</td>
<td>70.4%</td>
<td>19</td>
</tr>
<tr>
<td>2-4 Patients per day</td>
<td>29.6%</td>
<td>8</td>
</tr>
</tbody>
</table>

Totals: 27

2. How often do you see postpartum hemorrhage patients in the ED?

<table>
<thead>
<tr>
<th>Value</th>
<th>Percent</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 times per week</td>
<td>100.0%</td>
<td>27</td>
</tr>
</tbody>
</table>

Totals: 27
3. How often do you see maternal hypertensive disorder patients in the ED?

![Pie chart showing the frequency of seeing maternal hypertensive disorder patients in the ED.]

<table>
<thead>
<tr>
<th>Value</th>
<th>Percent</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 times per week</td>
<td>85.2%</td>
<td>23</td>
</tr>
<tr>
<td>2-4 times per week</td>
<td>14.8%</td>
<td>4</td>
</tr>
</tbody>
</table>

Totals: 27

4. How comfortable are you in recognizing and treating postpartum hemorrhage?
5. How comfortable are you in recognizing and treating preeclampsia?
6. How comfortable are you in recognizing and treating preeclampsia with severe symptoms?
<table>
<thead>
<tr>
<th>Value</th>
<th>Percent</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25.9%</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>7.4%</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3.7%</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>14.8%</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>18.5%</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>3.7%</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>3.7%</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>14.8%</td>
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</tr>
<tr>
<td>10</td>
<td>7.4%</td>
<td>2</td>
</tr>
</tbody>
</table>

Totals: 27
7. Do you have prior experience working directly with labor and delivery or postpartum patients on an obstetric unit?

<table>
<thead>
<tr>
<th>Value</th>
<th>Percent</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>11.1%</td>
<td>3</td>
</tr>
<tr>
<td>No</td>
<td>88.9%</td>
<td>24</td>
</tr>
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</table>

Totals: 27

8. Are you aware of the current JMH policies and protocols in place when a patient presents with postpartum hemorrhage in the ED?
9. In your opinion, how effective is the ED staff in recognizing and treating a patient presenting with postpartum hemorrhage in a timely manner?
<table>
<thead>
<tr>
<th>Value</th>
<th>Percent</th>
<th>Responses</th>
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</thead>
<tbody>
<tr>
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<td>1</td>
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<td>3</td>
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<tr>
<td>6</td>
<td>3.7%</td>
<td>1</td>
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<tr>
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<td>22.2%</td>
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<td>8</td>
<td>18.5%</td>
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</tr>
<tr>
<td>10</td>
<td>3.7%</td>
<td>1</td>
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</table>

Totals: 27
10. In your opinion, how effective is the ED staff in recognizing and treating a patient presenting with preeclampsia in a timely manner?

<table>
<thead>
<tr>
<th>Value</th>
<th>Percent</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.7%</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
<td>7.4%</td>
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<tr>
<td>4</td>
<td>25.9%</td>
<td>7</td>
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<tr>
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<tr>
<td>7</td>
<td>11.1%</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>22.2%</td>
<td>6</td>
</tr>
</tbody>
</table>

Totals: 27
11. Can you identify gaps in your knowledge base regarding the treatment of postpartum hemorrhage and/or preeclampsia?

12. What is your job title at [blackout]?
### Appendix N: Post-survey Question Results

<table>
<thead>
<tr>
<th>How comfortable are you in recognizing and treating preeclampsia after having participated in the training?</th>
<th>Count</th>
<th>Row %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>0%</td>
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<td>0%</td>
</tr>
<tr>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>33.3%</td>
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<td>0%</td>
</tr>
<tr>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>66.7%</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>0%</td>
</tr>
</tbody>
</table>

### Summary Report for Maternal Hypertensive Disorders and Postpartum Hemorrhage Emergency Department Staff Post-Survey

1. Choose a rating below:

| 1 - Totally Uncomfortable | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 - Totally Comfortable | Responses |
|---|---|---|---|---|---|---|---|---|---|---|---|
| How comfortable are you in recognizing and treating postpartum hemorrhage after having participated in the training? | 0% | 0% | 0% | 0% | 0% | 33.3% | 0% | 33.3% | 33.3% | 0% | 3 |

<table>
<thead>
<tr>
<th>Count</th>
<th>Row %</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
2. Do you have prior experience working directly with labor and delivery or postpartum patients?

<table>
<thead>
<tr>
<th>Value</th>
<th>Percent</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>100.0%</td>
<td>3</td>
</tr>
</tbody>
</table>

3. Can you identify gaps in your knowledge base regarding postpartum hemorrhage and preeclampsia?
4. What is your job title at [redacted]?

5. Did you attend the Maternal Hypertensive Disorders and Postpartum Hemorrhage Simulation?

<table>
<thead>
<tr>
<th>Value</th>
<th>Percent</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>100.0%</td>
<td>3</td>
</tr>
</tbody>
</table>

Totals: 3
Appendix O: Statement of Determination Form

Project: Statement of Determination and Non-Research Determination Form

**Student Name:** Yvonne Oliva

<table>
<thead>
<tr>
<th><strong>Title of Project:</strong></th>
<th>Stop the Bleed and Seize Control: The Use of Simulation and Video Modules in Educating Emergency Department Staff Regarding Maternal Hypertension and Hemorrhage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brief Description of Project:</strong></td>
<td>Developing and implementing simulation training and a recording simulation video to train emergency department staff in the early recognition and treatment of preeclampsia and postpartum hemorrhage to satisfy new Joint Commission Standards.</td>
</tr>
</tbody>
</table>

- **Data that Shows the Need for the Project:** OB hemorrhage is the leading cause of maternal mortality in California from 2002-2004 (Lyndon et. al., 2015), while PreEclampsia is the second leading cause of pregnancy-related mortality in California from 2002-2007, over 60% of those deaths were deemed preventable (Shields et. al., 2021). Early recognition and timely, appropriate treatment of these two pathologies can greatly reduce mortality and morbidity rates (Simpson, 2010). Frequent simulation training decreases the time of staff response rates and increases treatment information retention (Sullivan et. al., 2015).

- **Aim Statement:** We aim to increase ED staff awareness and comfort in recognizing and responding to PHDs and PPH by 10%, by increasing the amount of training ED staff receives via simulation by April 2022. As well as implementing a video as a new training modalities by January 2023.

- **Description of Intervention(s):** Simulation scenarios developed by hospital ED and L+D education development teams as well as the simulation lab manager and a separately recording acted simulation to be uploaded to the Knowledge Center education training by early 2023.

- **Desired Change in Practice:** An increased awareness and comfort with recognizing and treating PreE and PPH in the emergency department.

- **Outcome measurement(s):** Staff surveys ascertaining their exposure to, and comfort with addressing PreE and PPH in the ED.

**Resources**


To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: (http://answers.hhs.gov/ohrp/categories/1569)

☐ This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

☐ This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *
Instructions: Answer YES or NO to each of the following statements:

<table>
<thead>
<tr>
<th>Project Title: Stop the Bleed and HELLP Moms: The use of simulation and simulation videos in educating staff regarding preeclampsia and postpartum hemorrhage.</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>The aim of the project is to improve the process or delivery of care with established/accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>The specific aim is to improve performance on a specific service or program and is a part of usual care. ALL participants will receive standard of care.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>The project is NOT designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does NOT follow a protocol that overrides clinical decision-making.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does NOT develop paradigms or untested methods or new untested standards.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience. X

The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP. X

The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research. X

The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/or patients. X

If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: “**This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board.**” X

**ANSWER KEY:** If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does **NOT** meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to **ANY** of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

**STUDENT NAME (Please print):** Yvonne Oliva

**Signature of Student:**

**DATE:** 03/31/2022

**SUPERVISING FACULTY MEMBER NAME (Please print):**

Lisa Brozda RN, MSN, CNS

**Signature of Supervising Faculty Member:**

**DATE:** 5/14/2022