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Postpartum Hemorrhage: A Change Strategy

Alison Landis

University of San Francisco

Abstract

Problem: Postpartum hemorrhage (PPH) is one of the leading causes of severe maternal morbidity and mortality. It is unpredictable and can occur with or without identified risk factors. A postpartum hemorrhage can happen rapidly, therefore it is important for the team to be trained and prepared to recognize and respond quickly to the situation, by quantifying blood loss at deliveries.

Context: The California Maternal Quality Care Collaborative (CMQCC) has created a toolkit to better prepare maternal child health teams for readiness, recognition, response, and reporting when a hemorrhage occurs. This program was rolled out on the unit in 2015 resulting in a dramatic decrease in the postpartum hemorrhage rate, yet the unit was not able to sustain the changes.

Intervention: 100% of staff from all disciplines were retrained with an educational presentation of evidence-based practice on quantifying blood loss and a review of postpartum hemorrhage medications. Education, skills stations with new scales and a weighing worksheet, followed with a hemorrhage drill were completed. The team was asked to begin quantifying with a birth pause after the neonate's delivery. The expectation was to quantify at every delivery.

Results: Since the completion of retraining and the roll out of the new equipment, there has been an increased adherence to the practice expectations, from 60% to 80%. The team is practicing the birth pause after the delivery of the neonate and quantifying blood loss. The fallouts for quantifying blood loss were emergency and precipitous deliveries, as the birth pause was not done.

Conclusion: The collaborative efforts of the Family Birth Center team made this project a success. Sharing the evidenced-based "why" of a practice change, along with unit data motivated the team to adhere to the quantification process. With support from leadership and the unit-based council teams the sustainability of this project has great potential and feasibility. The practice changes made are a standard of care, based on CMQCC recommendations to ensure the patient has the safest and highest quality of care during their stay. The team will continue the quality improvement work until it becomes a standard of practice and a part of the daily culture in order to have a positive effect on morbidity and mortality of our perinatal population.

Postpartum Hemorrhage: A Change Strategy

Introduction

Introduction

The American College of Gynecologists (ACOG) defines a maternal hemorrhage as a blood loss greater or equal to 1000 ml for any type of delivery in the first 24 hours after giving birth, accompanied by signs and symptoms of hypovolemia (Committee on Practice Bulletin-Obstetrics [ACOG], 2017). Postpartum hemorrhage, leading to a blood transfusion, is one of the leading causes of severe maternal morbidity and mortality, it is also the most preventable (California Maternal Quality Care Collaborative [CQMCC], 2010). It can happen to any woman after delivery, it is unpredictable and can occur with or without risk factors present. A postpartum hemorrhage can happen very fast, and it is important for all staff to be prepared.

The primary causes of a postpartum hemorrhage seen in the first 24 hours after delivery are uterine atony, lacerations, retained placenta, abnormal adherent placenta, defects of coagulation, and uterine inversion (ACOG, 2017, table 1). Secondary causes, usually seen between 24 hours and 12 weeks post-delivery, are subinvolution of placental site, retained products of conception, infection, and inherited coagulation defects (ACOG, 2017, table 1). During the last 15 years there has been a dramatic increase in postpartum hemorrhages worldwide. In the United States alone the statistics for maternal hemorrhage needing an intervention went from 4.3 in 1993 to 21.2 per 10,000 deliveries in 2014, with a steeper increase seen in the last few years (Center for Disease Control and Prevention [CDC], 2017, para. 2).

In 2006 the California Maternal Quality Care Collaborative (CMQCC) was formed with a goal to decrease maternal mortality rates. In July 2010 they released their first obstetrical hemorrhage toolkit. The focus was to help hospitals standardize care and improve readiness,

recognition, response, and reporting of maternal hemorrhage (CQMCC, 2010). One of the leading causes of maternal morbidity and mortality during childbirth is the failure to recognize excessive blood loss (The Joint Commission, 2010). The CMQCC toolkit was adopted by the hospital group and was integrated into the labor and delivery unit's policy, procedures, and practice in 2015.

Problem Description

The Family Birth Center (FBC) opened in November 2013. It is a low risk labor, delivery, and postpartum unit with a level one nursery. The FBC exists to provide safe, high quality care to antepartum, intrapartum, and postpartum women. The leadership team, staff, and providers work well together and are committed to providing exceptional care to patients and their families.

Since its opening, the FBC has delivered more than forty-eight hundred babies. In 2014 the FBC began implementing the CMQCC toolkit for preventing postpartum hemorrhages, through a collaborative multidisciplinary team approach that involved planning, teaching, implementing, assessing, and adjustments occurred. In 2014 with 1,103 deliveries, the FBC team transfused 14 patients due to postpartum hemorrhage. In 2015, with 1,115 deliveries, following the CMQCC guidelines for quantifying blood loss, there was a significant decrease in postpartum hemorrhages leading to blood transfusions, with only 4 patients were transfused.

With 2016 came new quality initiatives and the team focused their attention on other measures, resulting in a decreased consistency for quantifying blood loss. With 1,293 deliveries for the year, 16 patients received blood transfusions. In 2017 with 1,288 deliveries, 42 were classified as postpartum hemorrhages and 19 patients were transfused with blood products, that

is 45% of the postpartum hemorrhage patients required a blood transfusion (Infoview, 2014 - 2017).

The evidenced-based practice suggests the optimal practice should be quantifying blood loss at every delivery. This process begins with a birth pause, to signify the zeroing of fluids collected before and during birth such as urine, amniotic fluid, or irrigation. The provider, nurse, and obstetrical technician should pause after the birth and state the amount of fluid in the fenestrated drape or the suction canister, the total amount is noted and signifies the beginning of the quantifying process. All items with blood are then weighed and dry weights are subtracted from the total, along with the birth pause amount to get a total quantified blood loss. Quantifying should be done throughout the cesarean section, or vaginal repairs and total blood loss should be communicated with the entire team. This process increases the recognition and response time to the blood loss total helping the team to begin necessary interventions. The implementation of this evidence-based practice change, will decrease the number of postpartum hemorrhages leading to blood transfusions by 50%.

After reviewing the data and observing deliveries on the unit, it was noted that the FBC team did not sustain the practice changes that were implemented in 2015. The staff were not routinely using a birth pause to note the fluids in the under buttocks drape or the suction cannisters and were only using visual inspection to estimate blood loss. The team's current practice is to begin quantifying only when heavy bleeding is noted after delivery, not when a second line uterotonic is called for as originally taught. This practice can lead to a longer recognition and response time to bleeding, and ultimately cause the patient to have a postpartum hemorrhage.

Available Knowledge

The PICOT question that guided the search for evidence in this project was: Will quantifying blood loss (I) instead of estimating blood loss (C), decrease the number of postpartum hemorrhages requiring blood transfusions (O) in women (P)?

A comprehensive electronic literature search was conducted in September 2017 reviewing postpartum hemorrhage, recognition, and quantifying blood loss. The data bases searched included CINAHL Complete, Pub Med, Scopus, and Cochrane Database of Systemic Review. The data bases were searched using the following combinations: postpartum hemorrhage, quantifying blood loss, estimation vs. quantification, patient safety, and maternal hemorrhage. Limitations were set to include English only, research, and publication dates no earlier than 2004. The search yielded 38 articles. Articles were considered based on estimation vs. quantification processes and postpartum hemorrhage evidenced-based practice for recognition and intervention of blood loss. Articles that were based on opinions and reviews without references to postpartum hemorrhage were excluded. Eight articles met inclusion criteria and were selected for review.

The John Hopkins Evidenced Based Practice (JHEBP) research evidence appraisal tool was used to appraise the evidence for this review (See Appendix B). The appraisal tool includes the evidenced levels and quality ratings. One article reviewed rated a level II B the others were level III - V B, the research found was mostly prospective cohort studies, using chart reviews to determine evidenced based practices.

An integrated literature review suggested early recognition of a postpartum hemorrhage has shown to be a “crucial step” in improving maternal outcomes (Hancock, Weeks, & Lavender, 2015, p. 1). In a second study reviewed, it was suggested that accurate and timely determination of blood loss could lead to earlier interventions and decrease the need for invasive

interventions such as transfusion, surgery and length of hospital stay, thereby decreasing the morbidity and mortality rates (Lertbunnaphong, Lapthanapat, Leetheeragul, Hakularb, & Ownon, 2016). The amount of blood loss estimated at the time of delivery is determined by the provider using visual inspection of the blood drapes, sponges and any other blood in the delivery room. This amount can be misinterpreted by the presence of urine, amniotic fluid, and saline during the birthing process. Visual estimation of blood loss by the obstetrical team can result in severe underestimation, up to 50% of blood loss, causing a delay in recognition and response (Golmakani, Khaleghinezhad, Dadgar, Hashempor, & Baharian, 2015). Based on the research that was reviewed, visual estimation can be improved with a didactic course, but is not sustainable and continues to have a high rate of error (Dildy, Paine, George, & Velasco, 2004). The more blood loss the less accurate estimation becomes (Dildy et al., 2004). In a study using a calibrated under buttock drape vs visual estimation, it was found that using the drape has an error rate of less than 15% and can be helpful in the quantifying process during a vaginal delivery (Toledo et al., 2007).

For the most accurate measurements at the time of delivery, the team should take a birth pause and note the fluid amounts in either the suction canister in the operating room or the under buttocks calibrated drape in a vaginal delivery. This birth pause would then begin the quantification process (CQMCC, 2010). The most accurate method used at the time of delivery is quantification, the process of weighing all blood soaked items and subtracting the dry weights of the item (Kadri, Anazi, & Tamim, 2011).

Early recognition and response to heavy bleeding after a delivery is the key to reducing maternal morbidity and mortality during a postpartum hemorrhage. Following clinical practice guidelines and protocols during a delivery helps the team to recognize heavy bleeding, make

critical decisions in a timely manner, and respond to the patient's blood loss thereby improving safety and quality of care for the patient (Edhi, Aslam, Naqvi, & Hashmi, 2013). Providing the staff and providers with the evidence and data will help to drive and sustain the practice changes.

Rationale

The Family Birth Center needs action now. Quantifying blood loss at all deliveries, will assist the staff in recognizing and reacting to significant blood loss during the postpartum period. If harm can be prevented to one patient with prompt recognition and intervention of postpartum hemorrhage, we will be reducing maternal morbidity and mortality rate. Using Kotter's 8 step theory of change, the team will be called to action (Kotter International, 2014). Presenting the FBC team with the four year trends for postpartum hemorrhages that resulted in blood transfusions, specifically focusing on 2017 monthly postpartum hemorrhage and transfusion rates, will create an urgency within the team. Presenting evidence-based practices and sharing the "why" with the team will help support the understanding of how important quantifying blood loss is for the safety of the patients that choose to deliver on our unit. The unit based practice council, a multidisciplinary team, will be enlisted to help drive the change. The team will make plans for the steps of quantifying blood loss at every delivery on the unit and will come together to help educate and create simulations for teaching the quantification practices. Through the team's collaborative efforts, barriers will be identified, eliminated, and provide solutions, making the practice changes possible. Using short term goals and monthly data updates the focus and momentum for the changes will be sustained. If the team begins to show a drift in practice changes, it will be necessary for either individual or team re-education or performance expectation setting, to ensure quality care at every delivery. Kotter's theory

suggests it is necessary to continue the work until there is a complete culture change, ingraining the behavior so it becomes routine (Kotter International, 2014). The unit's leadership team and unit practice council has committed to this practice change and are willing to hold staff accountable until there is a culture shift.

Specific Aim

The aim of this project is to increase the birth pause adherence rate from a baseline of 60% to 80% by July 2018.

Methods

Context

Microsystem Assessment

The Family Birth Center is a 31-bed unit with, 4 triage beds, 8 labor, delivery, recovery rooms, 4 antepartum beds, 15 postpartum rooms, 2 operating rooms, and a 2-bed recovery bay. It is the only Labor and Delivery unit within the health system that has a level I nursery. This means that any newborn requiring extended medical observation or treatment must be stabilized and transported out to the closest tertiary center.

One hundred percent of the patient population is female ages fourteen to forty-nine. The top admission diagnosis includes: active labor, spontaneous rupture of membranes not in labor, induction, and scheduled cesarean section, pre-eclampsia, cholestasis, induction for non-reassuring fetal heart tones, and preterm labor stabilization. The average daily census fluctuates greatly but averages 7 postpartum patients and 3.5 laboring patients in a 24 hour period, with an average length of stay of 2.6 days. There is a readmission rate of two percent within the first week of discharge. Ninety-five percent of patients are discharged home while five percent are transferred to tertiary centers for a higher level of neonatal care.

The staffing for this unit includes a 1:4 ratio in triage, 1:2 ratio in labor, 1:1 while pushing through the first hour of recovery, and 1:4 in postpartum. The unit is a 24-hour operation and is staffed with a unit assistant on both day and even shift only, surgical technician (OB Tech), obstetrician, certified nurse midwife, anesthesiologist, pediatrician, two level two or level three trained nursery nurses, and labor and delivery nurses staffed to census. There is an assistant manager on the unit 24/7. The unit has one manager. The director is shared with the clinical education department. The director has an assistant that is also shared with the perioperative department. The unit does not have a clinical nurse specialist or educator.

Culture Assessment

The FBC team works to encourage open communication, team work, and multidisciplinary collaboration. They are dedicated to providing a safe, high quality, care experience to their patients and families. The team has a high level of engagement, and encourages opportunities for improvement. Once a month a multidisciplinary unit practice council meets, focusing on quality metrics, safety, and care experience. The focus of this workgroup is to decide on evidenced-based practice change.

SWOT

The team strives to make continuous change for safe, high quality care for their patients. The multidisciplinary team is dedicated to evidenced based practice changes and improving quality care. The team is very responsive to unit data when shared at staff and unit-based practice council meetings. Unit updates and information are provided to multidisciplinary staff during shift huddles and through email. The postpartum maternal hemorrhage cart, put into clinical practice in 2015, continues to be a part of the clinical practice tools used when a patient is

bleeding heavily. The team responds well once a postpartum hemorrhage is identified, accessing the cart, medications, and alerting providers to the situation.

Over the last two years, the unit has seen a significant increase in postpartum hemorrhages leading to blood transfusion. There has been significant drift on postpartum hemorrhage practices such as quantifying blood loss at every delivery. The barriers for sustaining change have been identified as the lack of support from the staff and providers. The team identified it takes more time during the repair and recovery process to weigh all the blood instead of the provider providing the estimation of blood loss. Since 2015, there have been many additions to the provider group, both doctors and midwives alike. Most were not involved in the original postpartum hemorrhage/quantification drills and training in 2015.

The team has many opportunities for improvement and success for quantifying blood loss at every delivery. New smaller scales, that weigh in grams instead of kilograms, with a smaller footprint in the rooms will be provided, as requested by the staff. The previous scales had been identified as a barrier. The OB Tech will be available for most deliveries and help in the weighing process. The providers will also be trained to pause at birth to get an accurate quantification starting point.

The threat to this project includes the staff taking more time during the recovery period, due to weighing all blood, causing the unit to be less productive. Overall, if the team does not believe that quantification of blood loss is important in identifying a postpartum hemorrhage and has the potential to save lives, it will not be a success. (See Appendix D)

ROI

The budget for this project mainly consists of team training. Meeting dates are incorporated into the unit practice council, therefore does not require extra time away from

patient care or additional meeting space. There is a thirty minute time allotment within the meeting schedule. During the monthly meetings, strategic planning for the postpartum hemorrhage project will take place. The project requires updating the dry weight cards with the updated products carried on the unit, they will need to be laminated and replaced on the ring clips that attach to the scales. The drills and skills for the entire FBC staff will take place at the annual skills training days in May; an hour has been allotted for the training and drill for the estimation of blood loss versus quantification station, medication review, and postpartum hemorrhage drill. (See Appendix I).

Once training is completed the postpartum hemorrhage champions will attend all cesarean sections and vaginal deliveries, ensuring the quantification process is in practice and being done correctly. The observing nurse is projected to be in the room for fifteen minutes per delivery for the first month, as this is the average time of clean up post-delivery. There is an the average delivery rate of 3.5 per day. Chart audits will be performed monthly on all postpartum hemorrhages; the data will be shared at the unit based council meetings, staff meetings, and strategy board on the unit. The Clinical Nurse Leader will use the data to monitor outcomes and implement change as necessary.

The average cost of a postpartum hemorrhage with a blood transfusion has been estimated at $50,000. By recognizing and responding quickly to a hemorrhage situation the additional costs can be avoided as well as harm to the patient. This project is expected to decrease the hemorrhage leading to a blood transfusion rate from 19 in 2017 to 12 in 2018, therefore providing a yearly savings of $350,000. (See Appendix H)

Intervention

The intervention consists of 4 elements: simulation training, standardizing the birth pause practice and quantification process for all deliveries, additional scales, and emergency medication prompts (see Appendix K). The practice change begins with education. The team will have a 30-minute review of evidenced-based practice standards for quantifying blood loss, review postpartum hemorrhage medications, and the postpartum hemorrhage stages (See appendix J, figure 1). The team will go through a 30-minute skill stations, reviewing the Bakari balloon, Belmont rapid infuser, Floseal, and an opportunity to quantify a simulated vaginal delivery, using the new scale (See Appendix J, figure 2). The team will then participate in a postpartum simulation drill.

During the planning process it was recognized that the team did not have the equipment necessary to quickly and efficiently weigh the blood-soaked items. The scales on the unit only weigh in kilograms, which require the nurse to recalculate the weight to grams and lock after a weight is obtained, requiring the nurse to start the process over each time an item is added for weight. New scales with rolling stands were purchased for this project. They weigh in grams and have a continuous weighing feature, so the weighing process is quicker and with less obstacles. During skills day the team asked for more than 2 new scales. They asked for a total of 5, two for the eight delivery rooms, 1 for the 2 operating suites, and 2 more to replace the old scales on the postpartum hemorrhage carts, the request was granted by leadership.

The quantification process will be completed by the primary nurse or OB Tech, or any nurse that is available to help. The team will weigh all items with blood on them after the delivery, and dry weights of items will be subtracted. This will give an accurate blood loss calculation to the team and help them to recognize a postpartum hemorrhage in a timely manner. This will decrease the response time to the interventions necessary to help decrease the bleeding

and decrease the need for the patient to receive a blood transfusion. The intervention will consist of education followed by drills in skills days. Skills days are scheduled for eight sessions during the month of May. Attendance for the entire team is mandatory.

Sharing the monthly data with the team will help to ensure the culture change. Being able to see the practice change working and knowing that the changes are improving quality and safety for their patients will continue to motivate the staff until it becomes the culture.

Study of Intervention

Creating the project charter was an essential step in the project, it provided a guide throughout the process, keeping the project measures and outcomes in focus (Appendix C).

The tests of change (Appendix E) for this project include: implementing the birth pause and new scales on smaller stands that measure in grams. During skills training of the quantifying process, the team discussed a calculation tool, a paper with dry weights on one side to tick off for counts, and two columns to keep track of all other calculations and totals. This was designed by the clinical nurse leader, based on team suggestions, and made available with the scales.

100% of the staff completed the educational training sessions. After completion of the last day, the quantifying tools were put into clinical practice. The assistant managers start each shift with a huddle to provide information on safety, hot topics, and an overview of the patients on the unit. The assistant managers will huddle the birth pause and quantifying process at each shift for the entire month. The quantifying champions and assistant managers agreed to go to each delivery to audit the birth pause at all deliveries.

Measures

The outcome measure is the number of patients receiving blood transfusions due to postpartum hemorrhage rate per month. The process measure will be the number of deliveries

that adhere to the birth pause and are quantified appropriately. The balancing measures for the outcomes include a higher or lower delivering census as delivery rates vary, and staff or provider turn over. It is important that everyone on the team is educated on the quantification practices, postpartum hemorrhage medications, and interventions.

Ethical Considerations

This project has been approved as a quality improvement project by faculty using quality improvement review guidelines and does not require IRB approval (Appendix A). There are no ethical concerns or implications for the quantification process. Increasing the recognition and decreasing the response time to heavy bleeding after a delivery will improve the quality of care received at the Family Birth Center. The CMQCC, American College of Obstetrics and Gynecologist (ACOG), and the Association of Women's Health, Obstetrics and Neonatal Nurses (AWHONN) have deemed the quantification process as best practice, it is crucial for patient safety and quality for an immediate culture change (ACOG, 2017). As for the team, the ethical considerations for the quantifying process is the obligation to the patients for the highest quality and safest care. Non-adherence to the process due to inconvenience or failure to see the importance of the process is unethical and can endanger patients.

Results

Results

On June 1, 2018 the practice changes began. Assistant managers and quantifying champions audited each delivery for 17 days, focusing on the birth pause and quantification process. The standardization of the quantification process, starting with the adherence to the birth pause, shows a trend of improvement. The baseline performance for the adherence to the birth pause, was 60% before the intervention and has improved to exceed the target of 80% post intervention.

The results were expected due to the education and skills process and the team was excited to follow the evidence-based, best practice standards (See Appendix F). There was a decrease seen in the number of postpartum hemorrhages leading to blood transfusions from 45% in 2017 to 19% in 2018 (See Appendix G).

Discussion

Summary

The postpartum hemorrhage reboot has been successful, the staff continue to show improvement completing the birth pause, which initiates the quantifying process.

The skills, drills, evidenced based practice education, new equipment, and expectation setting has set the team up for ongoing success. Once skills day was completed, with 100% of staff attendance, the new scales and worksheets were delivered to the floor. During the kick off of the quantifying, the Clinical Nurse Leader (CNL) noted enthusiasm from the staff with the process in vaginal deliveries but resistance to the process in the operating room (OR). The team focused the skills and drills on the vaginal delivery scenario but had only a brief discussion of the OR process and expectation, leaving many questions and unclear practice guidelines. The CNL along with the PPH team worked together to created huddle messages, provide a champion to start the quantifying process for all deliveries, and lead discussions with the providers regarding the entire quantification process. Once the quantification process in the OR was clearly defined for all staff, it was followed and completed. Quantifying is a team effort and will not be successful without the entire team working together at completing it.

There were many lessons learned from this project. The first and most significant of all the lessons was collecting and understanding the data, it is the first step to improving outcomes. The hospital has a quality department, along with a regional quality department, data obtained

from these departments were postpartum hemorrhage cases and postpartum hemorrhage with blood transfusion cases. The CNL audited each patient chart for the entire 2017 year and the completed 2018 charts, the data was compared to the reports received from the quality departments and was found to be not accurate. This was due to scanned documents, and data entry errors. Cross checking data is imperative to ensuring accurate data reporting.

The second lesson comes from implementation of skills and drills. The focus should not have been only on the vaginal delivery process. In retrospect more, time should have been spent on the step by step quantifying for both the vaginal and cesarean deliveries. Not understanding the differences in the process caused confusion and had the potential to derail the process in the OR. The final lesson the CNL learned was to trust in the team. During the skills and drills the staff identified potential pre-mortem scenarios, such as the need for more scales and the quantifying worksheet. The CNL along with the director, and PPH team, were able to fix these barriers before they caused a problem on the unit, therefore contributing to the success of the quantifying process.

Conclusion

This project has already been effective in the recognition and prompt intervention to hemorrhages, the team is using the birth pause and quantifying during deliveries. We have seen a decrease in the postpartum hemorrhage leading to blood transfusion rate. It will be necessary to continue to focus on the quantification practices, ensuring the team follows the practice changes. The PPH hemorrhage team will continue to meet monthly, creating helpful tips and tricks to share in the huddles to keep the team focused on the quantifying process. This project has high potential for sustainability, as a quality and safety measure it is best practice, therefore it is an expectation of the team. The collaborative efforts of the Family Birth Center team made this

project a success. Sharing the evidenced-based “why” of a practice change, along with unit data motivated the team to adhere to the quantification process. The leadership team along with the unit council have committed to sustaining the quantifying process as a quality focus. The team will continue the quality improvement work until it becomes a standard of practice and a part of the daily culture in order to have a positive effect on morbidity and mortality of our perinatal population.

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Appendix A

CNL Project: Statement of Non-Research Determination Form

Student Name: Alison Landis

Title of Project:

Quantifying Blood Loss: Implementation of Evidenced Based Change

Brief Description of Project: Implementation of quantifying blood loss at every delivery. This will increase recognition and response time of a postpartum hemorrhage.

A) Aim Statement: Increase the birth pause adherence rate from a baseline of 60% to 80% by July 2018.

B) Description of Intervention:

1. Presentation on evidenced based practice of quantifying vs. estimation

2. Team skills and drills

A. Skill – Estimation vs. Quantification process- accuracy and how to quantify blood loss in real time during a delivery using a measuring under buttocks drapes and scales in a vaginal delivery, during c/s pausing to record suction canister measurement at birth and weighing all linen and soiled materials after c/section completion.

3.Team lead in every delivery to ensure process of measuring and weighing followed and understood with providers, nurses, and techs.

C) How will this intervention change practice? Increases the recognition and response time to a bleed therefore decreasing the amount of blood loss.

D) Outcome measurements:

1. **Outcome:** Decrease the number of blood transfusions per month by 50%

2. Process measure: Quantification of blood loss to be completed at 80% of all deliveries

3. Process measure: Birth pause, to be completed in 80% of all deliveries.

4. Balancing – increase or decrease in census- fluctuation in delivery rate per month

5. **Balancing**- Staff turnover

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:

Project Title:	**YES**	**NO**
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.	**X**	
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.	**X**	
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.	**X**	
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.	**X**	
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	**X**	

research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.		
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):
___ Alison Landis __
Signature of Student:
_____DATE_____

SUPERVISING FACULTY MEMBER NAME (Please print):
_____
Signature of Supervising Faculty Member
_____DATE_____

Appendix B

Evaluation Table

Study	Design	Sample	Outcome/Feasibility	Evidence rating
Main EK, Cabe V, Abreo A, et al. (2017). Reduction of severe maternal morbidity from hemorrhage using a state perinatal quality collaborative. *American Journal of Obstetrics*. 10.1016/j.ajog.2017.01.017	Quality Improvement Design	99 collaborative hospitals with 48 non-collaborative hospitals	Collaborative hospitals experience 20.8% reduction in severe maternal morbidity / Non-collaborative hospitals had a 1.2% reduction.	L V A
Golmakani, N., Khaleghinezhad, K., Dadgar, S., Hashempor, M., & Baharian, N. (2015). Comparing the estimation of postpartum hemorrhage using the weighting method and National Guideline with the postpartum hemorrhage estimation by midwives. *Iranian Journal of Nursing and Midwifery Research*, *20*(4), 471–475. http://doi.org/10.4103/1735-9066.161005	Descriptive Study	112 Females	Significant difference between the estimated blood loss based on the weighing methods	L III B
Lertbunnaphong, T., Lapthanapat, N., Leetheeragul, J., Hakularb, P., & Ownon, A. (2016). Postpartum blood loss: visual estimation versus objective quantification with a novel birthing drape. *Singapore Medical Journal*, *57*(6), 325–328. http://doi.org/10.11622/smedj.2016107	Prospective Study	286 patients low risk pregnancies	Significant difference between the estimated blood loss and weighing methods including using drape for measurement	L III B
Edhi, M. M., Aslam, H. M., Naqvi, Z., & Hashmi, H. (2013). “Post-partum hemorrhage: causes and management.” *BMC Research Notes*, *6*, 236. http://doi.org/10.1186/1756-0500-6-236	Cross sectional study	1493 Deliveries	Improved results with critical judgment, early referral and resuscitation	L III B
Hancock et al. Is accurate and reliable blood loss estimation the 'crucial step' in early detection of postpartum	Integrated literature review:	36 studies	Early recognition of postpartum	L V A

hemorrhage: an integrative review of the literature. BMC Pregnancy and Childbirth (2015) 15:230. DOI 10.1186/s12884-015-0653-6	Exploring strategies and methods of blood loss assessment		hemorrhage has improved outcomes	
Al Kadri HM, Al Anazi BK, Tamim HM. Visual estimation versus gravimetric measurement of postpartum blood loss: a prospective cohort study. Arch Gynecol Obstet. 2011; 283:1207–13.	Prospective cohort study	150 patients	Significant difference between the gravi- metric calculated blood loss and both health-care providers' estimation with a tendency to underestimate the loss by about 30%.	L II B

Appendix C

Project Charter:

Quantifying blood loss

Global Aim:

To reduce the number of blood transfusions in postpartum patients, from a baseline of 2 per month to 1, in the Family Birth Center by December 31, 2018.

Specific Aim:

Increase birth pause adherence rate from a baseline of 60% to 80% by July 31, 2018.

Background:

Obstetrical hemorrhage is the leading cause of maternal morbidity and mortality, it is also the most preventable. The California Maternal Quality Care Collaborative (CMQCC) has created a standardized toolkit to better prepare hospitals for readiness, recognition, response, and reporting when a hemorrhage occurs (California Maternal Quality Care Collaborative [CQMCC], 2010). The toolkit was adopted regionally by Kaiser and put into clinical use on all maternal child health units, including the Family Birth Center. The implementations of best practices adopted by some California hospitals, resulted in at 20.8 % decrease in maternal morbidity between 2014 and 2016. Many research studies have shown providers, greatly underestimate blood loss in vaginal and cesarean deliveries, recognition and time are crucial to better outcomes.

Sponsors:

Director of Maternal Child Health	Elizabeth Bigby
Chief of Obstetrics	Sarah Smith
Chief of Midwifery	Anne Vosler

Goals:

To reduce blood transfusions by 50% of the current baseline of 2 per month by implementing and sustaining a multidisciplinary process to quantify blood loss at all deliveries.

1 Providers to pause immediately after birth and team call out for fluid collected in suction canister or fenestrated drape to be subtracted from total fluid volume at the end of QBL.

2 Monthly transfusion data review with team at PPSP (Perinatal Patient Safety Program)

3 Skills day review on estimation vs. quantification, evidenced based practice

Family of Measures:

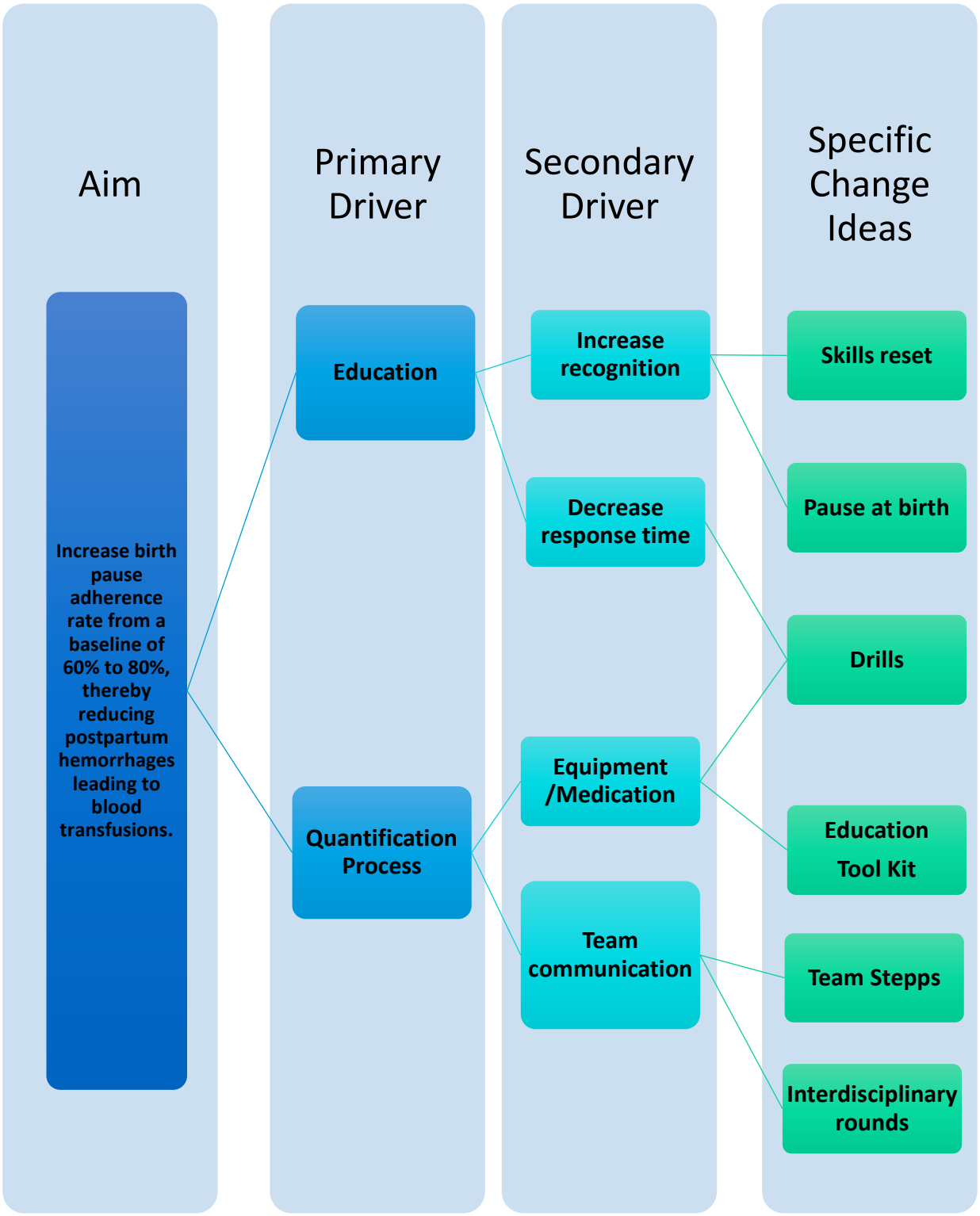
Measure:	Data Source:	Target:
Outcome:		
Number of patients who received blood transfusions per month	Infoview Report Chart Review	• Less than 2 a month
Process:		
• Quantifying Blood loss at delivery • Birth Pause	Infoview Report Chart Review Delivery Audit	• 80% - Every delivery • 80% - Every delivery

Balance:		
• Higher or Lower Census • Staff turnover	Infoview report	• Delivery rates from 0 -7/day • Less than 20% turnover for physicians, midwives and nurses

Team:

Executive Sponsor:	**Elizabeth Bigby, RN, DNP**
MD Co-lead:	**Sarah Smith, DO**
Midwife Co-lead:	**Anne Vosler, CNM**
Manager:	**Melodie Martin, RN, BSN**
ANM:	**Alison Landis, RN, BSN**

Driver Diagram:



Measurement Strategy:

Background (Global Aim):

To implement standard quantification processes during birth, per the CQMCC toolkit, increasing the recognition and response time to blood loss during the birthing process thereby decreasing the number of postpartum hemorrhages

Population Criteria:

All women giving birth at the Family Birth Center

Data Collection Method:

Data will be obtained from blood transfusion audit reports from infoview and chart review from each delivered patient. Baseline data will be collected for Quarter 1 of 2018. After baseline data has been collected, monthly data will be reviewed for Quarter 2 for project measures. Data review and plan reevaluated every 2 weeks.

Data Definitions:

Data Element:	Definition
Blood transfusion	Unit of blood given to patient after delivery due to low hemoglobin and hematocrit or symptoms of low blood count.
Blood Loss Quantified at delivery	All blood loss weighed and measured from birth through recovery, and any major loss in first 48 hrs.

Measures Description:

Measure:	Data:	Data Collection Source:	Goal:
Birth Pause at deliveries	N=# of deliveries when birth pause was completed, starting the quantification process D=# of patients delivered in a day	Chart review / delivery audit	100% at all deliveries

Changes to Test:

- Interdisciplinary education, skills and drills (Equipment and medication review)
- Unit data will be reviewed with staff each month
- Evidence based practice review
- Nurse champions will attend deliveries to assist in the initial process of the "pause" at deliveries.
- Daily huddles will be used as practice changes are revised

New equipment – scales and quantifying worksheet

Project Timeline

	Action Plan	27-Feb	6-Mar	13-Mar	20-Mar	27-Mar	3-Apr	10-Apr	17-Apr	24-Apr	1-May	8-May	15-May	22-May	28-May	5-Jun	12-Jun
1	Data Review																
2	Create urgency within team- power point with data and background information																
3	Seek volunteer team members for change project																
4	Create multidisciplinary wokgroup- weekly meeting times set																
5	Team members assessed - SWOT																
6	Problem/Vision/Desired Outcome, and Evidenced based review																
7	Project time lines, change ideas, and strategies discussed-AIM statement reviewed																
8	Barriers identified by team- Leadership to resolve																
9	Skills, Education and Drill completed by all team members																
10	Go Live quantifications process on unit (Practice experts present in all deliveries																
11	Chart review, evaluation cards collect (staff feedback) data review with team																
12	Practice improvement changes to meet goal discussed - implemented																
13	Shorterm goals met - Celebratiom																
14	Continued chart audits and data review																
15	Address fallouts with staff prevent drift																

CNL Competencies:

1. **Organizational and Systems Leadership**
    - Assume leadership role on interdisciplinary team, focus on quality, patient centered care.
    - Collaborate with interdisciplinary team including physicians, midwives, manager, nurses and techs to plan, implement and evaluate a quality improvement measure.
    - Participate in microsystem multidisciplinary team to make effective change.
2. **Quality Improvement and Safety**
    - Uses effective, professional communication with team, including verbal, written, and technological abilities.
    - Implements quality improvement based on evidence-based practice, systems analysis, and risk anticipation
    - Uses quality measures to assess and improve evidenced based practice delivery and foster outcomes that validate a higher value of care.
3. **Translating and Integrating Scholarship into Practice**
    - Facilitate evidenced based practice change on latest evidence with outcomes that reflect quality, safety, and fiscally responsible change

Lessons Learned:

1. **Microsystem assessment** – diving deep into the microsystem, found it difficult to find measurements that matter and finance information. Access to the data systems needed for information only for managers.
2. **Evidenced based practice is** powerful to a team. Giving the "why" we make practice changes and seeing outcomes on a graph is motivating.

Appendix D

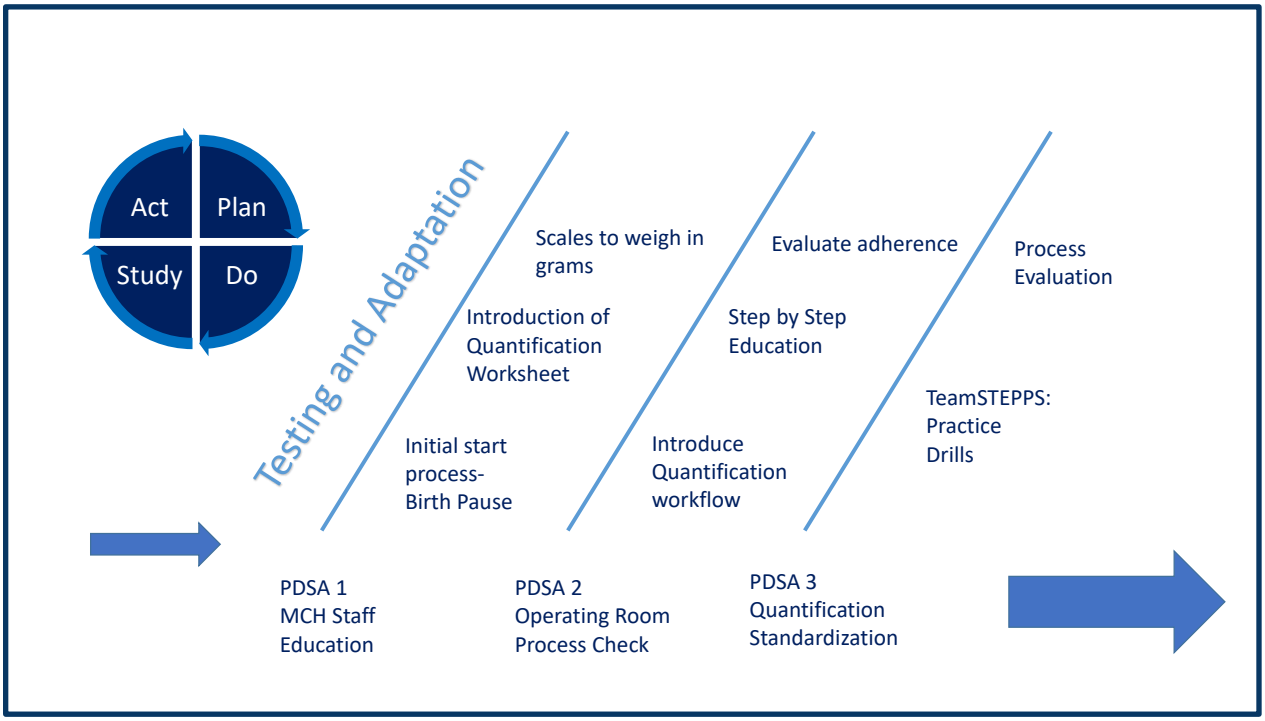
Performance Improvement Tools

SWOT Analysis

Created by the FBC Team

Appendix E

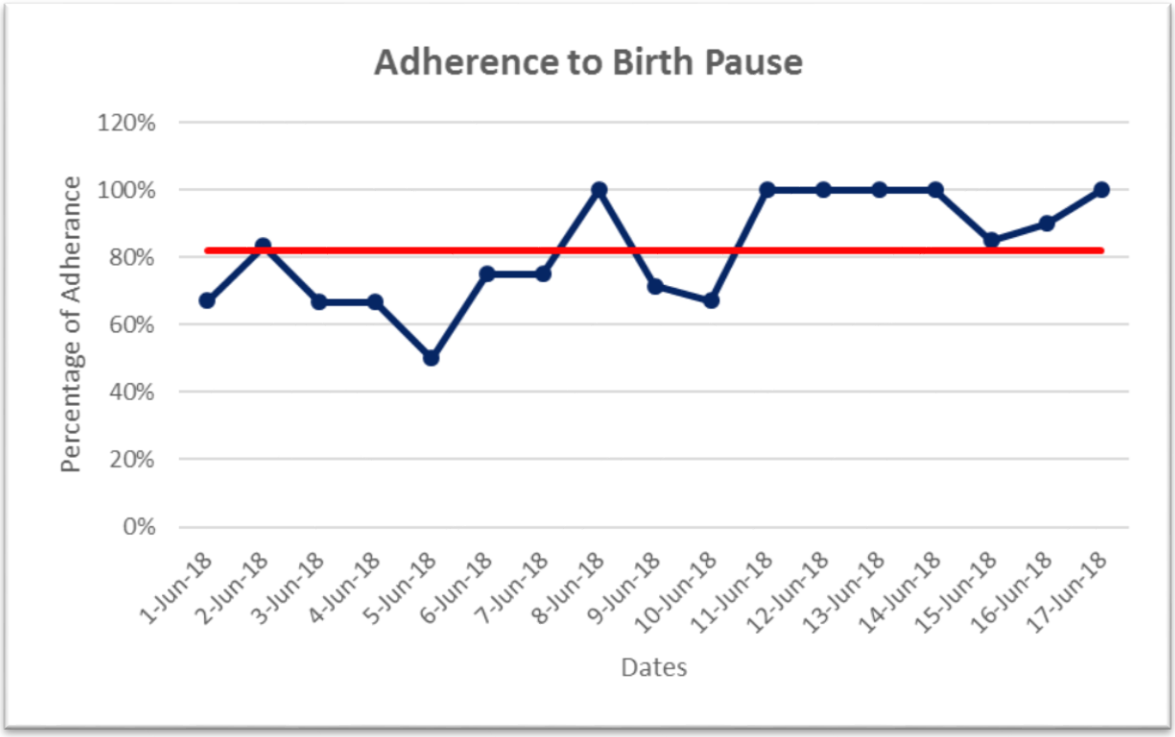
PDSA Cycle



Created by CNL on June 1, 2019

Appendix F

Results



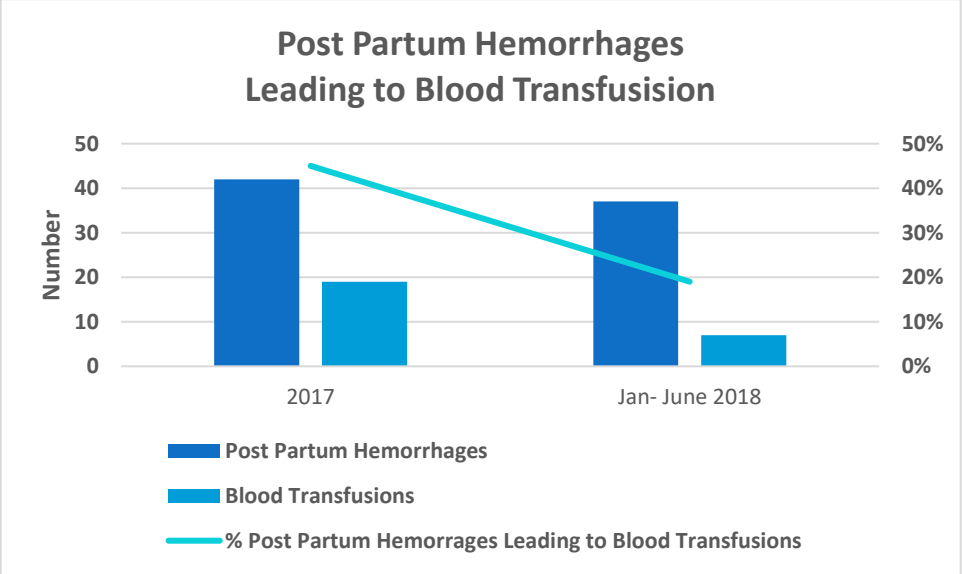
Source: Delivery Audits

Analysis: Baseline performance of adherence to the birth pause intervention was 60% before the intervention and has improved to exceed the target of 80% post intervention.

Sustainability Plan: Continue to audit deliveries

Appendix G

Table



Source: Infoview Report

Analysis: Decrease seen in the number of postpartum hemorrhages leading to blood transfusions from 45% in 2017 to 19% in 2018.

Appendix H

Cost Benefit Analysis

Cost Description		
Item	Description	Cost
Cost Avoidance	Cost Per PPH leading to a blood transfusion	$ 50,000.00

Cost Savings

2017		Proposed Project		Cost Savings
Quantity	Amount	Quantity	Amount	Amount
19	$950,000.00	12	$ 600,000.00	$ 350,000.00

Appendix I

Budget

Role	Number	Unit Costs	Hours	Total Cost
PPH PI RN's	12	$75	3	$2700
PPH PI OBT	2	$27	3	$162
PPH PI UA	1	$23	2	$46
PPH ANM	1	$85	80	$6800
Laminated / Color Weight Cards with rings	6	$5		$30
Small Scales	2	$375	1	$750
Co-Lead RN	1	$75	20	$1500
Training all RNs	87	$75	1	$6525
Training all OBTs	7	$27	1	$189
Delivery auditors	1	$75	15	$1125
Total Cost:				$19,827

Appendix J

Implementation Tools

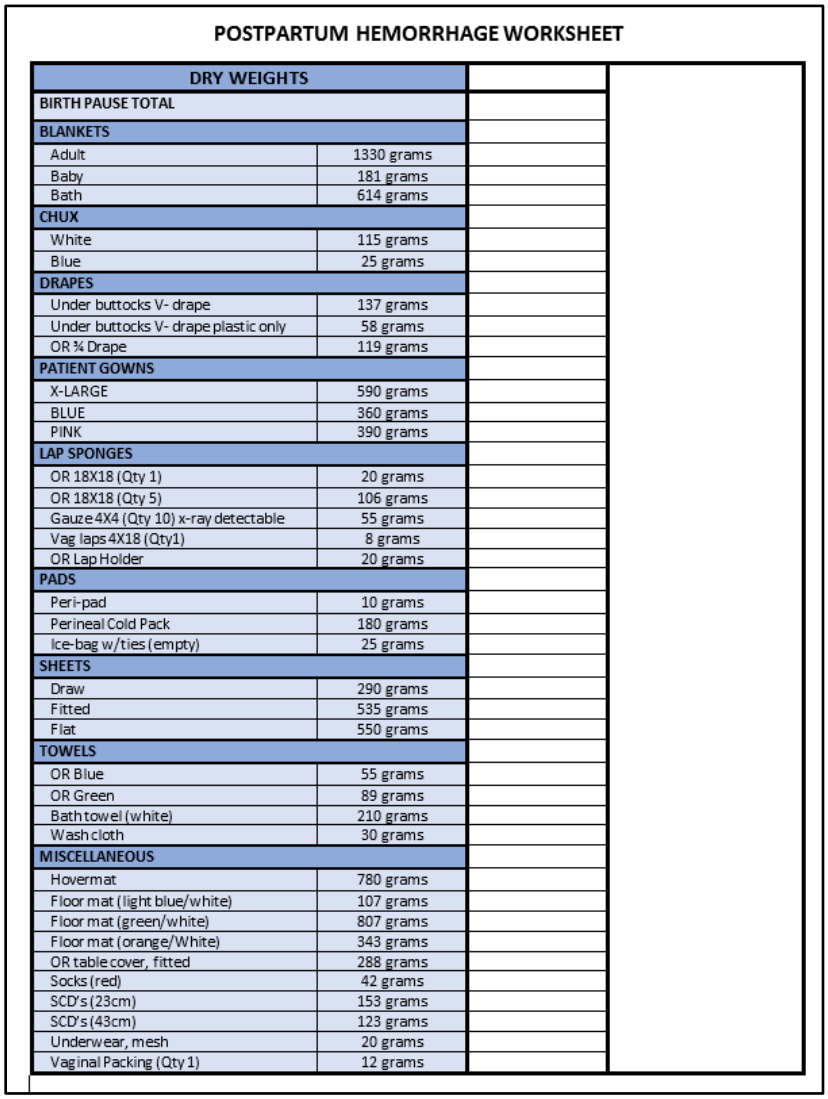
Figure 1

Drug	Dose	Onset	Comments
Oxytocin	IV 30 units/500ml of crystalloid IM 10 units/ml	Rapid	First-line therapy
Methergine (Methylgonovine maleate or ergonovine maleate)	IM 0.2 mg	+/1 10-20 minutes	Avoid in patients with hypertensive disease, including preeclampsia
Hemabate (Carboprost tromethamine)	IM 0.25 mg	30 minutes	Caution in asthmatic patients. Concurrent use of antiemetics and anti-diarrheal recommended
Cytotec (Misoprostol)	Buccal/PO/PR 400-800 mcg	Rapid	Single dose; can give PO. May cause tachycardia and/or fever
Tranexamic Acid (TXA)	IV 1000 mg	5 minutes	Not first-line therapy, give within 3 hours of signs of hemorrhage

Adopted from CMQCC Toolkit 2015 with modification

Figure 2. Weight Scale

Figure 3 Postpartum Quantifying Worksheet



POSTPARTUM HEMORRHAGE WORKSHEET

DRY WEIGHTS			
BIRTH PAUSE TOTAL			
BLANKETS			
Adult	1330 grams		
Baby	181 grams		
Bath	614 grams		
CHUX			
White	115 grams		
Blue	25 grams		
DRAPES			
Under buttocks V- drape	137 grams		
Under buttocks V- drape plastic only	58 grams		
OR ¾ Drape	119 grams		
PATIENT GOWNS			
X-LARGE	590 grams		
BLUE	360 grams		
PINK	390 grams		
LAP SPONGES			
OR 18X18 (Qty 1)	20 grams		
OR 18X18 (Qty 5)	106 grams		
Gauze 4X4 (Qty 10) x-ray detectable	55 grams		
Vag laps 4X18 (Qty1)	8 grams		
OR Lap Holder	20 grams		
PADS			
Peri-pad	10 grams		
Perineal Cold Pack	180 grams		
Ice-bag w/ties (empty)	25 grams		
SHEETS			
Draw	290 grams		
Fitted	535 grams		
Flat	550 grams		
TOWELS			
OR Blue	55 grams		
OR Green	89 grams		
Bath towel (white)	210 grams		
Wash cloth	30 grams		
MISCELLANEOUS			
Hovermat	780 grams		
Floor mat (light blue/white)	107 grams		
Floor mat (green/white)	807 grams		
Floor mat (orange/White)	343 grams		
OR table cover, fitted	288 grams		
Socks (red)	42 grams		
SCD's (23cm)	153 grams		
SCD's (43cm)	123 grams		
Underwear, mesh	20 grams		
Vaginal Packing (Qty 1)	12 grams		

Figure 3 – Created by the CNL with input from the entire FBC Team

Appendix K

Competency Tool

FAMILY BIRTH CENTER SKILLS DAY 2018		
Aspect of Care/Skill:	**ANNUAL SKILLS DAYS**	
Employee's Name (PRINT):	Employee ID#	
Unit: **FBC**	Facility (Circle):	
Completed signed copy sent to HR Service Center Date: Mo Day Yr **Initials:**		
Competency Performance Check List Validation Legend: V=Verbalize, R= Return Demo, C= Case Study, T= Test	**Validation Method V, R, C, T**	**Requires Validation Follow Up**
CARE EXPERIENCE		
Discusses "Joy at Work," TeamSTEPPS, & professional responsibility		
CARE OF THE HEMORRHAGING PATIENT		
Demonstrates how to properly calculate QBL Discusses TXA: need for use, documentation, side effects, contraindications Demonstrates how to use Bakri Balloon and care for patient with Bakri placed Verbalizes appropriate use of Flow Seal Demonstrates how to correctly run Belmont pump		
SAFE PATIENT HANDLING		
Returns Demonstration of safe patient handling techniques including use of: • Proper body mechanics, boost/repositioning • Argo steady, Golvo, Overhead lift, Walker, Hovermatt		
LDRP SKILLS		
Verbalizes understanding of proper I/O charting Discusses use Dextrose Gel protocol and administration Completes all POCT certification per the lab protocol Demonstrates appropriate abdominal preparation Identifies/locates OR equipment and supplies Demonstrates how to properly setup and apply patient strap for OR table		
POST-PARTUM PATIENT CARE		
Demonstrates understanding of ERAS Protocol Discusses appropriate Rhogam workflow Verbalizes understanding of • Journey home booklet • Help at Home • Ask 3/Teach 3		

Note: This instrument was utilized to assess competency of staff