

**Staff Education Within Postpartum Hemorrhage Bundle Implementation:  
A Quality Improvement Project**

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### **Abstract**

*Background:* Meeting staff education goals during the implementation of a state level perinatal collaborative postpartum hemorrhage (PPH) bundle was a consistent struggle due to provider workflow and a lack of concise materials and on a labor and delivery unit. The aim of this intervention was to increase the cumulative percentage of staff who completed an education program on PPH bundle elements, unit standard protocol and management of PPH through the development and implementation of a unit specific education tool. This project was set in an 18-bed labor and delivery unit at a rural hospital in Oregon. Participants included registered nurses, certified nurse-midwives, obstetricians and family medicine physicians.

*Methods:* The Plan Do Act Study method of quality improvement was used for this project. Data that had been previously collected by nursing management to monitor staff education were used as baseline data. The education tool was made available to all staff electronically and hard copies were placed throughout the unit for use. Use of the education tool was self-reported by staff and recorded categorically (done/not done) by nursing management. A pre and post-implementation Likert scale survey was used to assess self-reported staff knowledge of PPH bundle contents and unit standard protocol before and after the intervention.

*Results:* Following the 11-week implementation phase, data on education tool completion and survey results were analyzed. The cumulative percentage of education tool completion for both registered nurses and providers was 100%. The cumulative staff average score before the use of the education tool was 3.6 and after use was 4.3—indicating a general staff shift in self-reported knowledge of the OPC obstetric hemorrhage toolkit, unit stand protocol and PPH management from moderate/strong to strong/very strong.

*Conclusions:* Implementation of a unit-specific education tool on PPH bundle elements and unit standard protocol successfully increased the cumulative percentage of staff who had completed

an education program. Additionally, the implementation of the education tool increased staff-reported knowledge on PPH bundle contents. Although improvement goals were exceeded as a result of this project, additional work is needed to continue improving the staff education process in the context of PPH bundle implementation. Specifically, tracking provider education completion and developing a system for education tool updates. Future research that investigates the sustainability and transferability of the education tool is recommended.

*Keywords:* Postpartum hemorrhage, quality improvement bundle, labor and delivery, staff education.

### **Staff Education Within Postpartum Hemorrhage Bundle Implementation: A Quality Improvement Project**

Postpartum Hemorrhage (PPH) significantly impacts maternal morbidity and mortality across the globe. This remains true, despite the fact that PPH is a largely preventable, and often treatable, complication of childbirth (Say et al., 2014). In response to the increasing rates of maternal morbidity and mortality in the United States (CDC, n.d.), many state-level perinatal quality improvement collaboratives have implemented obstetric hemorrhage safety bundles and toolkits in an effort to improve outcomes. The Oregon Perinatal Collaborative (OPC) launched the Obstetric Hemorrhage Initiative Toolkit in 2019. Since then, hospital systems across the state of Oregon have begun implementing the toolkit on labor and delivery units. The OPC Obstetric Hemorrhage Initiative Toolkit is based on the hemorrhage bundle released by the National Partnership for Maternal Safety, Council on Patient Safety in Women's Health Care and includes four distinct phases— (1) readiness, (2) recognition and prevention, (3) response, and (4) reporting/systems learning (Main et al., 2015). See Appendix A for details on these phases.

Toolkit implementation is a complex undertaking as there are multiple parts within each phase to initiate and track. Conversations with key stakeholders revealed a distinct need for improvement within the *Readiness* phase at Legacy Silverton Medical Center's Family Birth Center (FBC) in Silverton, Oregon. The FBC began to implement the OPC Obstetric Hemorrhage Toolkit in the fall of 2019. The implementation phase of the toolkit is set to take place over one year and is guided by monthly meetings conducted by nursing management and staff champions. In these meetings, toolkit implementation progress is assessed, plans for standardizing protocol are made, and barriers are discussed.

According to key stakeholders, FBC has had overall positive reception of the OPC OB Hemorrhage Toolkit, but reported challenges with adhering to the staff education requirements

outlined under Domain 5 of the toolkit (OPC, 2019). See Appendix B. The nursing staff at FBC use a unit “education/drill book” as one source of staff education. The education/drill book is a physical binder containing written guidance on facilitating in-situ simulations for various obstetric emergencies. Drills and education sessions are held by the charge nurse and participant involvement is recorded and tracked by nursing management. Provider involvement is encouraged. According to key stakeholders, use of the drill book has declined at FBC in the past six months, and has not been updated since OPC Obstetric Hemorrhage Toolkit implementation began. Therefore, the education/drill book did not include changes in unit protocol that have occurred since fall 2019. In order to ensure that all staff working at FBC recognize and respond to PPH as outlined by the OPC Obstetric Hemorrhage Toolkit, the addition of a new education tool added to the unit drill-book was needed.

### ***Available Knowledge***

Postpartum hemorrhage is the leading cause of maternal mortality in low-income countries, and the primary cause of nearly one quarter of all maternal deaths globally (Say et al., 2014). The World Health Organization’s multi-country analysis found PPH to be the leading cause of maternal near-miss cases resulting in significant organ impairment (Souza et al., 2013). In the United States, PPH is the fifth leading cause of maternal mortality, accounting for approximately 11– 12% of deaths (Creanga et al., 2017). Comparative data from 1994 to 2006 showed a 26% increase in the percentage of delivery hospitalizations with a code for PPH, and a 50% rise in cases of PPH caused specifically by uterine atony (Callaghan et al., 2010). Although more recent data on PPH has yet to be released, the Center for Disease Control and Prevention (CDC) has demonstrated continuous increases in rates of PPH across the United States between 1993 and 2014 (CDC, n.d.) and a current maternal mortality rate of 17.4 maternal deaths per 100,000 live births are attributed to postpartum hemorrhage (CDC, 2020). While examining

trends in data sets over time, it is important to note that the definition of PPH has recently changed. Traditionally defined as blood loss of 500 mL or greater after vaginal delivery, and 1000 mL or greater after cesarean birth, the American College of Obstetricians and Gynecologists published a nomenclature consensus document that included the following revised early PPH definition for vaginal and cesarean deliveries: the cumulative blood loss of 1000 mL or greater, or blood loss accompanied by signs/symptoms of hypovolemia within 24h following the birth process (ACOG, 2017). This change will certainly impact trends in diagnosis of PPH moving forward, and must be kept in mind when comparing data sets in the future.

The long-term health consequences of PPH on community and family well-being has made it a focus of obstetric research and quality improvement science for the last decade. A growing body of evidence now suggests that the implementation of PPH safety bundles produces improved outcomes on multiple levels (Main et al., 2017; Shields et al., 2015; Einerson, et al., 2015). Decreased use of blood products (Shields et al., 2015), changes in clinical practice that reduce severity of PPH (Einerson et al., 2015), and significant reduction in overall morbidity from PPH (Main et al., 2017) is reflected in the literature. Though results have been overwhelmingly positive, distinct barriers have been identified. Common barriers to implementation of PPH bundles include: lack of multidisciplinary coordination and buy-in, clash with hospital culture and practices, lack of leadership support, misalignment with other quality or safety initiatives and inadequate education (Baptiste et al., 2019; Freidman, 2018). These trends speak to the fact that successful implementation of PPH safety bundles requires prioritization of staff education and other bundle elements that prepare staff for emergency responses on their unit.

Robust staff education programs are essential to toolkit success. Once protocols for system-level readiness have been established, it is essential to ensure that those protocols are

well-understood and can be enacted efficiently (Spiegelman et al., 2019). Furthermore, improving culture, awareness of toolkit elements, and education for PPH can positively impact sustainability. Quality improvement experts have cited sustainability as a significant issue facing bundle implementation--staff turnover, of both nurses and providers, necessitates continual education and tracking (Markow & Main, 2019). Additionally, individualization is described as a key element to bundle success (Arora et al., 2016), but many education programs are not tailored to specific units. Having an education tool that is concise, up-to-date and individualized to the unit has the potential to not only increase current staff understanding of toolkit elements and unit protocol, but improve sustainability and long-term objectives.

### ***Rationale***

This QI project used the quality improvement bundle framework as its foundation. The Institute for Healthcare Improvement (IHI) defines a bundle as a small set of evidence-based, independent interventions, that when implemented together, in an all-or-none fashion, result in significantly improved outcomes compared to when they are implemented individually (IHI, 2012). Therefore, the power of the bundle is the synergistic effect of each evidence-based component. The science behind quality improvement is rapidly evolving and bundles are one of several core tools that have been demonstrated to improve the quality and safety of care. Bundles can facilitate measurable improvements in quality of care, aid timely diagnosis and treatment to prevent or limit the severity of morbidity, and are customizable for local implementation. When implemented successfully, they have the potential to facilitate interdisciplinary, patient-centered care and to contribute to a culture of safety (Arora et al., 2016). Bundles are particularly useful on labor and delivery units, as obstetric emergencies are extraordinarily complex events that require multidisciplinary coordination and hinge on adequate preparation and accurate communication between team members.

### ***Aims***

This quality improvement project had three aims that were developed to address the sustainability of bundle implementation. The primary aim was to increase the cumulative proportion of staff that have completed an education program on OPC Obstetric Hemorrhage Toolkit elements and unit standard protocol to 90% by March 22, 2021. The second aim of this project was to increase the cumulative proportion of staff that completed an education program on management of PPH to 90% by March 22, 2021. The third aim was to increase self-reported staff knowledge of OPC Obstetric Hemorrhage Toolkit elements and unit standard protocol by 70% by March 22, 2021.

### **Methods**

#### ***Context***

The setting of this QI project was the FBC at Legacy Silverton Medical Center. FBC is an 18-bed labor and delivery unit located in a 48-bed, rural community hospital one hour from Portland, Oregon. The multi-disciplinary obstetric provider team on this unit includes 22 providers consisting of obstetricians, family medicine physicians and certified nurse-midwives. There are 24 full-time registered nurses and 20 part-time registered nurses that work on the unit. In 2019, this unit had an average of 105 deliveries per month. Of the 1,249 deliveries that occurred at FBC in 2019, there were 134 diagnosed with PPH (10.7%). FBC uses the revised PPH definition of blood loss of 1,000 mL or greater for vaginal and cesarean deliveries. There is one operating room and a level 1 neonatal intensive care unit. The primary participants and the population studied were FBC nursing staff and providers using the education tool. Through their assistance with data collection and tool implementation, secondary participants included nursing leadership staff such as charge nurses and nurse managers.



All labor and delivery units at Legacy Health's hospitals in Oregon and Washington implemented the OPC Obstetric Hemorrhage Toolkit in fall 2019. Each hospital has a unit-based group that oversees the implementation of the toolkit. At the FBC, there is a multi-disciplinary PPH work group consisting of a nurse manager, a nurse-midwife, a certified registered nurse anesthetist, a family medicine physician and an obstetrician. This group is responsible for championing toolkit implementation on the unit and reports monthly to the larger Legacy Health PPH group. The Legacy Health PPH group is made up of representatives from all of the smaller unit-based groups from participating Legacy Health hospitals. The purpose of the monthly meeting is to have each unit report on their progress, share barriers that they have faced, and make goals for the coming month. Members of the Legacy Health PPH group also attend monthly meetings held by the OPC. The participants of the OPC monthly meetings are from all participating hospital systems and units across Oregon that are implementing the OPC Obstetric Hemorrhage Toolkit. The purpose of this meeting is to report on progress and create a space for collaboration between hospital systems working toward this shared goal.

### ***Intervention***

The education tool created for this project was designed to meet staff education criteria for both an education program on PPH management and an education program on OPC Obstetric Hemorrhage Toolkit elements and unit standard protocol as outlined by Domain 5 in the toolkit (OPC, 2019). It is an individualized, unit-specific guide to protocols, policies and interventions involving the management of PPH. It was designed to concisely incorporate all OPC Obstetric Hemorrhage Toolkit elements as they relate to the FBC. The education tool was organized in accordance with the Alliance for Innovation on Maternal Health (AIM) eModules on PPH. The AIM eModules are recommended as an education resource by the OPC (OPC, 2019) and are made available by the Council on Patient Safety in Women's Healthcare at no cost (CPSWH,

n.d.). The AIM eModules are structured around the four phases previously discussed—readiness, recognition, response and reporting—and therefore are easily transferable to OPC toolkit contents. For example, under the *Readiness* section of the AIM eModules, the use of hemorrhage carts, medication and response teams is presented. The education tool has information on these elements that is specific to FBC—i.e. where the hemorrhage cart is, what it contains, what first line medications are and where they can be found, and who is part of the response team.

Two hard-copies of the education tool were made available on the unit for individual review by providers and nursing staff. The physical placement of the education tools was decided in collaboration with nursing management. One copy of the education tool was placed in the RN breakroom and the other in the provider computer area. The decision was made not to place a copy within the existing education/drill book due to nursing management's belief that it would not be visible enough to draw the attention of staff. After reviewing the tool, providers and nursing staff signed their names and the date of completion on the sheet provided attached to the tool. The education tool was also made available electronically as a PDF for staff use off of the unit through an all staff email sent out by the nurse management team. One distinct barrier outlined by stakeholders was that many of the labor and delivery providers at FBC are family medicine physicians who are only present on the unit when they have admitted patients who require attention. Therefore, having an education tool that could be accessed off-site was essential. Both on-unit education tool use and electronic use, were self-reported by staff and tracked by the nurse manager using a paper check-off list with all staff names and date of completion. See Appendix C for the PPH education tool created for this project.

### ***Project Implementation***

An initial data set to measure staff knowledge before education tool implementation was created through the use of a Likert Scale survey. It assessed current knowledge of PPH safety

bundle elements and unit standard protocol. Paper copies of the survey were made available to fill out at FBC on November 4, 2020. Nurses and providers on the unit were encouraged regularly to complete them by nursing management. The surveys were available for a three-week period one month before the intervention implementation. Completed surveys were collected and blank surveys were removed from the unit on December 2, 2020. The decision to use hard copies of the survey over an electronic version was made due to the current culture of ‘computer burnout’ that many were experiencing during the COVID-19 pandemic. The total number of nurses and providers on the unit was 76. The original survey completion rate goal before intervention implementation was 50% (38). The number of surveys distributed was 60 and the number of completed and returned surveys was 32. There was relatively equal distribution between staff role for survey completion, with 13 provider responses and 19 RN responses.

The education tool was introduced to the primary participants following approval by the nursing leadership team and the unit-based, multi-disciplinary PPH work group. The implementation of the education tool was evaluated through three Plan Do Study Act (PDSA) cycles (IHI, n.d.). There was a one week break between each cycle for data collection and time for improvements to be made to the education tool and implementation process. The first PDSA cycle was January 11, 2021 through January 25, 2021. Changes to the education tool and implementation process following this cycle included minor formatting and wording changes, as well as adding a verbal reminder to the afternoon RN huddles organized by nursing management. The second PDSA cycle was February 1, 2021 through February 22, 2021. Changes to the education tool and implementation process following this cycle included a presentation on the education tool at the monthly OB provider meeting as well as the initiation of an email reminder plan for those who had not yet completed the tool. The third and final PDSA cycle was March 1, 2021 through March 22, 2021. Two reminder emails, with a PDF attachment of the education

tool, were sent throughout this cycle to the staff member who has yet to complete the education tool. Two days before the end of the final cycle, phone calls were made to the four remaining providers who had not yet responded to the email. Recommendations made by the multi-disciplinary PPH work group, as well as user feedback, inspired the changes in content, use and advertisement that were done within each cycle.

The same Likert Scale survey was used again after intervention implementation in order to compare changes in self-reported staff knowledge before and after use of the education tool. The same process described for the pre-intervention survey was used post-implementation. The post-implementation surveys were made available on the unit March 24, 2021 and were collected April 14, 2021. The number of surveys distributed was 60 and the number of completed and returned surveys was 16. There was relatively equal distribution between staff role for survey completion given existing staff ratios, with 6 provider responses and 10 RN responses. See Appendix D for the survey.

Data that were collected before this quality improvement project by nursing management on the cumulative proportion of RNs and providers who have completed an education session on PPH were used to establish baseline data for post-intervention comparison for the PPH education measure only. This data has been collected by nursing management over the past five years and reported monthly to the Oregon Maternal Data Center. The purpose of the collection and reporting of this data before the implementation of the OPC Obstetric hemorrhage toolkit is to track maternal health statistics in Oregon. Before the implementation of this project, nursing management reported that 50% of providers and 90% of RN staff had completed an education program on PPH management. There was no education on the unit for OPC Obstetric Hemorrhage Toolkit elements and unit specific protocol before this project. Therefore, the beginning cumulative percentage for that measure was 0% for both RNs and providers.

### ***Measures***

The primary outcome of this QI project was to determine if the implementation of a unit specific PPH bundle staff education tool occurred successfully. Secondary outcomes included measuring the percentage of FBC nursing staff and providers that used the education tool (OPC, 2019), as well as determining if the use of the education tool increased staff knowledge on OPC Obstetric Hemorrhage Toolkit elements and unit specific protocol. Data collected on nursing staff and provider use of the education tool over time were categorical (done/not done within a PDSA cycle) and analyzed through two run charts—one on nursing staff data and one on provider data. Likert Scale survey scores before and after education tool implementation were analyzed using Microsoft Excel. Numeric scores rating self-perceived staff knowledge were entered for each survey completed using the same scale as the survey itself (5 = very strong, 4 = strong, 3 = moderate, 2 = minimal, 1 = none, 0 = unsure). Average scores for each staff type (provider and RN), as well as cumulative staff averages, were calculated for each question. The percent change in average scores was calculated to show changes in scores before and after project implementation. Three bar charts reflecting the differences in staff type, as well as composite staff averages, display scores before and after implementation.

### **Results**

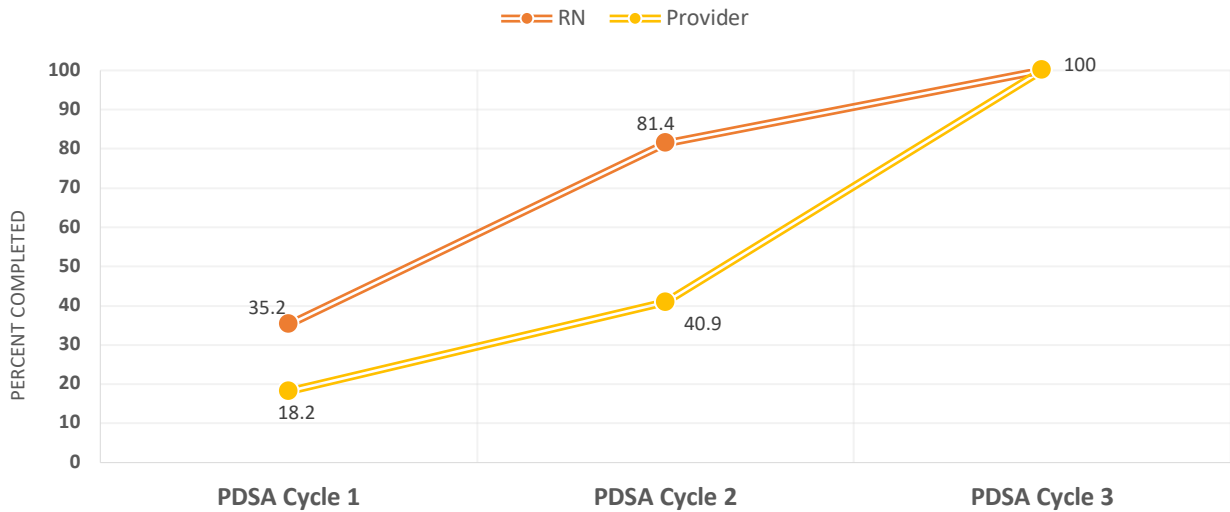
Data for the cumulative percentage of education tool completion were collected at the end of each PDSA cycle. At the end of the first cycle, 35.2% of RN staff and 18.2% of providers completed the education tool. At the end of the second cycle 81.4% of RN staff and 40.9% of providers had completed the education tool. By the end of the third and final cycle, 100% of RN staff and providers used the education tool. These data are represented in Figure 1.

Data for the pre and post-implementation survey were collected before and after project implementation. Figure 2, 3 and 4 show average survey score difference between staff type. The

cumulative staff average score before the use of the education tool was 3.6 and after use was 4.3—indicating a general staff shift in self-reported knowledge of the OPC obstetric hemorrhage toolkit, unit stand protocol and PPH management from moderate/strong to strong/very strong.

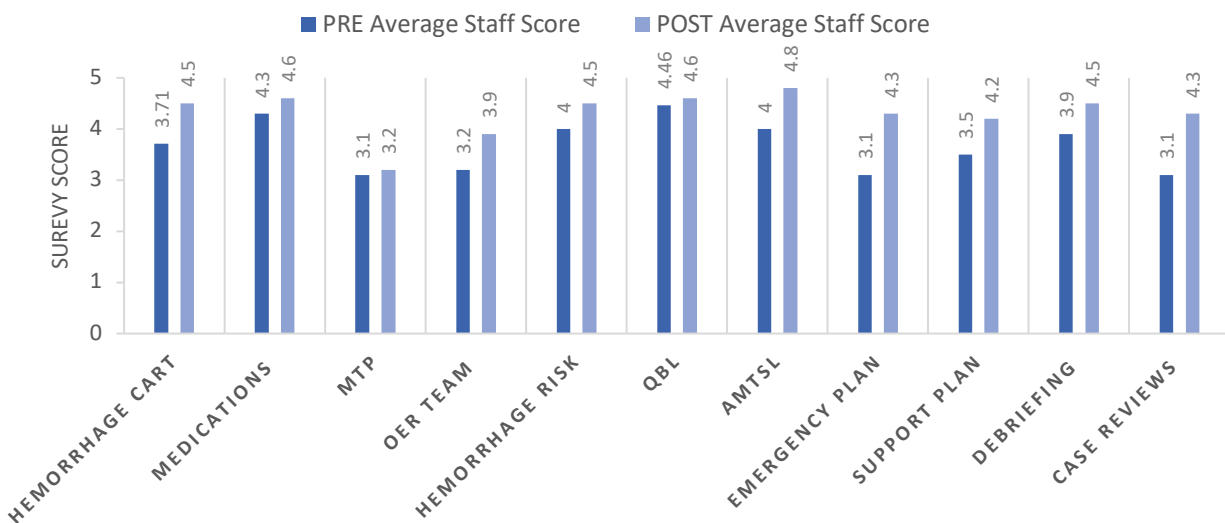
**Figure 1**

*Education Tool Completion by Staff Type*



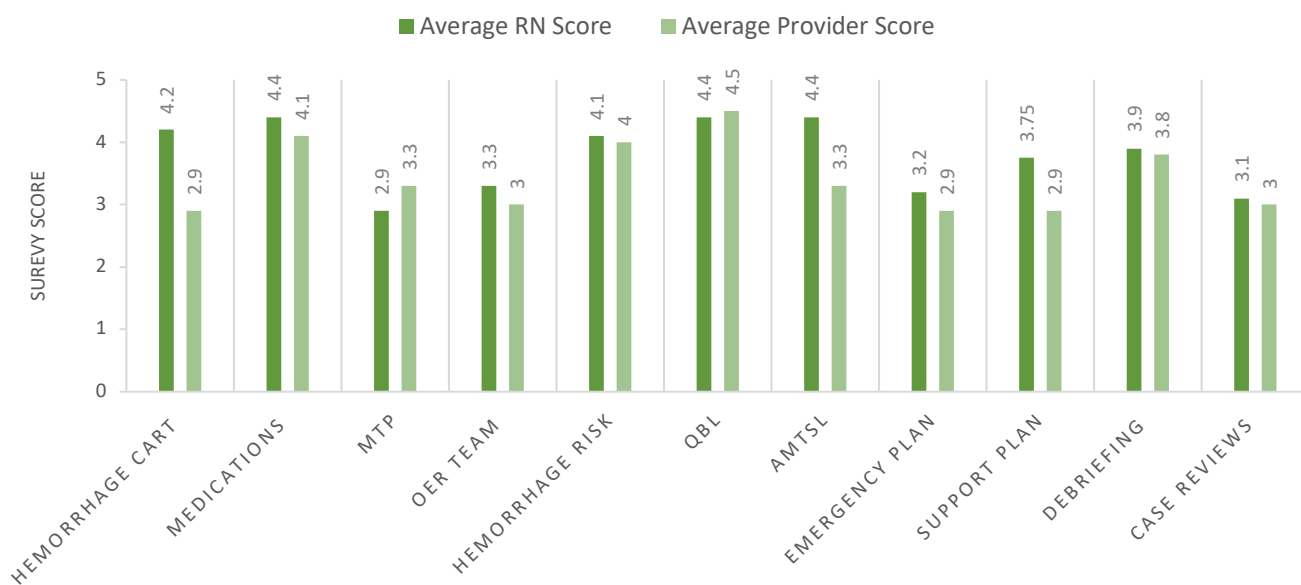
**Figure 2**

*Average Staff Scores: Pre and Post Education Tool Implementation*



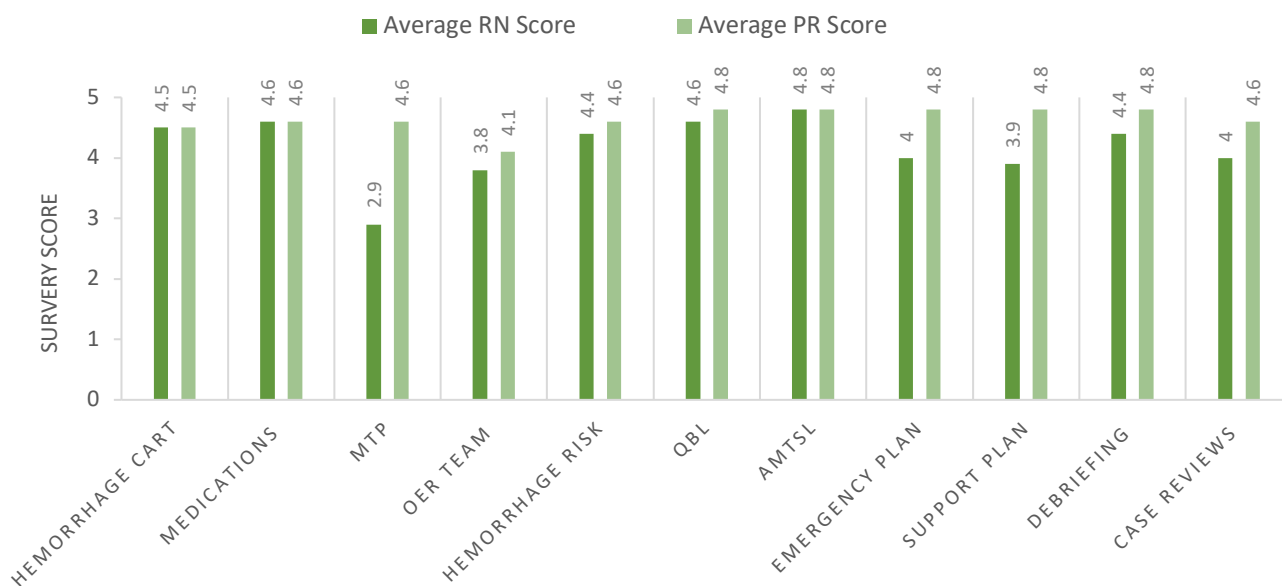
**Figure 3**

*Pre-Implementation Average Survey Score by Staff Type*



**Figure 4**

*Post-Implementation Average Survey Score by Staff Type*



*Note.* Figures 2-4 abbreviations: RN, registered nurse; PR, provider; MTP, massive transfusion protocol; OER Team, obstetric emergency response team; QBL, quantified blood loss; AMSTL, active management of the third stage of labor. Survey scores indicate self-reported staff knowledge as 5=very strong, 4=strong, 3=moderate, 2=minimal, 1=none and 0=unsure.

### *Analysis*

Data analysis showed that PPH education tool implementation was successful. The primary aim of increasing the cumulative proportion of staff that completed an education program on OPC Obstetric Hemorrhage Toolkit elements and unit standard protocol to 90% by March 22, 2021 was exceeded. The cumulative proportion of staff who completed an education program on OPC Obstetric Hemorrhage Toolkit elements and unit standard protocol and management of PPH was 100%, surpassing the primary and secondary aims of this project. The percent increase in staff education completion for an education program on PPH management was 50% for providers and 10% for RNs, and the percent increase for staff completion of an education program on OPC Obstetric Hemorrhage Toolkit elements and unit standard protocol was 100%.

The third aim, increasing staff reported knowledge of OPC Obstetric Hemorrhage Toolkit elements and unit standard protocol by 70% by March 22, 2021, was not met. The percent change of average staff scores on the survey increased by 18.4% following implementation of the education tool. Trends in staff use were seen throughout each PDSA cycle, with notable patterns depending on staff type. Overall, RNs tended to complete the education tool within the first two PDSA cycles and the majority of providers completed the education tool in the third PDSA cycle. This pattern is consistent with the general experience of nursing management for staff education—that is, it is generally more difficult to track provider education completion than that of RN staff. Changes to how the education tool was advertised before the third PDSA cycle are most likely the cause of the eventual success in provider education tool completion. In particular, the cycle of email reminders containing education tool PDFs to those who had not yet signed off on completion is thought to have been a major contributing factor given the response rate following this change.



Data analysis from the pre and post-implementation surveys revealed distinct areas of increased staff knowledge following education tool implementation and highlighted unit protocol areas that require further education. The toolkit elements that showed the greatest percent change in average survey scores after education tool implementation were case reviews (38.7%), emergency plan (38.7%), hemorrhage cart (21.2%), and obstetric emergency response team (21.8%). It is unclear why these elements saw the greatest increase. It could be hypothesized that they were the elements that had previously had the least amount of education focus (such as case reviews) or that they were the elements that staff were most motivated to learn about (hemorrhage cart contents and obstetric emergency response team roles). The toolkit elements that showed the least percent change in average survey scores after education tool implementation were massive transfusion protocol (3.2%) and quantitative blood loss (3.1%). However, percent change must also be examined in context of average score to best understand staff education needs moving forward. For example, the pre-intervention average staff score for quantitative blood loss was 4.4 and post-intervention average score was 4.5. Both of these scores correspond to a staff response reporting a strong to very strong knowledge of unit protocol in this toolkit element. Whereas the massive transfusion protocol pre-intervention average staff score was 3.1 and increased to 3.2 post-intervention. Both these scores correspond to a moderate knowledge of unit protocol for this toolkit element. Therefore, these results indicate that FBC staff had a strong knowledge of the quantified blood loss protocol on the unit to begin with, while unit protocol on massive transfusions remains an area that needs improvement.

## **Discussion**

Given the high cumulative percentage of education tool completion by staff, and the positive impact on staff self-reported knowledge of OPC Obstetric Hemorrhage Toolkit elements and unit standard protocol, this quality improvement project was overall successful at improving

the process of staff education within the context of a PPH bundle implementation at FBC.

Feedback on the education tool from staff following use was generally very positive. The most common themes that emerged were appreciation of the education tools' clarity, ease of use and consolidation of information. The education tool is listed under Appendix C. The "Self-Quiz" section was noted to be the most helpful part of the education tool by both RNs and providers.

Explanation for this statement was often related to the fact that the addition of unit specific questions made the tool an interactive experience and increased interest in the education tool.

Given the education tool's design and the success of this project, it is reasonable to presume that it could be implemented on other labor and delivery units undergoing OPC Obstetric

Hemorrhage Toolkit initiation. The right-hand column of the education tool is designed to be modified to fit any unit's specific standards, protocols and culture. That being said,

implementation of the education involved the commitment of multiple project champions was not without barriers.

The most complex element of project implementation was tracking completion of the education tool by staff, most notably, the providers. Indeed, the majority of changes made in between PDSA cycles were related to how best to advertise the education tool and communicate with staff who had not yet completed it. This barrier was expected, as this was an issue reported by FBC nursing management before project implementation. The final cumulative percentage of providers who completed the tool was 100% by the end of the third PDSA cycle, but this was in part due to the perseverance of unit project champions and not necessarily due to project design or inherent qualities of the education tool itself. That being said, the addition of two group emails and four phone calls within an eleven-week time frame to achieve 100% completion is not a large allocation of time or resources, and ultimately speaks to the efficiency and cost effectiveness of the intervention.

Sustainability is a key concept within communities researching bundle implementation and continuation. The ability of a bundle to be integrated fully into unit culture is essential to its long-term success (Baptiste & D'Alton, 2019). Though the sustainability of the PPH education tool is yet to be seen, the baseline data collected during this project can easily be used moving forward. Now that 100% of staff have completed both an education program on PPH management and on OPC Obstetric Hemorrhage unit standards and protocol, through the use of the PPH education tool, new hires will be the only staff whose education needs to be tracked. A distinct issue not addressed in the original project design is a specific plan for PPH education tool updates when they are needed. Unit protocol, policies, and instrument/medication availability quickly change, and will need to be reflected in the PPH education tool in order for it to remain meaningful. This oversight certainly has the potential to impact the long-term sustainability of the education tool, but creating a plan that ensures regular updates could easily become the work of a unit-based quality improvement committee or future a DNP student.

The over-arching goal of this quality improvement project was to increase unit buy-in by improving staff education on the purpose and elements of the OPC Obstetric Hemorrhage Toolkit. Though this was not directly measured, it is a crucial part of the conversation. Now that a successful education process has been put in place, the question of how to measure long-term impact of that process remains. The implementation of this project highlighted many areas for future quality improvement, including but not limited to, tracking provider education status, improving staff education on massive transfusion protocol and working toward the integration of regular PPH in-situ drills. The results of this quality improvement project were neither anticipated or surprising. This project involved the creation of a brand-new intervention designed to breakdown a known barrier in the successful implementation of a PPH bundle. Though they

are not without limitations, the results of this project signal great potential for improving staff education within the context of PPH bundle implementation.

The process and results of this project will be presented to the Legacy PPH group on June 2, 2021. The goal of this presentation is to highlight strengths, discuss barriers and share the education tool itself with stakeholders from other labor and delivery units within the Legacy system. The education tool was designed specifically to be easily transferable to other units using the OPC Obstetric Hemorrhage Toolkit, and therefore has the potential to be implemented at other Legacy locations following the presentation. A report on the results of this project, along with the education tool itself, will be shared directly with OPC leadership via email. The monthly OPC PPH meetings were temporarily discontinued in January 2021 due to logistical issues. Therefore, it is yet to be seen if the results of this project will be directly presented to that group. However, the education tool was designed with the intention to be added to the resource section of Domain 5 of the OPC Obstetric Hemorrhage Toolkit. Part of the continuing work of this project will be to facilitate this possibility with representatives from the OPC over the next several months.

### ***Ethical Considerations***

There are no conflicts of interest to disclose for this project. Prior to implementation this project was approved by the OHSU Institutional Review Board (IRB). There were no ethical concerns involved in the implementation of this work and no formal ethics committee review was required or recommended.

### ***Limitations***

This quality improvement project was limited by several factors. Of note, is the discrepancy between the number of completed surveys before and after education tool implementation. The markedly lower number of completed and returned post-implementation

surveys potentially impacted the post-implementation data, and thus the pre and post-intervention comparison analysis. To that extent, all data collected for this project were self-reported. Staff completion of the tool was reported individually and there was no testing conducted to measure knowledge gained following completion. Other district barriers included incorporating use of the education tool into staff workflow and email communication around completion. Since this was a novel form of education on the unit, and through email, it took time for staff to become familiar with its purpose and presence. When reminder emails were sent out, multiple staff replied stating that they had already completed the education, but had forgotten to communicate their completion.

### ***Conclusion***

This project shows promising results that the addition of a unit specific education tool outlining toolkit elements, unit standard protocol and PPH management to the OPC Obstetric Hemorrhage Toolkit implementation process could greatly increase the proportion of staff that meet the staff education measures outlined in Domain 5 (OPC, 2019), as well as increase self-reported staff knowledge of toolkit elements, unit standard protocol and PPH management. The transferability of this project to other units is yet to be tested. However, given the simplicity, low cost and time efficiency of the intervention, it is projected to be easily transferable. Tracking provider education completion continues to be a key barrier in the education domain of PPH bundle implementation and further quality improvement research on this issue is recommended. Postpartum hemorrhage bundles created by state-level perinatal collaboratives such as OPC work toward meaningful change in decreasing maternal morbidity and mortality from PPH. Staff education is vital to this work as it is essential to readiness. Prioritizing and understanding staff knowledge of unit specific policy and protocol can heighten the powerful synergistic effect that PPH bundles have on patient outcomes, and ultimately, on community well-being.

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## APPENDIX A



### READINESS

#### Every unit

- Hemorrhage cart with supplies, checklist, and instruction cards for intrauterine balloons and compressions stitches
- Immediate access to hemorrhage medications (kit or equivalent)
- Establish a response team - who to call when help is needed (blood bank, advanced gynecologic surgery, other support and tertiary services)
- Establish massive and emergency release transfusion protocols (type-O negative/uncrossmatched)
- Unit education on protocols, unit-based drills (with post-drill debriefs)

### RECOGNITION & PREVENTION

#### Every patient

- Assessment of hemorrhage risk (prenatal, on admission, and at other appropriate times)
- Measurement of cumulative blood loss (formal, as quantitative as possible)
- Active management of the 3rd stage of labor (department-wide protocol)

### RESPONSE

#### Every hemorrhage

- Unit-standard, stage-based, obstetric hemorrhage emergency management plan with checklists
- Support program for patients, families, and staff for all significant hemorrhages

### REPORTING/SYSTEMS LEARNING

#### Every unit

- Establish a culture of huddles for high risk patients and post-event debriefs to identify successes and opportunities
- Multidisciplinary review of serious hemorrhages for systems issues
- Monitor outcomes and process metrics in perinatal quality improvement (QI) committee

## PATIENT SAFETY BUNDLE

# Obstetric Hemorrhage

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Standardization of health care processes and reduced variation has been shown to improve outcomes and quality of care. The Council on Patient Safety in Women's Health Care disseminates patient safety bundles to help facilitate the standardization process. This bundle reflects emerging clinical, scientific, and patient safety advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed. Although the components of a particular bundle may be adapted to local resources, standardization within an institution is strongly encouraged.

The Council on Patient Safety in Women's Health Care is a broad consortium of organizations across the spectrum of women's health for the promotion of safe health care for every woman.

## Appendix B

### Domain 5: Education & Unit-Based Drills

All obstetric providers and nurses and supporting clinical staff should complete an educational program that covers the major components of obstetric hemorrhage risk assessment, prevention and treatment as well as training about planned or implemented protocols and policies on a regular basis, at least every two years. Online training, lectures and assigned readings are all potential approaches to standard unit education. A clinical leader within each facility should monitor progress of staff in completing the selected education program.

#### **Unit Education Quality Measures — Provider & Nurses:**

1. At the end of this quarter, what cumulative proportion of staff has completed (within the last two years) an education program on Obstetric Hemorrhage?
2. At the end of this quarter, what cumulative proportion of staff has completed (within the last two years) an education program on the Obstetric Hemorrhage bundle elements and the unit-standard protocol?

Appendix C

Oregon Perinatal Collaborative  
Obstetric Hemorrhage Toolkit  
Unit Education Tool

Background


The Oregon Perinatal Collaborative (OPC), in partnership with the Centers for Disease Control & Prevention and the Alliance for Innovation on Maternal Health (AIM) launched a state-wide data-driven quality improvement initiative in October 2019 with the objective of reducing severe maternal morbidity and mortality related to obstetric hemorrhage among people who give birth in Oregon. The obstetric hemorrhage toolkit contains key resources from existing toolkits and serves as an evidence-based, collaborative, patient-centered resource for the prevention and management of obstetric hemorrhage. It has been implemented on 20 labor & delivery units across Oregon.

Education tool objectives

- To assist RNs and providers in better understanding how the implementation of the OPC obstetric hemorrhage toolkit has influenced protocol on their unit
- To increase compliance and knowledge of all OPC toolkit contents
- To provide a stream-lined education process on the prevention and management of obstetric hemorrhage on participating units


How it works

This education tool follows the layout of the OPC obstetric hemorrhage toolkit and uses the 4-R's of the AIM Obstetric Hemorrhage Patient Safety Bundle: **R**eadiness, **R**ecognition & **P**revention, **R**esponse and **R**eporting/**S**ystems Learning. Each section contains unit specific information as it relates to the OPC obstetric hemorrhage toolkit contents.


OPC Toolkit Contents	Silverton FBC Protocol
<p>The column on the left outlines OPC obstetric hemorrhage toolkit contents and their role in the prevention and management of obstetric hemorrhage.</p>	<p>The column on the right outlines <i>unit specific information</i>, such as policies, team members and location and contents of essential equipment</p> <p> <b>SELF QUIZ:</b> Throughout the education tool there are questions for the reader to ask themselves. The purpose of these questions is for the reader to pause and reflect on their knowledge in a particular area of the toolkit.</p>

## READINESS


### Hemorrhage Cart

<ul style="list-style-type: none"> <li>• Immediate access and familiarity of contents is essential to preventing delay in response.</li> <li>• Hemorrhage carts contents are determined with multi-disciplinary input from providers, anesthesia, nursing and pharmacy staff</li> </ul>	<div style="display: flex; align-items: flex-start;">  <p><b>SELF QUIZ:</b> Do you know where the hemorrhage cart is? Are you familiar with its contents? Would you be able to use it efficiently in an emergency?</p> </div> <ul style="list-style-type: none"> <li>• The hemorrhage cart is located through the doors to the OR and supply rooms on the right side, up against the wall</li> <li>• <i>There are no medications stored in the hemorrhage cart at FBC</i></li> <li>• Some examples of contents include IV and vaginal packing supplies, Bakri balloons and sutures</li> <li>• Safety check-lists and cognitive aids for infrequently performed procedures, such as placement of uterine tamponade balloon, uterine compression sutures and the massive transfusion protocol are attached the cart</li> </ul>
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### Medications

<ul style="list-style-type: none"> <li>• Immediate availability of medications must be balanced with safe storage</li> <li>• Knowledge of recommended doses, side effects and contraindications is essential for all RNs and providers</li> </ul>	<div style="display: flex; align-items: flex-start;">  <p><b>SELF QUIZ:</b> Which hemorrhage medications are readily available in every patient room? Which medications require removal from the medication room?</p> </div> <ul style="list-style-type: none"> <li>• Pitocin and Misoprostol are kept in the locked RN drawer in every patient room at FBC</li> <li>• Methergine, Hemabate and Tranexamic Acid are kept in the medication room and are available in Omnicell under "Hemorrhage Kit"</li> <li>• Recommended doses, side effects and contraindications for each medication are attached to the outside of the hemorrhage cart</li> </ul>
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### Obstetric Emergency Response Team

<ul style="list-style-type: none"> <li>• The obstetric emergency response team is determined by each facility and depends on the severity and clinical context of each hemorrhage</li> <li>• A simple and reliable system of communication for the team is critical and each member of the team should be educated on the established emergency communication process</li> </ul>	 SELF QUIZ: Are you part of the obstetric emergency response team? Who else? <ul style="list-style-type: none"> <li>• Obstetric emergency response team members at FBC most often include RNs, obstetric providers and charge nurses. In cases of severe hemorrhage other team members could include anesthesia providers, blood bank, ICU providers and chaplains</li> <li>• All providers and RNs are trained using team STEPPS methods and are expected use this communication system for all OB emergencies</li> </ul>
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### Massive Transfusion Protocol

<ul style="list-style-type: none"> <li>• A massive transfusion protocol facilitates rapid dispensing of RBCs, plasma, and platelets in a predefined ratio intended to preclude development of a dilutional coagulopathy</li> <li>• Blood bank protocols should ensure that the institution has eliminated any barriers to rapid blood access when needed</li> </ul>	 SELF QUIZ: When was the last time you reviewed the LHS massive transfusion protocol? Do you know your role within the algorithm? <ul style="list-style-type: none"> <li>• The massive transfusion protocol (MTP) used at FBC is outlined in a policy available on the Legacy intranet and is attached to the hemorrhage cart</li> <li>• All MTPs are called using the overhead page system</li> <li>• Information on the roles of different staff members at FBC (Appendix A), as well as general LHS staff roles and responsibilities for a MTP (Appendix B) can be found in the appendix of this document</li> </ul>
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### Unit Education

<ul style="list-style-type: none"> <li>• Unit based education, team training and emergency drills are an effective way to familiarize every team member with the</li> </ul>	 SELF QUIZ: When was the last time you participated in an in-situ drill on obstetric
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<p>entire obstetric hemorrhage bundle and management plan</p> <ul style="list-style-type: none"> <li>• Drills and simulations may allow for faster and improved response to emergent situations, thereby potentially maximizing patient outcomes</li> </ul>	<p>hemorrhage or another obstetric emergency?</p> <ul style="list-style-type: none"> <li>• FBC utilizes a Drill Book as the main resource of in-situ simulation on the unit. The Drill book is located at the front desk and drills are typically initiated by the charge nurse on duty.</li> <li>• Other sources of education include annual system wide simulations days and self-guided exercise often available in the nursery</li> </ul>
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## RECOGNITION

### Hemorrhage Risk Assessment

<ul style="list-style-type: none"> <li>• Identification of risk factors for hemorrhage can help to improve readiness in allowing for increased surveillance and early recognition and can prepare the team to initiate an early, aggressive response to bleeding</li> <li>• Obstetric hemorrhage risk assessment should be considered at multiple points during patient care, including antepartum, on admission to labor and delivery, later in labor as new risks such evolve and in the postpartum period</li> </ul>	<p> SELF QUIZ: What hemorrhage risk assessments are incorporated into your work flow?</p> <ul style="list-style-type: none"> <li>• Formal risk assessment for hemorrhage is integrated into work flows depending on your role at FBC</li> <li>• Examples include the second stage risk assessment tool that will be used by RNs, and risk assessment prompts in the progress note templates of providers</li> </ul>
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### Quantification of Blood Loss

<ul style="list-style-type: none"> <li>• The accuracy in the estimation of actual blood loss during birth and the postpartum period <i>is a leading driver of delayed response that can result in preventable harm</i></li> <li>• Accurate measurement of blood loss is essential for 1) recognizing potentially life-threatening hemorrhage and 2) managing blood product replacement</li> </ul>	<p> SELF QUIZ: What definition of obstetric hemorrhage is used at FBC?</p> <ul style="list-style-type: none"> <li>• FBC defines obstetric hemorrhage as a cumulative blood loss of greater than or equal to 1,000 mL or blood loss accompanied by signs or symptoms of hypovolemia within 24 hours after the birth process, regardless of mode of delivery</li> <li>• FBC uses a quantified blood loss protocol—utilizing tools such as calibrated drapes, collecting blood in measurement containers</li> </ul>
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	and weighing all blood-soaked items and clots for two hours following a delivery
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### Active Management of the Third Stage of Labor

<ul style="list-style-type: none"> <li>Active management during the third stage of labor (AMSTL) has been demonstrated <i>to be the single most important approach to preventing postpartum hemorrhage.</i></li> <li>Systematic reviews have found that prophylactic usage of oxytocin, 10 units by intramuscular injection or intravenous infusion, remains the most effective medication for prevention</li> <li>Women without risk factors having a physiologic birth who make an informed choice to forgo prophylactic oxytocin, can and should be supported in their decision.</li> </ul>	<ul style="list-style-type: none"> <li>At FBC the assumption is that all patients will receive AMTSL unless they have undergone a shared decision-making conversation with their provider and have chosen to decline AMTSL</li> <li>The provider is responsible for communicating this decision to the RN team upon admission to the labor and delivery unit</li> </ul>
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## RESPONSE

### Emergency Management Plan

<ul style="list-style-type: none"> <li>Stage-based management plans facilitate an organized, stepwise response to blood loss and maternal warning signs.</li> <li>They serve as a comprehensive summary guideline which provides detailed information for identifying stages of hemorrhage and for preparing appropriate clinical strategies at each stage of hemorrhage.</li> </ul>	 SELF QUIZ: Where are the emergency management plans kept at FBC? Was it used the last time you were part of the management of an obstetric hemorrhage? <ul style="list-style-type: none"> <li>FBC uses the OB Hemorrhage Worksheet that is located in the locked RN drawer inside every patient room as its emergency management plan</li> <li>The worksheet is part of the LHS policy for obstetric hemorrhage and can be found on the Legacy intranet</li> <li>The OB Hemorrhage Worksheet is listed as Appendix C in this document for review</li> </ul>
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### Family and Patient Support Plan

<ul style="list-style-type: none"> <li>Patients and their families need timely information, reassurance and the opportunity to discuss the incident with</li> </ul>	<ul style="list-style-type: none"> <li>While there is no formal protocol, FBC is committed to caring for the entire family unit and utilizes referrals to chaplains for in-patient family support when indicated</li> </ul>
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<p>the care provider who can provide referrals to support resources.</p>	<ul style="list-style-type: none"> <li>• It is the expectation that providers that are involved in any obstetric emergency review the events and interventions of the clinical situation with the patient and family when appropriate</li> </ul>
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## REPORTING

### Role Debriefing

<ul style="list-style-type: none"> <li>• Establishing a culture of team briefs, huddles and debriefs is an important strategy to identify successes and opportunities for improvement</li> <li>• Debriefs are short, informal feedback sessions that occur after events and are designed to identify opportunities to improve teamwork, skills, and outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>•  SELF QUIZ: When was the last time you participated in a role debriefing session following an obstetric hemorrhage or other emergency? What did you learn about what went well and what could be done differently next time?</li> <li>• While there is no formal protocol or debrief form used at FBC at this time, all staff involved in any emergency are expected to conduct an informal debrief session</li> <li>• There is a formal debriefing process done through LHS that can be initiated through a request to nurse management if needed</li> </ul>
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### Multidisciplinary Care Reviews

<ul style="list-style-type: none"> <li>• Multidisciplinary reviews are formal meetings including staff involved in the incident, unit and facility leadership, and risk management personnel.</li> <li>• The purpose of these reviews is to identify systems issues or breakdowns that influenced the outcome of the event.</li> </ul>	<ul style="list-style-type: none"> <li>• Cases are reviewed at FBC depending on severity</li> <li>• All cases involving a Massive Transfusion Protocol are reviewed by clinical nurse specialists at LHS</li> <li>• Monthly provider meetings amongst specialty or practice groups are the most common time for multidisciplinary case review</li> </ul>
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Once you have completed the education tool, and taken time to review the documents in the Appendix, **please sign your name on the attached check-list or email Amie Vinogradoff at [avinogra@lhs.org](mailto:avinogra@lhs.org).**



## Resources

Alliance for Innovation on Maternal Health (AIM) eModules

<https://safehealthcareforeverywoman.org/aim/patient-safety-bundles/emodules/>

California Maternal Quality Care Collaborative

<https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit>

Oregon Perinatal Collaborative Obstetric Hemorrhage Toolkit

<https://oregonperinatalcollaborative.org/wp-content/uploads/2019/10/OB-Hemorrhage-Toolkit-OR-2.pdf>

*\*This education tool was created by Shanti Colo, CNM as part of a Doctor of Nursing Practice quality improvement project in association with by the Oregon Health & Science University. Its contents are based on resources created by the Oregon Perinatal Collaborative and the Alliance for Innovation on Maternal Health. For questions and comments please email [shanti.colo@gmail.com](mailto:shanti.colo@gmail.com)*

## Appendix

## Appendix A

**Massive Transfusion Protocol at Silverton**

- 1) Provider initiates Massive Transfusion**
- 2) Primary RN**
  - a. **Dial 6000 and overhead page** "Massive transfusion protocol to (location and room number)" *State the full name of the unit, do not use FBC, SDC, ICU etc.*
  - b. Call blood bank: 2262**
    - i. Patient name
    - ii. Medical record number
    - iii. Gender
    - iv. Age
    - v. If patient is pregnant or within 3 weeks postpartum
    - vi. Contact phone number
    - vii. Location of intervention
  - c. Enter START MTP (MTP order) in Epic**
- 3) Charge Nurse or Designee**
  - a. Notify House Supervisor – if not already present
  - b. Retrieve MTP Cart (OR) or hemorrhage cart (FBC)
  - c. Assign Roles cards (top drawer of cart) as help arrives
    - i. Ancillary staff that have received blood transport training (E+) can retrieve blood from Blood Bank
- 4) Runner goes to lab with patient sticker to retrieve blood.**
- 5) ED RN responds to overhead page with rapid infuser**
- 6) Protocol**

Send first blood draw  Notify RT (if they have not responded)	Cannot be drawn from an IO. <i>Initial lab tubes located in cart and labeled as "1<sup>st</sup> lab draw"</i> Type and Screen HH Platelet count PT INR Fibrinogen Potassium ABG/VBG
Establish 2 large bore IVs (14-16)	CRNA or LIP also to consider Art line

Insert Foley temp probe where available and use warming blanket	
Administer NS as ordered until PRBCs arrive Transfuse RBCs and other blood products as soon as they become available	<p><i>See Blood Bank expected products below.</i></p> <ul style="list-style-type: none"> <li>• Begin infusing blood products as soon as they arrive.</li> <li>• Do not wait for lab results.</li> <li>• All products of one cooler should be infused before administering products from subsequent coolers.</li> </ul>
Once hemostatic control has been achieved, stop MTP and administer blood products based on laboratory targets.	

### 7) Blood Bank expected products and response time

**1<sup>st</sup> cooler:** 2 RBC in cooler - 15 minutes after receiving the MTP call

**If OB case:** 1 cryo as soon as thawed (~15-20 minute)

2 FFP as soon as thawed (FP takes 30 minutes to thaw so expect 20" after cooler)

**2<sup>nd</sup> cooler:** 2 RBC – 15 minutes after last cooler, then

2 FFP – (FP takes 30 minutes to thaw so expect 15' after cooler)

**1 Platelet-** available approximately 2 hrs after receiving the call

***Do not cancel platelet delivery because patient transfer is ordered.*** Platelets may arrive prior to transfer and can be returned if not used.

**\*\* RBC and FFP will continue to be supplied until STOP MTP is ordered. If additional cryo or platelets are needed, they must be ordered separately.**

***Call Blood Bank as soon as possible if MTP STOP so additional FFP is not thawed and wasted.***

### 8) Continue administering blood products and drawing labs until MTP is discontinued

- *With the MTP, labs will be drawn automatically every 15-30 minutes and blood will keep coming.*

*PRBCs and FFP should be given until the patient's hemorrhage is under control (surgically, via transfusion, via adjuncts, etc.). Targeted transfusion does not happen during a Massive Transfusion.*

- *The automatically drawn labs will help determine whether/when cryo, additional platelets or pharmacologic adjuncts need to be given.*
- ***Once MTP is no longer needed, enter STOP MTP order into Epic***

### 9) Document

## Appendix B

### LHS Massive Transfusion Roles and Responsibilities

**NOTE:** This algorithm identifies the key actions necessary in an MTP, which may be performed by other personnel depending on site specific resources and professional roles.

<p><b>Primary RN</b> <i>Patient Care</i></p>	<ul style="list-style-type: none"> <li>• Start 2 large bore peripheral IVs</li> <li>• Document VS every 5-15 minutes as indicated</li> <li>• Document Core temperature every 30 minutes</li> <li>• Apply external warming device</li> <li>• Administer scheduled and other medications as ordered</li> </ul>
<p><b>Oversight RN</b> (Site variation) <i>Communication with Blood Bank</i></p>	<ul style="list-style-type: none"> <li>• Call blood bank and provide patient name, approximate age, gender and MRN. For OB patients, include pregnancy status (e.g. pre-partum, peripartum, post-partum).</li> <li>• Communicate need for additional blood products as requested by physician</li> <li>• Assist with checking of blood products</li> <li>• Contact transportation to facilitate delivery and return of blood products as needed</li> </ul>
<p><b>Transporter</b> (Site variation) <i>Transportation of Blood Products</i></p>	<ul style="list-style-type: none"> <li>• Transport blood products from blood bank to patient location.</li> <li>• Return empty boxes to blood bank</li> <li>• NOTE: No additional responsibilities will be given to MTP Transporter until MTP is discontinued.</li> </ul>
<p><b>Physician</b> <i>Direction and Provision of Care</i></p>	<ul style="list-style-type: none"> <li>• Initiate MTP</li> <li>• Coordinate care and disposition (OR, IR, GI consult)</li> <li>• Insert central and arterial lines as indicated</li> <li>• Consider administration of pharmacologic adjuncts, electrolytes and antibiotics as indicated.</li> <li>• Determine when to stop MTP</li> </ul>
<p><b>Second RN</b> (Site Variation) <i>Verify, Transfuse, &amp; Document</i></p>	<ul style="list-style-type: none"> <li>• Check blood products with an RN per Blood Administration Policy (915.4282)</li> <li>• Infuse normal saline and blood products through rapid infuser and warmer</li> </ul>

	<ul style="list-style-type: none"> <li>• Keep blood products in temperature-controlled containers until transfused.</li> <li>• Document blood products and IVF</li> </ul>
<b>Respiratory Care Practitioner</b> <i>Patient Care, POC Laboratory Testing</i>	<ul style="list-style-type: none"> <li>• Assure adequate airway, oxygenation, and ventilation</li> <li>• Perform Point of Care ABGs and other labs as directed.</li> </ul>
<b>Pharmacist</b> Consultation	<ul style="list-style-type: none"> <li>• Review lab results</li> <li>• Provide consultative recommendations about prothrombin complex concentrate (PCC), fibrinogen (RiaStap), tranexamic acid (TXA)</li> <li>• Facilitate preparation and administration of agents</li> </ul>

Appendix C

OB Hemorrhage Worksheet — Legacy Health

STAGE 1	STAGE 2	STAGE 3																														
<p><b>Criteria: Excessive bleeding</b>                      QBL Vaginal &gt;500mL or Cesarean &gt;1000mL                      WITH continued bleeding                      AND stable vital signs and lab values</p>	<p><b>Criteria: Continued bleeding</b>                      AND QBL less than 1500mL                      OR &gt; 2 uterotonics given                      WITH or WITHOUT stable vital signs</p>	<p><b>Criteria: QBL &gt; 1500 mL</b>                      AND continued bleeding                      OR 2 RBCs given                      OR there is suspicion of DIC (abnormal labs)                      OR abnormal vital signs/oliguria                      (HR &gt; 110, SBP &lt; 85, DBP &lt; 45, MAP &lt; 65, O2Sat &lt; 94%).</p>																														
<p><input type="checkbox"/> Call for extra Help:                      Charge RN _____ @ _____                      OB Provider _____ @ _____                      Anesthesia _____ @ _____</p> <p><input type="checkbox"/> Increase oxytocin rate, perform uterine massage</p> <p><input type="checkbox"/> Monitor QBL and I &amp; O</p> <p><input type="checkbox"/> VS q 5 mins (including O2 Sats and LOC)</p> <p><input type="checkbox"/> 1st line: Methergine 0.2mg IM @ _____                      (Contraindications: HTN, cardiovascular disease)                      May repeat per order.</p> <p><input type="checkbox"/> 2nd line: Misoprostol once 400mcg SL or 800mcg PR.                      Miso dose _____ @ _____ route _____</p> <p><input type="checkbox"/> Assure large bore IV in place and functional</p> <p><input type="checkbox"/> Place Pulse Ox</p> <p><input type="checkbox"/> Empty bladder, indwelling catheter</p> <p><input type="checkbox"/> O2 non-rebreather mask w/8-10L if pulse ox &lt;96%</p> <p><input type="checkbox"/> Type and Cross 2 Units if not already done</p> <p><input type="checkbox"/> Anticipate potential Blood Transfusion</p> <p><input type="checkbox"/> Keep patient warm use Bair Hugger</p> <p><input type="checkbox"/> Keep family informed</p> <p><input type="checkbox"/> Anticipate transfer to OR</p> <p><input type="checkbox"/> Consider Tranexamic Acid (TXA) 1 gram IV over 10 mins.</p>	<p><input type="checkbox"/> Perform tasks under Stage 1, as appropriate.</p> <p><input type="checkbox"/> Tranexamic Acid (TXA) 1gram IV over 10 mins.                      @ _____ @ _____ May repeat per order.</p> <p><input type="checkbox"/> Consider Hemabate 250 mcg IM.                      May repeat per order.                      @ _____ @ _____                      (Use cautiously with: asthma, hepatic, cardiovascular or pulmonary disease, hypertension.)</p> <p><input type="checkbox"/> Consider placing a 2nd large bore IV (18 gauge or larger)                      # _____ @ _____ Site: _____</p> <p><input type="checkbox"/> Consider moving the patient to the OR</p> <p><input type="checkbox"/> Consider uterine tamponade balloon</p> <p><input type="checkbox"/> Anticipate needed labs: CBC, DIC panel, CMP</p> <p><input type="checkbox"/> Order 2 units PRBCs</p> <p><input type="checkbox"/> Consider thawing 2 units FFP</p> <p><input type="checkbox"/> Transfuse 2 units PRBCs based on clinical signs and per LIP order. Do not wait for lab results.</p> <p><input type="checkbox"/> Consider emergency O neg blood</p> <p><input type="checkbox"/> If considering transfusing ≥4 units, be aware of transfusion ratio of 4:4:1 (PRBC:FFP:Pit)</p> <p><input type="checkbox"/> Consider labs: CBC, DIC panel, CMP.</p> <p><input type="checkbox"/> RRT called @ _____</p>	<p><input type="checkbox"/> Perform tasks under Stages 1 &amp; 2, as appropriate</p> <p><input type="checkbox"/> Transfer patient to the OR if not already there</p> <p><input type="checkbox"/> Anticipate surgical intervention</p> <p><input type="checkbox"/> Activate Massive Transfusion Protocol based on clinical signs and continued bleeding. Follow site-specific response plan in MTP standard 915.6149.                      Activated @ _____</p> <p><input type="checkbox"/> Consider cryoprecipitate to maintain OB fibrinogen levels &gt; 200 mg/dL</p> <p><input type="checkbox"/> Be able to give SBAR to those who respond.</p> <p><input type="checkbox"/> Assist as needed.</p>																														
<table border="1"> <thead> <tr> <th colspan="3">QBL Tracker</th> </tr> <tr> <th>Time</th> <th>Weight (ml or g)</th> <th>Running Total</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			QBL Tracker			Time	Weight (ml or g)	Running Total																								
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## Appendix D

Your role:  Provider  RN full-time  RN part-time

This is an *anonymous* survey that is part of the doctoral work being done at FBC by Shanti Colo, CNM. The purpose of this survey is to assess staff knowledge of unit protocol for the management of postpartum hemorrhage in context of the Oregon Perinatal Collaborative's Obstetric Hemorrhage Toolkit that was implemented at FBC in 2019. This is a pre-intervention implementation survey to assess baseline.

Please rate your knowledge of unit standard protocol at FBC for each element of the OPC OB Hemorrhage Toolkit	Very strong	Strong	Moderate	Minimal	None	Unsure
<b>Readiness Phase</b>						
<ul style="list-style-type: none"> <li>Hemorrhage cart location and contents</li> </ul>	5	4	3	2	1	UN
<ul style="list-style-type: none"> <li>First line medications and access</li> </ul>	5	4	3	2	1	UN
<ul style="list-style-type: none"> <li>Massive transfusion protocol</li> </ul>	5	4	3	2	1	UN
<ul style="list-style-type: none"> <li>Obstetric Emergency response team</li> </ul>	5	4	3	2	1	UN
<b>Recognition Phase</b>						
<ul style="list-style-type: none"> <li>Hemorrhage risk assessment</li> </ul>	5	4	3	2	1	UN
<ul style="list-style-type: none"> <li>Quantification of blood loss</li> </ul>	5	4	3	2	1	UN
<ul style="list-style-type: none"> <li>Unit policy on Active Management of the Third Stage of Labor</li> </ul>	5	4	3	2	1	UN
<b>Response Phase</b>						

● Emergency Management Plan	5	4	3	2	1	UN
● Family and patient support plan	5	4	3	2	1	UN
<b><i>Reporting Phase</i></b>						
● Role debriefing	5	4	3	2	1	UN
● Multidisciplinary case reviews	5	4	3	2	1	UN