Safety Action Series

National Improvement Challenge on Obstetric Hemorrhage Winning QI Programs
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PGY-3

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Disclosures

- Rachael Bailey, DO has no real or perceived conflicts of interest to disclose.
- Erin Clark, MD, FACOG has no real or perceived conflicts of interest to disclose.
- Laurie P. Erickson, MD, FACOG has no real or perceived conflicts of interest to disclose.
- Rebecca Feldman, MD has no real or perceived conflicts of interest to disclose.
- Susan Garpiel, RN, MSN, C-EFM has no real or perceived conflicts of interest to disclose.
- Gerald Girardi, MD, FACOG has no real or perceived conflicts of interest to disclose.
- Paul Gluck, MD, FACOG has no real or perceived conflicts of interest to disclose.
- Sindhu K. Srinivas, MD, MSCE, FACOG has the following to disclose: Pfizer (expert witness); AOCG-Bayer Research grant.
Objectives

➢ Learn about the National Improvement Challenge issued by the Council on Patient Safety in Women’s Health Care.

➢ Hear from the winners of the first cycle. Through their presentations you will:

  ▪ Learn how each of the winning institutions successfully utilized the Council’s patient safety materials to drive process improvement around obstetric hemorrhage.
  ▪ Gain valuable insight on ways that your institution can successfully implement the Council’s tools to drive culture change, increase collaboration, and improve outcomes.
  ▪ Hear real world challenges to successful QI program implementation and discover methods for overcoming these challenges.

➢ Find out how your institution can get involved in the next cycle of the challenge.
National Improvement Challenge

Improving Quality and Safety in Clinical Care

- Launched for Obstetric Hemorrhage in November 2014
- Entries were judged and voted on by members of the Council
- Awarded top 4 entries

47 Declarations of Intent
22 States + DC
20 Complete Applications
13 states + DC
Submission Evaluation Criterion

• Submissions were evaluated and voted on by members of the Council

• Overall evaluation of submission:
  – Introduction (study question and improvement goals)
  – Methodology
  – Results/Outcomes
  – Overall discussion

• Use of the Council’s tools

• Demonstrated multidisciplinary collaborative engagement
Preparation: Understanding Our Baseline

- 4100 deliveries are performed annually at the Hospital of the University of Pennsylvania.
- 626 deliveries occurred during the 2 month study period.
- 592 (95%) were included, 71% were vaginal and 29% were cesarean deliveries.
- Based on the ACOG reVITALize definition, 9% of deliveries had an EBL of >=1000 (2.4% of vaginal deliveries and 25% of cesarean deliveries).
# Expected vs. Actual Hemoglobin Drop

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>Reported EBL (cc +/- SD)</th>
<th>EXPECTED Hgb drop based on EBL</th>
<th>ACTUAL Hgb drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVD (N=411)</td>
<td>350</td>
<td>.07</td>
<td>1.4</td>
</tr>
<tr>
<td>CD (N=188)</td>
<td>880</td>
<td>1.8</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>P&lt;0.001</td>
<td></td>
<td>P&lt;0.001</td>
</tr>
</tbody>
</table>
Preparation: Quality Improvement Committee

• A standing multidisciplinary obstetric quality improvement (QI) committee (members include Obstetric and Family Medicine faculty and residents, nurses and a perinatal safety nurse) meets monthly.

• All cases of severe maternal morbidity reviewed using the Council’s SMM Review Form since July 2014.

• Our rate of severe maternal morbidity: 1.3%
Data Helped With Buy-In

• Pre-intervention data of rates $\text{EBL} \geq 1000$, underestimation of blood loss, and cognizance around severe maternal morbidity led to enthusiasm

• TEAM EFFORT- Multidisciplinary champions included nursing and physician leadership, residents, departmental safety leaders, the Director of Obstetrical Services and the Chair of Obstetrics and Gynecology

• All team members important-education intervention was targeted at ALL staff members including obstetric, anesthesia, and family medicine physicians, CNM, labor and postpartum nurses, obstetric scrub technicians, secretaries, and certified, nursing assistants
Specific Aims: Processes

• To standardize the definition of postpartum hemorrhage as $\geq 1000$ ml blood for all deliveries
• To implement quantitative blood loss (QBL) assessment at delivery (compared to previous method of provider visual estimation)
• To create a comprehensive multidisciplinary obstetric hemorrhage education program that addresses antenatal risk assessment, intrapartum risk assessment, accurate blood loss quantification, and hemorrhage response
  ▪ To create a sustainable educational model that will allow for consistent training of all new staff and ongoing education of current staff
• To create multidisciplinary policies to standardize responsiveness to hemorrhage both on labor and delivery and on the postpartum unit
• To centralize all equipment needed to adequately respond to a hemorrhage (hemorrhage cart)
Specific Aims: Outcomes

• To improve the accuracy of blood loss estimation at delivery

• To compare discrepancy between estimated blood loss and actual hemoglobin drop before and after the intervention

• To reduce the rates of postpartum hemorrhage, severe maternal morbidity (maternal admission to the ICU and transfusion $\geq 4$ units PRBC) and overall maternal blood product transfusion rate
Intervention

• Antepartum
  – Risk assessment
  – Mitigate risk (IV FE)

• Intrapartum
  – Risk assessment
  – Supplies
  – Method of response
  – Accurate assessment of blood loss

• Postpartum
  – Response
## Intervention: Antepartum

<table>
<thead>
<tr>
<th>Average Risk</th>
<th>Elevated Risk</th>
<th>Highest Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>No significant risk factors</td>
<td>Prior c-section(s)/uterine surg</td>
<td>Placenta Previa</td>
</tr>
<tr>
<td>Singleton pregnancy</td>
<td>Multiple gestations</td>
<td>Suspected Accreta/Percreta</td>
</tr>
<tr>
<td></td>
<td>Polyhydramnios</td>
<td>Platelets &lt; 50K</td>
</tr>
<tr>
<td></td>
<td>EFW=4000g</td>
<td>Hgb &lt; 9 plus other risk factor</td>
</tr>
<tr>
<td></td>
<td>Grandmultiparity (&gt;4 births)</td>
<td>Known coagulopathy</td>
</tr>
<tr>
<td></td>
<td>History of PPH</td>
<td>Active bleeding (&gt; bloody show)</td>
</tr>
<tr>
<td></td>
<td>Chorioamnionitis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oxytocin administration for &gt;24 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Achievement of 40mu/min Oxytocin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operative vaginal delivery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Significant myomas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Retained placenta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prolonged 2nd stage (&gt;=3 hrs)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Magnesium Sulfate administration</td>
<td></td>
</tr>
</tbody>
</table>

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Average Risk-Type and screen, Routine IV pitocin after delivery of neonate, Controlled cord traction until placental delivery

Elevated Risk-Preparation for delivery with appropriate uterotonic/OB hemorrhage cart available/Low threshold for T&C based on clinical judgment

Highest Risk-T&C (available products at delivery), preparation of appropriate uterotonic/appropriate personnel/OB hemorrhage cart outside of patient room
Intervention: Intrapartum/Postpartum

- Online Education module
- Mandatory skills and drills fair
Intervention: Intrapartum/Postpartum

Procedural Interventions:

– Hemorrhage Cart
– Safety Boards
– Hemorrhage Response Protocol
– QBL as standard way to assess blood loss
Results

Attendees of Skills and Drills

<table>
<thead>
<tr>
<th>Provider Title</th>
<th>Number of Attendees</th>
</tr>
</thead>
<tbody>
<tr>
<td>RNs</td>
<td>159</td>
</tr>
<tr>
<td>Support Staff/CNA/OB Tech/Unit Sec/Nursing Support</td>
<td>27</td>
</tr>
<tr>
<td>Obstetric Attendings</td>
<td>20</td>
</tr>
<tr>
<td>Maternal-Fetal Medicine Fellows</td>
<td>5</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>2</td>
</tr>
<tr>
<td>Midwives &amp; APNs</td>
<td>9</td>
</tr>
<tr>
<td>Obstetric and Family Medicine Residents</td>
<td>30</td>
</tr>
</tbody>
</table>
The Study and Analysis of the Intervention

• Qualitative
  – Post-assessment survey regarding the effectiveness of our skills and drills workshop
  – Chart review of IV iron usage
  – Pre and post assessment with onsite simulation

• Quantitative
  – Collect data on all women who deliver at HUP from October 19, 2015 through December 20, 2015
    • Predict more accurate blood loss assessment with QBL
  – Continue completing council forms for SMM
    • Decreased rates of transfusion and severe maternal morbidity
Challenges and Helpful Strategies

• Universal buy-in ➔ show your data!!

• Implementation of multiple interventions simultaneously ➔ Momentum around an area of competence

• Reaching large number of staff ➔
  – Multiple strategies-email, huddles, online modules, skills fair
  – Support of leadership to track attendance and make mandatory
Success

- Multipronged approach
- Multidisciplinary team
- Educational component
  - Assessment and management of PPH in an ongoing way through online modules, hands on activities and onsite simulation
- Clinical change
  - Quicker decision-making regarding a patient’s risk for hemorrhage during delivery
  - Improved access to the tools needed to manage a hemorrhage
- Reproducibility
In Utah, hemorrhage was the **third leading cause of maternal mortality** between 2005-2012:

1. Embolism
2. Overdose/drug toxicity
3. Hemorrhage (3.2% of deliveries)
4. Cardiac
5. Infection
Postpartum Hemorrhage: UTAH


Utah’s maternal transfusion rate is >2 fold higher than the national average

– Utah: 0.66% of live births (1/150)
– U.S.: 0.28% of live births (1/350)
University of Utah Hospital

• Located in Salt Lake City
• 680 bed facility (14 L&D rooms)
• ~4,000 deliveries per year
• In 2013, our PPH rate was 12%

• Our working assumption:
  ▪ PPH is under recognized
  ▪ PPH is under treated
Objective

Reduce the overall PPH rate by 25% in one year through development and implementation of a standardized OB Hemorrhage Safety Bundle and interdisciplinary team approach
Multidisciplinary Team of Stakeholders

- High level of project engagement and investment:
  - Labor and Delivery staff (medical assistants, hospital unit coordinators)
  - Labor and Delivery nurses
  - Labor and Delivery Nurse Educator
  - Nurse midwives and nurse practitioners
  - Resident physicians (Ob/Gyn, Family Practice, Emergency Medicine, Anesthesia)
  - Attending physicians (Ob/Gyn, Family Practice, Anesthesia)
  - Women and Newborns Service Line hospital administrators
Tools

- Obstetric Hemorrhage Patient Safety Bundle from the Council on Patient Safety in Women’s Healthcare
- California Maternal Quality Care Collaborative
- AWHONN PPH Project
Project Timeline

Early 2013

Initial Steps:
Chart audits
Focus groups

Action Items:
Chart audits
Focus groups

Late 2013

Action Items:
Develop 'OB Hemorrhage Guideline'
Staff education
Simulation & team training

Early 2014

Action Items:
Implement 'OB Hemorrhage Guideline'
Develop & implement 'Pitocin Algorithm'
Join UHC OB Adverse Events Collaboration

Late 2014

Action Items:
Active management of the 3rd stage
PPH debriefing form
Documentation workshop for providers
Obstetric Hemorrhage Care Guidelines

All patients are active participants in their care. Patients should be informed of any risk factors they may have or develop for PPH and advised of recommendations for their care. These recommendations may be individualized to reflect the patient’s decisions.

**Prenatal Assessment Planning**
Identify and prepare for patients with special considerations: placenta previa/accrete, bleeding disorders or those who decline blood products (and have risk factors)

<table>
<thead>
<tr>
<th>Low Risk</th>
<th>Medium Risk</th>
<th>High Risk</th>
</tr>
</thead>
</table>
| - No previous uterine incision  
- Singleton pregnancy  
- <4 previous births  
- No known bleeding disorder  
- No history of PPH | - TOCLAC  
- Multiple gestation  
- ≥ 4 previous births  
- History of previous PPH  
- Large uterine fibroids  
- Polyhydramnios  
- Estimated fetal weight > 4 kg  
- Morbid obesity (BMI > 35) | - Placenta previa  
- Suspected placenta accreta or percreta  
- Hematocrit < 30 AND other risk factors  
- Platelets < 20,000  
- Known coagulopathy – draw/send appropriate lab tests as specifically ordered for this patient |

<table>
<thead>
<tr>
<th>Admission Assessment &amp; Planning</th>
<th>Ongoing Risk Assessment</th>
</tr>
</thead>
</table>
| Evaluate for risk factors on admission  
- It is strongly recommended that all women who meet criteria for medium/high risk have IV access  
- If high risk, T&C for 2 units PRBC’s & keep ahead 2 - keep these units available for 24 hours post delivery  
- Identify women who may decline transfusion and counsel and consent  
If the patient has moderate/high risk for PPH:  
- Review OB Hemorrhage Guideline | Evaluate for development of additional risk factors in labor:  
- Prolonged 2nd stage labor (4 hours, including time for “rest and descend”)  
- Any oxytocin use  
- Sustained antepartum bleeding  
- Chorioamnionitis  
Risk Factors in this column are considered medium risk and need to be added to admission risk factors  
Treat 2 or more risk factors as “high risk” |

<table>
<thead>
<tr>
<th>Stage 0: All Births – Prevention &amp; Recognition of OB Hemorrhage</th>
</tr>
</thead>
</table>
| - Active management of the third stage of labor  
- Administer all IV Pitocin per postpartum Pitocin guideline or give 10 U Pitocin IM  
- After initial EBL for delivery is determined all subsequent blood loss will be quantified (weighed) for 24 hrs and documented in I&O  
- Ongoing evaluation of vital signs per guideline/orders  
- Empty bladder; patients who have received an epidural/spinal are catted (straight or Foley) prior to transfer to postpartum  
- If patients fundus is not firm but EBL <500:  
  1. Vigorous cruce for at least 15 seconds  
  2. Empty her bladder  
  3. Consider Methergine (notify the OB Resident/Provider if this is given) |
Simultaneous efforts:
Continued chart audits for data collection and distribution of quarterly results
Extensive electronic medical record build
- Admission and ongoing risk assessment
- Standardized documentation of PPH prophylaxis, diagnosis and treatment
- Inclusion of PPH algorithms for easy reference
Measurements

• Overall and stage 3 PPH rates
• Compliance with “Perfect Care”
  ▪ Admission and ongoing PPH risk stratification
  ▪ Active management of the 3rd stage of labor
  ▪ Standardized PPH documentation
  ▪ Activation of the PPH order set
  ▪ Activation of ‘OB Rapid Response’
  ▪ Quantification of blood loss for 24 hours postpartum
  ▪ Completion of PPH debriefing form
### University of Utah PPH Rates

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Series1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1/14</td>
<td>15.1</td>
</tr>
<tr>
<td>Q2/14</td>
<td>13.1</td>
</tr>
<tr>
<td>Q3/14</td>
<td>13.9</td>
</tr>
<tr>
<td>Q4/14</td>
<td>11</td>
</tr>
<tr>
<td>Q1/15</td>
<td>8</td>
</tr>
<tr>
<td>Q2/15</td>
<td>7.9</td>
</tr>
</tbody>
</table>
Stage 3 PPH

PPH Guideline
PP Pit Algorithm
3rd stage
Active Management

Graph showing stages and timeline.
# PPH Perfect Care Audit

<table>
<thead>
<tr>
<th>Perfect Care Measures</th>
<th>1st Qtr 2014</th>
<th>2nd Qtr 2014</th>
<th>3rd Qtr 2014</th>
<th>4th Qtr 2014</th>
<th>1st Qtr 2015</th>
<th>2nd Qtr 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Stratification</td>
<td>54%</td>
<td>68%</td>
<td>91%</td>
<td>93%</td>
<td>90%</td>
<td>88%</td>
</tr>
<tr>
<td>Active Management 3rd Stage</td>
<td>85%</td>
<td>92%</td>
<td>90%</td>
<td>92%</td>
<td>90%</td>
<td>92%</td>
</tr>
<tr>
<td>PPH Documentation</td>
<td>49%</td>
<td>62%</td>
<td>67%</td>
<td>78%</td>
<td>88%</td>
<td>71%</td>
</tr>
<tr>
<td>Activation PPH Order Set</td>
<td>19%</td>
<td>19%</td>
<td>20%</td>
<td>46%</td>
<td>48%</td>
<td>44%</td>
</tr>
<tr>
<td>OB Rapid Response</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>45%</td>
<td>56%</td>
<td>32%</td>
</tr>
<tr>
<td>Quantify Blood Loss (24 hr)</td>
<td>95%</td>
<td>87%</td>
<td>86%</td>
<td>97%</td>
<td>97%</td>
<td>100%</td>
</tr>
<tr>
<td>PPH Debriefing Done</td>
<td>19%</td>
<td>18%</td>
<td>29%</td>
<td>23%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary

• Using an interdisciplinary approach, the University of Utah developed an OB Hemorrhage Safety Bundle based on the framework provided by the Council on Patient Safety in Women’s Healthcare
  ▪ Exceeded goal of 25% reduction in overall PPH rate
  ▪ Improvement sustained through the 2nd quarter of 2015
  ▪ Improved compliance with “Perfect Care” measures
Background

- **Residency Research Project**
  - Special interest in postpartum hemorrhage
  - Large provider variation in management of PPH

- **PPH Checklist Developed**
  - Used the PPH resources already in place at BUMCP
  - Greater focus on timing and medication order and dosing
  - Highly specific
  - Greater awareness and documentation of vitals and cumulative blood loss
  - Concise location for documentation of labs, blood products, and procedures
  - Easier to follow with inexperienced providers
  - Instructions when to abandon conservative management

- **Supporting Data**
  - Retrospective data of ten cases of women who exsanguinated due to postpartum uterine atony
  - In all ten cases, application of the checklist would have resulted in abandonment of conservative management and application of a definitive surgical procedure before the time of cardiac arrest
  - In 9 of 10 cases, this would have occurred over one hour prior to cardiac arrest
  - Conclusion: Use of the checklist would lead to cessation of hemorrhage by medical or surgical means within one hour of diagnosis

- **National Improvement Challenge on Obstetric Hemorrhage**
  - Our Submission: Improving Obstetrical Hemorrhage Morbidity and Mortality by a Checklist Based Management Protocol; a Collaborative Quality Improvement Project
# Postpartum Hemorrhage Checklist

**Education/Explanations:**
- Wide open = remove from pump
- Activate team = PPH Team Lead (charge nurse, clinical manager) and additional nurse
- Other etiologies of PPH = lacerations, retained products, invasive placenta, uterine inversion/rupture, coagulopathy
- Uterotonic kit: dosing; contraindications
  - Methergine 0.2mg IM q 2-4hrs; HTN/pre-eclampsia/coronary artery disease
  - Misoprostol 1000mcg PV single dose; none
  - Hemabate 250mcg IM or intramyometrial q 15-90min; pulm/cardiac/renal disease

## Role Specifics:

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Nurse</strong></td>
<td>(always in patient room)</td>
</tr>
<tr>
<td><strong>PPH Team Lead</strong></td>
<td>(present with Stage I PPH)</td>
</tr>
<tr>
<td><strong>OB Rapid Response Team</strong></td>
<td>(present with Stage II PPH)</td>
</tr>
<tr>
<td><strong>Second Nurse</strong></td>
<td>(present with atony diagnosis)</td>
</tr>
</tbody>
</table>

**Infusion:**
- Bakri balloon: Inflated to ___ cc (up to 500cc)

## Important Contact List

- Team Lead: 602-618-6938
- Blood Bank: 3390
- Anesthesia: 4135 / 5921
- Universal: 0792
- Main OR: 2147
- IR: 4622
- ICU: 602-201-4442

## Visual Estimation of Blood Loss

- (saturated) 1 Ray-tec 10cc
- 1 Lap sponge 100cc
- 1 peri-pad 120cc
- 1 large pad 500cc

## Education/Explanations:
- Keep record of time, EBL total at each step (provider estimate and weighed), and vital signs
- Ensures vital signs are announced
- Responsible for alerting team if any of below occur
  - EBL > 2000cc
  - SBP < 80 mmHg
  - DBP < 40 mmHg
  - Pulse >120 bpm
- Announcement and documentation of labs as they return and blood products as administered

## Postpartum Hemorrhage Checklist

<table>
<thead>
<tr>
<th><strong>Time</strong></th>
<th><strong>EBL (total)</strong></th>
<th><strong>BP</strong></th>
<th><strong>Pulse</strong></th>
<th><strong>Notes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Atony diagnosed; EBL &lt;500cc</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Bimanual compression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Oxytocin 30u in 500mL NS, wide open</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Rule out other etiologies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Call for Uterotonic kit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Empty bladder</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wait 5 minutes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Atony Diagnosed; EBL > 500cc** | | | | |
| = Stage 1 PPH | | | | |
| 1. Activate team, PPH cart to room | | | | |
| 2. Administer Methergine 0.2mg IM | | | | |
| 3. Obtain labs and type/cross for 2u PRBC | | | | |
| 4. Second IV access (16G or larger) | | | | |
| 5. Increase IVF (200cc/hr NS or LR) | | | | |
| 6. Continuous pulse ox, 55min VS | | | | |

| **Wait 10 minutes (after administration of drug 1)** | | | | |
| **Bleeding persists; EBL > 1000cc** | | | | |
| 1. Administer Misoprostol 1000mcg PR | | | | |
| 2. Call for second physician | | | | |
| 3. Consider tamponade balloon / packing | | | | |

| **Wait 15 minutes (after administration of drug 2)** | | | | |
| **Bleeding Persists; EBL > 1500cc** | | | | |
| = Stage 2 PPH | | | | |
| 1. Administer Hemabate 250mcg IM | | | | |
| 2. Notify Anesthesiologist/anesthesia cart to room (arterial / central line prn) | | | | |
| 3. Transfuse 2u PRBCs, call for 2u more | | | | |
| 4. Alert OR and/or IR (only if Vs stable) | | | | |
| 5. Place Foley (if not already in place) | | | | |
| 6. Apply SCDS and warming blanket | | | | |
| 7. Consider additional labs | | | | |

| **Wait 10 minutes (after administration of drug 3)** | | | | |

| **Bleeding Persists** | | | | |
| 1. Initiate massive transfusion protocol | | | | |
| 2. Proceed to OR for exploratory laparotomy | | | | |
| 3. Notify ICU of possible admission | | | | |

| **Blood product totals:** | | | | |
| PRBCs | | | | |
| FFP | | | | |
| PLTs | | | | |
| Cryo | | | | |
• **Goals of QI Project:**
  – Improve maternal morbidity and mortality from postpartum hemorrhage at BUMCP and all Banner facilities
  – Multidisciplinary collaboration
  – Universally accepted and followed by providers (physicians and CNM), residents, anesthesia, and nursing
  – Continued interval assessment over the next ten years (6 mo and 1 yr)
    • Overall patient mortality, total units transfused, total number of operative interventions, and number of ICU admissions

• **Tools used:**
  – Patient Safety Bundle
  – Existing PPH checklist
  – Supporting retrospective data

• **Obstacles:**
  – Banner Health is a multi-hospital system (29 hospitals)
  – Pilot at BUMCP and then Banner-wide

• **Steps Moving Forward:**
  – Training (simulation)
    • Nursing, residents, anesthesia, and OB providers
Evaluating Improved Preparedness and Management of Obstetric Hemorrhage in a Large National Health System Using a Multidisciplinary Obstetric Hemorrhage Education Program
• One of the largest Catholic health systems in the United States
• 88 hospitals in 22 states
• 39 hospitals performing deliveries
• > 65,000 deliveries in 2014
• 1.7% of US births
• Average annual births at each hospital range from 80 to 9,700
• Implemented in 23 hospitals in 9 states beginning in 2013 (2900 participants)
OB Hemorrhage Education Program

- **Tools Utilized:**
  - 2008 Illinois Department of Public Health OB Hemorrhage Education Project
  - 2010 Improving Health Care Response to Obstetric Hemorrhage (California Maternal Quality Care Collaborative Toolkit to Transform Maternity Care)
  - 2012 AWHONN Obstetric Hemorrhage Monograph
  - 2014 Council on Patient Safety in Women's Healthcare Obstetric Hemorrhage Safety Bundle

- **Learning Components:**
  - The Benchmark Assessment Validation (Pre-Test)
  - The OB Hemorrhage Overview-A Self-Learning Module with voice-over slides
  - The Quantifying Blood Loss Skill Stations-An on-site exercise in quantifying blood loss
  - The TeamSTEPPS Overview-A Self-Learning Module focused on effective communication between team members
  - OB Simulation and Debrief-An on-site exercise focused on teamwork, communication and appropriate management of OB hemorrhage
  - The Benchmark Assessment Validation (Post-Test)
OB Hemorrhage Education Program
Bundle Components Structure

• **Readiness:**
  - Hemorrhage cart with supplies, checklist and instruction cards
  - Immediate access to hemorrhage medications
  - Establish a rapid response team
  - Establish a massive transfusion protocol
  - Unit based training, drills, debriefs

• **Recognition and Prevention:**
  - Assessment of hemorrhage risk upon admission, close to delivery and postpartum
  - Quantitative measurement of blood loss
  - Active management of 3rd stage of labor

• **Response:**
  - Stage-based OB hemorrhage emergency management plan

• **Reporting/System Learning:**
  - Process improvements identified from post event reviews/debriefs
  - Quality Metrics monitoring and reporting
Strengths and Challenges

• **Strengths:**
  - System wide clinical expertise in program development
  - Technical expertise in education product development and implementation
  - Broad hospital engagement
  - Standardized training and evaluation
  - 23 hospitals meet 12/13 of the OB Hemorrhage Bundle criteria
  - Hospital liability premium surcharge for noncompliance

• **Challenges:**
  - Participation of the medical staff independent physicians
  - Variation in EHR technology challenged clinical metric measurement
### OB Hemorrhage Education Program Participant Pre and Post Test Scores: June 2015

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Pre Mean</th>
<th>Pre Min</th>
<th>Pre Max</th>
<th>Post Mean</th>
<th>Post Min</th>
<th>Post Max</th>
<th>Difference</th>
<th>% Change</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia Providers</td>
<td>26</td>
<td>71</td>
<td>52</td>
<td>84</td>
<td>81</td>
<td>60</td>
<td>96</td>
<td>10</td>
<td>14%</td>
<td>0.002</td>
</tr>
<tr>
<td>Certified Nurse Midwives</td>
<td>16</td>
<td>68</td>
<td>52</td>
<td>84</td>
<td>78</td>
<td>60</td>
<td>96</td>
<td>10</td>
<td>15%</td>
<td>0.004</td>
</tr>
<tr>
<td>Registered Nurse</td>
<td>894</td>
<td>59</td>
<td>24</td>
<td>92</td>
<td>72</td>
<td>16</td>
<td>96</td>
<td>13</td>
<td>22%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>OB Physician</td>
<td>129</td>
<td>76</td>
<td>36</td>
<td>96</td>
<td>84</td>
<td>60</td>
<td>96</td>
<td>8</td>
<td>11%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Rapid Response Team</td>
<td>26</td>
<td>52</td>
<td>28</td>
<td>76</td>
<td>66</td>
<td>28</td>
<td>96</td>
<td>14</td>
<td>27%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>OB Resident/Fellow</td>
<td>39</td>
<td>70</td>
<td>36</td>
<td>92</td>
<td>80</td>
<td>60</td>
<td>96</td>
<td>10</td>
<td>14%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total Completed</td>
<td>1158</td>
<td>61</td>
<td>24</td>
<td>96</td>
<td>74</td>
<td>16</td>
<td>96</td>
<td>13</td>
<td>21%</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
## Top Ten OB Hemorrhage Process Improvements: June 2015

<table>
<thead>
<tr>
<th>Process indicated as being in hospital's top three improvements</th>
<th># Respondents</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>OB Hemorrhage cart immediately available.</td>
<td>18</td>
<td>82%</td>
</tr>
<tr>
<td>Weighing of saturated items (Quantitative Blood Loss)</td>
<td>13</td>
<td>59%</td>
</tr>
<tr>
<td>OB Hemorrhage Medication kit immediately available</td>
<td>7</td>
<td>32%</td>
</tr>
<tr>
<td>OB Rapid Response Team</td>
<td>5</td>
<td>23%</td>
</tr>
<tr>
<td>OB Hemorrhage Risk Assessment</td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td>Massive Transfusion Protocol developed / implemented</td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td>OB Hemorrhage Risk Assessment documentation within our current EMR</td>
<td>3</td>
<td>14%</td>
</tr>
<tr>
<td>OB Hemorrhage protocol</td>
<td>3</td>
<td>14%</td>
</tr>
<tr>
<td>OB Hemorrhage drills with all necessary staff</td>
<td>3</td>
<td>14%</td>
</tr>
<tr>
<td>Ensure adequate availability of scales for QBL</td>
<td>1</td>
<td>5%</td>
</tr>
</tbody>
</table>
## OB Hemorrhage Bundle Metrics Improvement: 10/25/2015

### Domain: Readiness

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage cart with supplies, checklist and instruction cards.</td>
<td>Not assessed</td>
<td>96%</td>
</tr>
<tr>
<td>Immediate access to hemorrhage medications</td>
<td>61%</td>
<td>96%</td>
</tr>
<tr>
<td>Establish a rapid response team</td>
<td>55%</td>
<td>96%</td>
</tr>
<tr>
<td>Establish a massive transfusion protocol</td>
<td>62%</td>
<td>96%</td>
</tr>
</tbody>
</table>

### Domain: Recognition and Prevention

<table>
<thead>
<tr>
<th>Assessment</th>
<th>2012 Pre-imp.</th>
<th>2015 Post-imp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of hemorrhage risk upon admission, close to delivery and postpartum</td>
<td>38%</td>
<td>96%</td>
</tr>
<tr>
<td>Measurement of blood loss:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Visual</td>
<td>86%</td>
<td></td>
</tr>
<tr>
<td>• Quantitative</td>
<td>5%</td>
<td>96%</td>
</tr>
<tr>
<td>• Pad</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Active management of 3rd stage of labor</td>
<td>Not assessed</td>
<td>96%</td>
</tr>
</tbody>
</table>

### Domain: Response

| Establish an OB Hemorrhage Policy | 62% | 96% |
Next Steps

• Finalize review of clinical outcome metrics
• Complete Cohort 1 final milestones: post-implementation hospital assessment and process improvements and post-event process improvements - March 2016
• Cerner OB Hemorrhage Advisor pilot
• Expand program to 13 new Trinity Health hospitals
  • Perform gap analysis regarding OB Hemorrhage Bundle practices
• Update course materials in program
• Continue multidisciplinary education program at all Trinity Health hospitals
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Your line will be unmuted by the operator for your turn

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Montefiore Medical Center
Bronx, NY

Miranda Klassen
Amniotic Fluid Embolism Foundation
Vista, CA

Christine Morton, PhD
Stanford University
Stanford, CA

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