Organization: University of Maryland St. Joseph medical Center

Solution: Reducing Postpartum Hemorrhage

Program/Project Description

Problem to be solved: A higher incidence of clinically significant (>15%) blood loss with childbirth than desired.

Identification of problem – A cluster of patients with significant blood loss led to systematic assessment of the average blood loss and the proportion of patients with >15% blood loss following vaginal delivery.

Baseline data – Blood loss was calculated by subtracting the first hemoglobin following vaginal delivery from last hemoglobin prior to delivery. Using this methodology, determined the average blood loss among all patients having vaginal delivery and percent of patients with >15% change. In June 2010 (baseline), average hemoglobin decline was 13.8% and 39% of patients experienced >15% blood loss.

Goals – Average blood loss <13% for patients with vaginal birth and fewer than 5% of these patients experiencing >15% blood loss.

Process

The A3 problem solving methodology was used. (See attached Power Point. First slide is our A3.) This technique includes first defining the problem in a statement, then identifying the background data. Then the multidisciplinary team composed of quality improvement specialists, a certified nurse midwife, nurses from labor and delivery and the postpartum unit, a nurse educator, a general obstetrician/gynecologist and maternal fetal medicine specialists “walked the process” to fully understand the current condition. After all of this assessment, problem analysis was done and countermeasures developed.

Solution

The solution included multiple features, the most significant of which were:

1. Quantification (rather than estimate) of blood loss.
   - Graduated drapes for vaginal deliveries were purchased for more accurate assessment of blood loss at the time of delivery. The provider doing the delivery is now required to announce the volume of blood loss at the completion of delivery.
   - Scales were purchased for every room in Labor and Delivery and the postpartum unit to allow ongoing accurate assessment of blood loss. Every pad is weighed throughout labor and for the first 12 hours post delivery.

2. Communication
• A charting tool in Meditech was revised to include blood loss in I’s and O’s, so it may be tracked and easily accessed by various providers.
• Parameters were set for notification of MD’s for blood loss (>750 cc cumulative for vaginal delivery, >1250 for cesarean section)
• Through a collaborative process involving nurse managers and floor nurses from both units, an improved handoff tool was developed to allow better communication and awareness of blood loss during transfer of patients from labor and delivery to the postpartum unit.

3. Interventions
• Timing of postpartum oxytocin administration was standardized to occur immediately after delivery of the placenta. Previously this was dependent on provider preference, requiring that either the provider or the nurse remember to ask about oxytocin administration, risking omission of this key step to minimize blood loss.
• Duration of recovery period in labor and delivery standardized to 2 hours, consistent with AWHONN guidelines.
• Timing of postpartum hemoglobin check standardized to 6 hours after delivery. This was previously done at 5-6 AM on postpartum day #1, which could be as little as 3 hours or as long as 26 hours postpartum.
• Two postpartum hemorrhage carts were developed and assembled.
• An intervention algorithm was developed by modifying that from the California Collaborative. Copies of the algorithm were laminated and placed in every obstetric patient room in Labor and Delivery and the postpartum unit for quick reference. (See attached Power Point, entitled “PPH algorithm”)
• A massive transfusion protocol was developed in collaboration with the members of the postpartum hemorrhage initiative as well as representatives from the Blood Bank, Anesthesiology and the Laboratory. (See attachment, entitled “Obstetrical massive hemorrhage guidelines”)
• All aspects of the postpartum hemorrhage initiative were communicated to the health care team throughout the development and implementation process. This consisted of many huddles with the Labor and Delivery and Postpartum staff, formal presentations to the medical staff (MDs and CNMs), 2 training videos for nursing staff and addition of a postpartum hemorrhage competency for nurses.

Measurable Outcomes
See attached graphs (in attached Power Point, last 2 slides)
Average hemoglobin change in April-July 2013 was between 11.3 and 12.4%, as compared with 13.6 to 13.8% in October and November 2011.
% of patients with >15% blood loss in August 2013 was 30%, as compared with 39% in June 2010.
Sustainability

Although we had 5 consecutive months from April 2013 through August 2013 with a monthly average hemoglobin decrease for vaginal deliveries at 11.3-12.4%, this is an ongoing project, on which we are continuing to monitor data. As we move forward, we are currently correlating blood loss with implementation of recommended measures. Once we have established that we are consistently at goal or better, processes will be incorporated into standard protocols for obstetric patients.

Collaboration and Leadership

Teamwork and collaboration were the keys to the success of this initiative. Members from the Quality Department helped with guiding the A3 process, as this was the group’s first introduction to this methodology. Maternal-child health staff was fully engaged throughout the process of development and implementation. This included bedside nurses from Labor and Delivery and the postpartum unit, PCCs and nurse managers from both units, a nurse midwife, an obstetrician and several maternal-fetal medicine specialists. The team provided expertise in the clinical aspects as well as the practical, day-to-day patient care concerns. Every team member’s input was valued and their engagement resulted in enthusiasm when time came for implementation and process change.

Hospital leadership was fully engaged and supportive. Updates on the project were given to the hospital Quality and Safety Committee every 4-6 months throughout its development and implementation. The Committee posed insightful questions and helped guide process, particularly in the early stages of the project. In addition, a presentation was given to the Quality Committee of the Board of Directors. Monetary support (Capital Allocation Committee of the hospital) allowed for the purchase of the scales and software to upload the postpartum hemoglobin data directly (point of care testing is done). Hospital leadership continues to recognize the team for its work.

Innovation

This solution is innovative, as it moved us from “the way we always did it” to best practice for the patients. Utilizing the A3 process to systematically address a large, multi-faceted process allowed for identification of many opportunities for improvement. Involving team members from many aspects of patient care allowed for incorporation of multiple perspectives and development of solutions that could be included in work flow, yet improve patient care and outcomes. The patients themselves are even involved, as they are educated on normal postpartum blood loss and encouraged to place their soiled pads in a receptacle so they may be weighed and their blood loss accurately measured. Prior to this process, there was concern that patients would be resistant; instead, they are, for the most part, pleased that such careful attention is being paid to their health.
Principle:
Obstetric massive hemorrhage (OMH) does not occur often but, when it does, large numbers of blood products are required in a short time frame for successful clinical management. This guideline outlines the responsibilities of both the clinical unit staff and the Blood Bank in order to assure that the appropriate blood products are available for the patient and to minimize wastage of products.

Guidelines:
A. Clinical Staff Response (OB, ICU)

1. One member of the clinical team is designated to have authority to call for activation and termination of the Massive Hemorrhage Protocol. Once in the operating room, the anesthesiologist, with continuous communication with the surgeon, will be referred to as the “OMH physician” (obstetric massive hemorrhage). In addition, a person, usually a nursing staff member, will be designated the anesthesia assistant. This person will assist the anesthesiologist in the resuscitation process as deemed necessary.

2. The anesthesia assistant will notify the blood bank by telephone at extension 1713.

3. Nursing staff will assure that
   a. A second peripheral 18G or larger IV line will be placed
   b. There is a designated transporter to bring blood from the blood bank
   c. The order for massive hemorrhage is entered in Meditech Order Entry as Category: Blood Bank and Procedure: Massive Hemorrhage Protocol (MASHE)
   d. A completed blood product requisition form is brought to the blood bank when blood products are issued.

4. Blood should be warmed whenever transfused in the OR; consider use of the Level 1 fluid warmer (The Level I is a rapid fluid warmer and is available in the back hallway of L&D).

5. The anesthesiologist determines the need for and orders appropriate blood tests while the protocol is activated. The initial testing (a-e) is done on a venous sample most often collected by nursing and is ordered in meditech using the order set /LDPPH.
   a. CBC with platelet count
   b. PT, APTT
      1) Requires a 4mL light blue top
   c. Fibrinogen
      1) Requires a 4mL light blue top
      2) OE meditech test mnemonic: FIB
   d. Fibrin Split Products
      1) Requires specialty tube (dark blue stopper); Fill with ONLY 2mL of blood. Overfilling renders the specimen useless; Call lab to obtain this tube.
      2) OE meditech test mnemonic: FISP
   e. BMP (includes calcium level)
f. Consider additional calcium levels after each four to six units when possible

g. At any time during the event, the OMH physician may order a “Whole Blood Rapid” (WBRAPID) which includes blood gas and co-oximetry, electrolytes, glucose, hemoglobin/hematocrit, ionized calcium and lactic acid.
   1) The Whole Blood Rapid requires an arterial sample.
   2) If unable to obtain an arterial sample, a venous sample may be sent; there are other Whole Blood panels available in meditech for venous samples.
   3) The blood gas and co-oximetry will NOT be run on a venous sample.

h. Red list critical lab results: The lab will make an attempt to contact the anesthesiologist, MD or CNM to give results. In the event that none of these providers are available (i.e. they are involved in the patient care emergency), the lab will notify an RN of the results. The RN taking the results then accepts responsibility for communicating the results to the OMH physician immediately.

6. When the Massive Hemorrhage Protocol is no longer needed, the OMH physician/anesthesia assistant will notify the blood bank by telephone to extension 1713.

7. Any blood products that have been delivered to the patient, but not infused, should be immediately returned to the blood bank.

8. Discontinuance of the Massive Hemorrhage Protocol in Meditech is the responsibility of the anesthesia assistant or their designee. The protocol is discontinued via Order Entry as Category: Blood Bank and Procedure: MASHEDI (Discontinue Massive Hemorrhage Protocol).

B. Blood Bank Response

1. Patient does NOT have a current type/screen sample:
   b. Issue, following the sequence below.

2. Patient has a current type/screen sample, with a negative antibody screen:
   a. Order/crossmatch two units red blood cells.
   b. Using test of record complete an immediate spin crossmatch; see procedure Compatibility Testing.
   c. Per procedure, patients with positive antibody screening results and identified RBC antibodies of clinical significance require antigen negative red cells, crossmatch compatible using LISS technique. Contact ARC, as necessary, to obtain products.

3. Assure that platelet product(s) are in-house and available for this patient's use, as needed.
   a. If unavailable, contact ARC and request stat release of platelet product(s) for possible transfusion.
   b. Keep platelet out-date in mind when requesting products - platelets will not be requested until 10 units of red cells have been transfused.

4. Assure that sufficient type-specific or type-compatible frozen products (FFP and CRYO) are available for patient support. Refer to chart below.

5. “Pre-issue” initial two products in Meditech following the procedure below:
   a. Review patient results, noting ABO/Rh type of patient and any pre-defined restriction on transfusion. (Option 50, option 12, review results)
   b. Issue products in Meditech per routine procedure (Option 15, option 17). Two units of red cells recently crossmatch and tagged for transfusion should be available for issue.
1) Retrieve products from refrigerator
2) Verify product identifiers to that in Meditech, and note nursing care floor, date and time on transfusion slips attached to the red cells.
3) Remove last copy of slip and retain, per procedure.
c. OB staff member will arrive in Blood Bank with pick-up slip.
   1) Verify patient identification (compare pick-up slip to transfusion slip and Meditech record), blood types of patient and red cell products, and expiration dates of products with staff member.
   2) Scan barcode of staff member ID badge.
   3) Tab to transfusion queries. Answer (Y) or (N) as appropriate.
   4) F12 to save information.
d. Attach activated Hemotemp stickers to red cell units. Send two red cells in transport container with OB staff member.

6. Once two units of red cells have been picked up for the identified patient, immediately begin to follow the guidelines for preparation of products following the table below. It is not necessary to get verbal orders for these products, as order of these products follows the OB Massive Hemorrhage Protocol as stated in Nursing Procedures.

<table>
<thead>
<tr>
<th>Batch</th>
<th>RBC</th>
<th>FFP</th>
<th>Platelets pheresis</th>
<th>Cryoprecipitate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>4</td>
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<tr>
<td>2</td>
<td>4</td>
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<td>1</td>
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<td>4</td>
<td>4</td>
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<td>-</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

7. Each successive batch of products will begin to be prepared as a batch of products is issued to the patient care floor. Note that two units of thawed plasma will routinely be available for immediate issue to the patient once the protocol is started (i.e. we will “stay ahead, 2 units” for thawed plasma). This schedule (one unit of FFP per 2 units of red cells, one unit of platelets per 10 units of red cells, 10 units of cryoprecipitate per 20 units of red cells) will continue until discontinued by the responsible physician.

8. Red cell products will be issued for transfusion to Labor/Delivery as intended for storage in their off-site refrigerator. Apply Hemotemp labels. Red cell and plasma products not transfused during the emergency procedure, and not intended to be transfused, will be returned by Labor/Delivery staff once intent to not transfuse is determined. **Transfusion of platelet products must begin within 30 minutes**, however; platelet products require storage at room temperature under controlled conditions. Those **platelets not intended for transfusion (within 30 minutes) must be returned to the Blood Bank Laboratory**.

9. Products available and not picked up within 30 minutes of availability will prompt a call to the floor from the Blood Bank staff, inquiring about the status of the patient/protocol.

10. The responsible physician, or anesthesia assistant, will call the Blood Bank to discontinue the OB Massive Hemorrhage Protocol. Unused blood products will be returned to the Blood Bank and appropriately returned to inventory, or discarded, per standard operating procedures.

11. Discontinuance of the Massive Hemorrhage Protocol in Meditech is the responsibility of the anesthesia assistant or their designee.
### Obstetric Hemorrhage Algorithm

#### Stage 0: Every woman in labor/giving birth
- Assess for hemorrhage risk factors
- Ongoing quantitative measurement of blood loss (throughout all stages)
- COMMUNICATION at every handoff
- Active Management 3rd Stage
  - Pitocin IV infusion or 10u IM
  - Fundal Massage: vigorous, minimum 15 seconds
- All patients: T&AS
  - High Risk: T&2 C U
  - Platelets < 80k
  - Hematocrit < 25%
- 2nd IV line for:
  - Suspected abruption
  - Placenta previa/accreta

#### Stage 1: Blood loss >750 ml vaginal or >1250 ml Cesarean, or with continued bleeding (>100 cc in 30 min)
- VS changes (H.R. >110, BP <85/45 O2 Sat <95%)

<table>
<thead>
<tr>
<th>Assessments</th>
<th>Medications / Procedures</th>
<th>Blood Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Activate OBH algorithm; start PPH flowsheet</td>
<td>□ IV access: At least 18 gauge</td>
<td>□ Notify Blood Bank</td>
</tr>
<tr>
<td>□ Bring Hemorrhage Cart to room</td>
<td>□ Empty bladder: Straight cath/Place Foley with Urometer</td>
<td>□ T&amp;C 2 Units PRBCs (if not already done)</td>
</tr>
<tr>
<td>□ Notify change nurse and anesthesia</td>
<td>□ Increase IVF (LR) and Pitocin</td>
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</tr>
<tr>
<td>□ VS with 02 sat, q 5 min.</td>
<td>□ Continue fundal massage</td>
<td></td>
</tr>
<tr>
<td>□ Calculate cumulative blood loss q 5-15 min</td>
<td>□ Misoprostol 800-1000 mcg PR and/or</td>
<td></td>
</tr>
<tr>
<td>□ Complete evaluation of vaginal wall, cervix, placenta and uterine cavity</td>
<td>□ Methylene 0.2 IM</td>
<td></td>
</tr>
<tr>
<td>□ IV access: At least 18 gauge</td>
<td>□ May repeat q. 2 hrs.</td>
<td></td>
</tr>
<tr>
<td>□ Empty bladder: Straight cath/Place Foley with Urometer</td>
<td>□ If hypertensive</td>
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<tr>
<td>□ Increase IVF (LR) and Pitocin</td>
<td>□ Place Foley with urometer</td>
<td></td>
</tr>
<tr>
<td>□ Continue fundal massage</td>
<td>□ Vaginal Birth (typical order)</td>
<td></td>
</tr>
<tr>
<td>□ Misoprostol 800-1000 mcg PR</td>
<td>1. Move to OR and apply SCD’s</td>
<td></td>
</tr>
<tr>
<td>□ Methylene 0.2 IM</td>
<td>2. Repair any tears</td>
<td></td>
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<tr>
<td>□ May repeat q. 2 hrs.</td>
<td>3. D&amp;C: R/O retained placenta</td>
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<tr>
<td>□ If hypertensive</td>
<td>5. Place intrauterine balloon</td>
<td></td>
</tr>
<tr>
<td>□ Place Foley with urometer</td>
<td>6. Selective Embolization (Interventional rad)</td>
<td></td>
</tr>
<tr>
<td>□ Vaginal Birth (typical order)</td>
<td>□ Cesarean Birth (still intra-op)</td>
<td></td>
</tr>
<tr>
<td>□ 1. Move to OR and apply SCD’s</td>
<td>1. Inspect broad ligament, posterior uterus and for retained placenta</td>
<td></td>
</tr>
<tr>
<td>□ 2. Repair any tears</td>
<td>2. B-Lynch Suture</td>
<td></td>
</tr>
<tr>
<td>□ 3. D&amp;C: R/O retained placenta</td>
<td>3. Place intrauterine balloon</td>
<td></td>
</tr>
<tr>
<td>□ 5. Place intrauterine balloon</td>
<td>□ Consider:</td>
<td></td>
</tr>
<tr>
<td>□ 6. Selective Embolization (Interventional rad)</td>
<td>□ Transfuse per clinical signs-do not wait for labs</td>
<td></td>
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<tr>
<td>□ Cesarean Birth (still intra-op)</td>
<td>□ Use blood warmer for transfusion</td>
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<tr>
<td>□ 1. Inspect broad ligament, posterior uterus and for retained placenta</td>
<td>□ Consider thawing 2 FFP (takes 35+ min) use if transfusing &gt;2 units PRBCs</td>
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<tr>
<td>□ 2. B-Lynch Suture</td>
<td>□ Determine availability of additional RBCs and other coag products</td>
<td></td>
</tr>
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<td>□ 3. Place intrauterine balloon</td>
<td>□ Cesarean Birth (still intra-op)</td>
<td></td>
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</table>

#### Stage 2: Continued bleeding (>100 ml in 30 min) and blood loss 1000-1500 ml (vaginal) or 1250-1500 (c/section)
- OR back to bedside (if not already there)
- Alert anesthesia, consider OBERT
- VS and cumulative blood loss q 5-10 mins
- Complete evaluation of vaginal wall, cervix, placenta and uterine cavity
- Send additional labs, including DIC panel
- If on 3E/W, move to L&D
- Evaluate for special cases
  - Uterine Inversion
  - Amniotic Fluid Embolism

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<td>□ 2nd Level Uterotonic Drugs:</td>
<td>□ Hemabate 250 mg IM</td>
<td>□ Notify Blood Bank of OBH</td>
</tr>
<tr>
<td>□ IV access: At least 18 gauge</td>
<td>□ Contraindication: Asthma</td>
<td>□ Meditech order entry MASHE</td>
</tr>
<tr>
<td>□ May repeat up to 8 times q. 15 min or</td>
<td>□ Misoprostol 800-1000 mcg PR</td>
<td>□ Call blood bank</td>
</tr>
<tr>
<td>□ Misoprostol 800-1000 mcg PR</td>
<td>□ 2nd IV Access (at least 18 gauge)</td>
<td>□ Transfuse Aggressively per OMH (anesthesia)</td>
</tr>
</tbody>
</table>
|  □ 2nd IV Access (at least 18 gauge) |  □ Bimanual Massage |  □ Unresponsive coagulopathy:
|  □ Place Foley with urometer |  □ Place Foley with urometer |  □ After 10 units PRBCs and full coagulation factor replacement:
|  □ Vaginal Birth (typical order) |  □ Place Foley with urometer |  □ may consider rFactor VIIa |
|  □ 1. Move to OR and apply SCD’s |  □ Place Foley with urometer |  |
|  □ 2. Repair any tears |  □ Place Foley with urometer |  |
|  □ 3. D&C: R/O retained placenta |  □ Place Foley with urometer |  |
|  □ 5. Place intrauterine balloon |  □ Place Foley with urometer |  |
|  □ 6. Selective Embolization (Interventional rad) |  □ Consider: |  |
|  □ Cesarean Birth (still intra-op) |  □ Transfuse per clinical signs-do not wait for labs |  |
|  □ 1. Inspect broad ligament, posterior uterus and for retained placenta |  □ Use blood warmer for transfusion |  |
|  □ 2. B-Lynch Suture |  □ Consider thawing 2 FFP (takes 35+ min) use if transfusing >2 units PRBCs |  |
|  □ 3. Place intrauterine balloon |  □ Determine availability of additional RBCs and other coag products |  |
|  □ Cesarean Birth (still intra-op) |  □ Notify Blood Bank of OBH |  |
|  □ 1. Inspect broad ligament, posterior uterus and for retained placenta |  □ Meditech order entry MASHE |  |
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|  □ 1. Inspect broad ligament, posterior uterus and for retained placenta |  □ After 10 units PRBCs and full coagulation factor replacement: |  |
|  □ 2. B-Lynch Suture |  □ may consider rFactor VIIa |  |

#### Stage 3: Total blood loss over 1500 ml, OR >2 units PRBCs given OR VS unstable or suspicion of DIC
- Mobilize Team as needed (OBERT)
  - Consider advanced GYN surgeon
  - Dedicated Anesthesia assistant
  - OR staff
  - Adult Intensivist
  - Repeat labs per OMM protocol (includes ABG’s and co-ex)
  - Consider Central Line
  - Social Worker / family support
- Activate Massive Hemorrhage Protocol
  - Laparotomy:
    - B-Lynch Suture
    - Uterine Artery Ligation
    - Hysterectomy
  - Patient support
    - Fluid warmer
    - Upper body warming device
- Notify Blood Bank of OBH
  - Meditech order entry MASHE
  - Call blood bank
  - Transfuse Aggressively per OMH (anesthesia)
  - Unresponsive coagulopathy:
    - After 10 units PRBCs and full coagulation factor replacement: may consider rFactor VIIa

Source: California Maternal Quality Care Collaborative Hemorrhage Task Force 2009
At SJMC, there is a higher incidence of >15% blood loss with childbirth than desirable. Ideally, with reduced EBL, there is a reduced need for intervention, need for transfusion and mortality.

**Background**
- Cluster of events occurred at SJMC relating to postpartum hemorrhage.
- National trend towards increased incidence of postpartum hemorrhage.
- Similar trend observed in this region and at SJMC.
- Feb 2012: 58 cesarean delivery patients had an average EBL = 13.3%; 28% of patients EBL >15%.
- Mar 2011: 40 vaginal delivery patients reviewed: 25% of patients had >15% EBL.
- June 2010: 67 sequential vaginal delivery patients chart review: 39% of patients had >15% EBL.

Ideally, with reduced EBL, there is a reduced need for intervention, need for transfusion, no communication to patient of PPH or risk.

**Current Condition**
- Lots of places to record EBL.
- Lots of handoffs with no EBL.
- Lots of opportunities to treat.
- Few opportunities to diagnosis.

**Problem Analysis**
- Cum EBL not calculated to measure.
- Cum EBL not visible.
- EBL hard Protocols unclear.
- Safety net too late.

**Implementation Plan**
- Hemacue after 6 hrs rather than CBC if <8.5.
- Implement revision of post op order sheet re: Hemacue timing.
- Implement: standardize pad/ice pack selection PP and L&D.
- Implement: PPH cart outside of high risk pt rooms - process chart.
- Implement: additional PPH cart.
- Develop massive transfusion protocol.
- Implement: mini intervention algorithm at quarterly staff meeting.
- Implement PPH intervention algorithm for excessive bleeding.
- Implement 3E/3W w/ consistent voicer use.
- handoff: EBL total to print on handoff.
- handoff: update format for summary information - update Meditec.
- Implement new audit tool of protocol if needed.
- Continue to monitor, analyze, and share data.

**Follow Up**
- Plan, Do, Study, Act.
  - Audit (chart review) Obstetric Hemorrhage Care Protocol of patients who had a blood loss > 20%.
  - Was the protocol followed?
  - Roll out new audit tool of protocol if needed.
**Obstetric Hemorrhage Algorithm**

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• COMMUNICATION at every handoff | • Active Management 3rd Stage  
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• Fundal Massage- vigorous, minimum 15 seconds  
• All patients: T&S  
• High Risk: T&C 2 U  
• Platelets < 80k  
• Hematocrit < 25%  
• 2nd IV line for:  
  • Suspected abruption  
  • Placenta previa/acreta  

| Stage 1: Blood loss >750 ml vaginal or >1250 ml Cesarean, or with continued bleeding (>100 cc in 30 min) | VS changes (H.R. >110, BP <85/45 O2 Sat <96%) | Consider:  
• T&C 2 Units PRBCs  
(if not already done) |
|---------------------------------|--------------------------|------------|
| □ Activate OBH algorithm; start PPH flowsheet  
□ Bring Hemorrhage Cart to room  
□ Notify charge nurse and anesthesia  
□ VS with O2 sat, q 5 min.  
□ Calculate cumulative blood loss q 5-15 min  
□ Complete evaluation of vaginal wall, cervix, placenta and uterine cavity | □ IV access: At least 18 gauge  
□ Empty bladder: Straight cath/Place Foley with Urimeter  
□ Increase IVF (LR) and Pitocin  
□ Continue fundal massage  
□ Misoprostol 800-1000 mcg PR and/or  
□ Methylene 0.2 IM  
• May repeat q. 2 hrs.  
• If hypertensive move on to 2nd level uterotonic drug (see below) | |

| Stage 2: Continued bleeding (>100 ml in 30 min) and blood loss 1000-1500 ml (vaginal) or 1250-1500 (c-section) | | Consider:  
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• Use blood warmer for transfusion  
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□ 2nd Level Uterotonic Drugs:  
• Hemabate 250 mcg IM  
• Contraindication: Asthma  
• May repeat up to 8 times q 15 min or  
• Misoprostol 800-1000 mcg PR  
□ 2nd IV Access (at least 10 gauge)  
□ Bimanual Massage  
□ Place Foley with urimeter  
□ Vaginal Birth (typical order)  
1. Move to OR and apply SCD’s  
3. Repair any tears  
4. D&C: R/O retained placenta  
5. Place intrauterine balloon  
6. Selective Embolization (Interventional rad)  
□ Cesarean Birth (still intra-op)  
1. Inspect broad ligament, posterior uterus and for retained placenta  
2. B-Lynch Suture  
3. Place intrauterine balloon | |

<table>
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<th>Stage 3: Total blood loss over 1500 ml, OR &gt;2 units PRBCs given OR VS unstable or suspicion of DIC</th>
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| □ Mobilize Team as needed (OBERT)  
• Consider advanced GYN surgeon  
• Dedicated Anesthesia assistant  
• OR staff  
• Adult intensivist  
□ Repeat labs per OMH protocol (includes ABG’s and co-ox)  
□ Consider Central Line  
□ Social Worker / family support | □ Activate Massive Hemorrhage Protocol  
• Laparotomy:  
  • B-Lynch Suture  
  • Uterine Artery Ligation  
  • Hystereotomy  
• Patient support  
• Fluid warmer  
• Upper body warming device | □ Notify Blood Bank of OBH  
• Meditech order entry MASHE  
• Call blood bank  
□ Transfuse Aggressively per OMH (anesthesia)  
□ Unresponsive coagulopathy:  
• After 10 units PRBCs and full coagulation factor replacement: may consider rFactor VIIa |
Vaginal Deliveries
Distribution of Change in Hgb Pre and Post Delivery
June 2013 vs Feb 2012

June 2013 Data:
Average = 12.5%
1 Std Dev = 6.6%
1 Std Dev = 13.2%
95% of the pt pop for June falls between 5.9% - 22.3%

Feb 2012 Data:
Average = 13.8
1 Std Dev = 7.0%
1 Std Dev = 14.0%
95% of pt pop falls between 6.7% - 27.7%
Average hemoglobin decrease for vaginal deliveries
October 2011 through Oct 2013

Goal = Hgb % Change <15%