Appendix I

*Boston Medical Center Obstetric Hemorrhage Bundle Components**

Readiness
System Level Readiness - Hemorrhage carts are available on labor and delivery floor and operating rooms, triage and post partum floors, with massive transfusion supplies supplies, hemorrhage response checklist, intrauterine balloons and compressions stitches - Hemorrhage medications are available in labor and delivery floor and operating rooms, triage and post partum floors medication dispenser (Pyxis) - Emergency response team: Back-up obstetric MD attending and 24/7 on-call back-up advanced gynecologic surgical specialist who can be called in for complex cases, 24/7 on-call interventional radiology - Transfusion: Massive Transfusion Protocol and Emergency Release Transfusion protocols - Unit education on protocols for all team members (RN, OB MD, FM MD, Anesthesia MD, CNM, residents) - Anesthesia: All patients receive an anesthesia consult on admission to labor and delivery and are thereby screened for hemorrhage risk factors as a part of that admission work-up.
Recognition & Prevention
Definition, Early Recognition and Triggers - Definition of Hemorrhage as Quantitative Blood Loss > 1000mL - Early Recognition: Regular interval assessment during delivery and postpartum of QBL - Intraoperative Antibiotics Redosing after >1500mL QBL - Tranexamic Acid: Consider giving after >1000-1500mL QBL
Risk Assessment (see Appendix II) - Assessment of hemorrhage risk: a specific form is used on admission, every 12 hours of delivery care, and on transfer to post partum to assess an individual patient's risk of obstetric hemorrhage. - Universal screening: All patients admitted get a blood type and screen drawn. If the patient is considered high risk via the risk assessment tool, a crossmatch is ordered as well.
Cumulative Quantitative Blood Loss - Vaginal Deliveries:Under-buttocks drape with clear conical pouch with QBL measurements in 50mL increments printed on the outside of the drape for easy visual quantification. Quantification initiated following delivery (prior to placental delivery). Blood soaked items weighed and blood volume calculated by subtracting weight of wet from dry (with 1 gram additional weight equivalent to 1mL blood loss). Add calculated blood volume from weighted soaked item and drape volume. - Cesarean Deliveries: Suction device, graduated cylinders and drapes utilized, all blood-soaked materials weighed and irrigation / amniotic sac rupture accounted for. Quantification starts after amniotic sac rupture or after delivery. Frequent intake and output measurements verbally shared with all team members throughout the case. Cumulative volume calculated from weighted soaked items and blood in suction cannister.
Active Management of 3rd Stage of Labor - Prophylactic oxytocin administration immediately after delivery of infant - Uterine massage immediately after delivery of infant - Umbilical cord traction for placental delivery
Response
Emergency Management Plan - Staged Response to Blood Loss: checklist and poster posted in every L&D room, on labor and delivery, inside of the operating room and on the hemorrhage carts that includes medications to give at specific QBL cutoffs, pagers or numbers to contact for emergency.

Reporting/Systems
Perinatal Quality Improvement / Safety - Perinatal Safety Specialist instills and promotes culture of team huddles for high-risk patients and systematically debriefing after all clinically significant events to identify successes and opportunities. Hemorrhage data is collected and analyzed on a regular basis. Safety specialist investigates all hemorrhages (all deliveries with QBL > 1000cc) - Quality Improvement Team help to find barriers to implementation and make systems level adjustments to improve the implementation of this new protocol

**Outline of Boston Medical Center Institutional Bundle structure modeled from the following resources:*
- California Maternal Quality Care Collaborative Hemorrhage Toolkit in National Partnership for Maternal Safety Hemorrhage Bundle Sections (https://www.cmqcc.org/resource/ob-hem-executive-summary)
- Council on Patient Safety in Women's Health Care's Obstetric Hemorrhage Patient Safety Bundle (https://safehealthcareforeverywoman.org/wp-content/uploads/safe-health-care-for-every-woman-Obstetric-Hemorrhage-Bundle.pdf)

Appendix II:

Boston Medical Center Obstetric Hemorrhage Risk Assessment Tool

<table>
<tr><td colspan="2">Low Risk</td></tr>
<tr><td colspan="2">All patients - Type and Screen, Anesthesia Consult</td></tr>
<tr><td colspan="2">Medium Risk</td></tr>
<tr><td><u>Antepartum</u>
▢ 5 or more vaginal births
▢ Multiple Gestation/ Polyhydramnios / EFW>4000g
▢ Previous OB Hemorrhage
▢ Anemia (Hct 28%)
▢ Prior Cesarean Section or Myomectomy</td><td>Apply Patient Sticker Here</td></tr>
<tr><td><u>Intrapartum</u>
▢ Chorioamnionitis
▢ Magnesium Sulfate Use
▢ Oxytocin use (any)
▢ Operative Delivery (vacuum, forceps)
▢ Cesarean Delivery
▢ Second Stage > 4h (Nullip) or > 3h (Multip)
▢ Shoulder Dystocia
▢ Suspected Placental Abruption</td><td>Risk Assessment:
<table><tr><td>At Admission or Ante/Intra Partum:
▢ Low
▢ Medium
▢ High</td><td>Immediately Prior to Delivery:
▢ Low
▢ Medium
▢ High</td></tr></table></td></tr>
<tr><td colspan="2">High Risk</td></tr>
<tr><td colspan="2">▢ Three or more Medium Risks
▢ Active Bleeding (vaginal or abdominal)
▢ Known Coagulopathy
▢ Platelets <100k
▢ Placenta Previa
▢ Suspected Accreta/Percreta</td></tr>
</table>

IF HIGH RISK

▢ **Type and Cross 1 Unit PRBC**

Date: _____ Time: _____