A California Toolkit to Transform Maternity Care

Obstetric Hemorrhage Toolkit
HOSPITAL LEVEL IMPLEMENTATION GUIDE

THIS COLLABORATIVE PROJECT WAS DEVELOPED BY:
THE OBSTETRIC HEMORRHAGE TASK FORCE
THE MATERNAL QUALITY IMPROVEMENT PANEL
CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE
MATERNAL, CHILD AND ADOLESCENT HEALTH DIVISION; CENTER FOR FAMILY HEALTH
CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

CMQCC OBSTETRIC HEMORRHAGE TOOLKIT HOSPITAL LEVEL IMPLEMENTATION GUIDE

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HOSPITAL LEVEL IMPLEMENTATION GUIDE
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INTRODUCTION

CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE (CMQCC)

CMQCC's mission is to transform maternity care in California to end preventable death and injury. To achieve this we will:

- Define and implement best practices for public health, communities and women with quality, safety and social justice as the clear priorities of every decision and action.
- Promote communication and collaboration between all maternity stakeholders.
- Gather, review and organize maternity data and statistics into actionable information.
- Build the next generation of maternal health leaders to continue the growth and scope of CMQCC.

We are devoted to eliminating preventable maternal death and injury and promoting equitable maternity care in California by bringing resources, tools, measures and quality improvement techniques to providers, administrators and public health leaders. This is a long-term collaborative effort of many organizations and individuals with Title V funding from the California Department of Public Health (Maternal, Child and Adolescent Health Program) and the California Perinatal Quality Care Collaborative (CPQCC). We are over 250 clinicians, public health leaders, key payers and representatives of the public all devoted to improving childbirth outcomes.

For more information about CMQCC, visit our website at www.cmqcc.org.

The Obstetric Hemorrhage Toolkit, Hospital-level Implementation Guide was reviewed by the California Department of Public Health, Maternal, Child and Adolescent Health Division and is a resource, but doesn't define the standard of care in California. Readers are advised to adapt the guidelines and toolkit based on their local facility's level of care and patient populations and are not to rely solely on guidelines presented here.

IMPACT OF OBSTETRIC HEMORRHAGE

The rate of maternal deaths has nearly tripled from 6 per 100,000 in 1996 to 17 per 100,000 annual births in 2006 9.(1) Alarmingly, the rate for African American women has risen from 27.7 to 45.7 per 100,000 live births between 1999 and 2006.(1) Obstetric hemorrhage is one of the leading causes for maternal death and is a major cause of maternal morbidity. In 1997, 2.4% of all live births in California were complicated by postpartum hemorrhage.(2) Nationwide, blood transfusions increased 92% during delivery hospitalizations between 1997 and 2005.(3)

COMPOSITE CASE

The following is an outline of a composite case (combined elements from multiple cases with indentifying features, including all person identifiers, removed to ensure patient confidentiality) that demonstrates how a normal low-risk pregnancy and birth can at times quickly escalate to an emergent situation and death. An outline of learning points and opportunities for quality improvement (QI) opportunities based on the case follows.

Composite Case Example: A 24yo woman, G2 P1 at 38 wks gestation was induced for "tired of being pregnant":

- After 8hr active phase and 2hr 2nd stage, she gave birth (NSVD) to an 8lb 6oz infant.
- After placental delivery, she had an episode of atony that firmed with massage. A second episode of atony responded to IM methergine and the physician went home (now 1am).
- The nurses called the physician 30min later to report more bleeding and further methergine was ordered.
- 60min after the call, the physician performed a D&C with minimal return of tissue. The woman received more methergine.
- 45min later a second D&C was performed, again with minimal returns. EBL at this point >2,000 ml.
- Delays in blood transfusion occurred because of inability to find proper tubing.
- Anesthesia was delayed, but a second IV started for more crystalloid. VS became markedly abnormal, P=144, BP 80/30.
- One further methergine given and patient taken for a 3rd D&C. She received 2u PRBCs by this point.
- After D&C is complete, she had a cardiac arrest from hypovolemia/hypoxia and was taken to the ICU where she succumbed 3 hours later.

QI Opportunities and Learning Points from the above composite case: How to reducing Mortality and Morbidity from OB Hemorrhage?

- Need a medical indication before performing an induction
- No documentation of actual blood loss, e.g., *what does "more bleeding" mean?*
- Only a few treatments tried, e.g., Methergine and D&C, and then repeated, even when they were ineffective
- Underestimation of blood loss
- Delay in administration of blood
- Lack of working equipment
- Delay in response from other team members
- Delays in adequate resuscitation

- Lack of an organized standardized team approach

OBSTETRIC HEMORRHAGE TASK FORCE

DEVELOPMENT OF BEST PRACTICES, TOOLS, CARE GUIDELINES

The Obstetric Hemorrhage Task Force Tools and Best Practices were developed by a volunteer group of California-based leaders and experts in obstetrics including obstetricians, nurses and midwives under the direction of the California Maternal Quality Care Collaborative's (CMQCC) Maternal Quality Improvement Panel (MQIP). This implementation guide was developed to support local leaders' efforts to successfully implement the best practices and tools for obstetric hemorrhage into practice and to create active quality improvement processes to drive implementation.

The implementation guide is organized to address four broad objectives as described by the Hemorrhage Task Force:

1. Improve ***readiness*** to respond to an obstetric hemorrhage by implementing standardized policies and procedures (general and massive) and developing obstetric hemorrhage rapid response teams.
2. Improve ***recognition*** of OB hemorrhage by performing on-going objective quantification of actual blood loss and triggers of maternal deterioration during and after all births.
3. Improve ***response*** to hemorrhage by performing regular on-site inter-professional hemorrhage drills.
4. Improve ***reporting*** of OB hemorrhage by standardizing definitions and consistency in coding and reporting.

The following elements are critical to affecting change to ensure that improvements are adopted and sustained over time:

- **Leadership**
  - Identifying Leader and Clinician behaviors, including "Champions"
  - Defining the problem and making the case for change
  - Setting goals
  - Allocating resources
- **Policy & Procedure**
  - Agreeing on a plan
  - Creating consistency between departments to improve teamwork and cohesive quality of care; see Appendix for sample policy and protocol
- **Monitoring**
  - Creating audit tools that work; see Appendix for sample tools
  - Communicating progress toward goals

GETTING STARTED

MODEL FOR IMPROVEMENT

The goal of this implementation guide is to provide a simple step-by-step guide for creating quality improvement (QI) changes in your facility to improve care processes associated with obstetric hemorrhage. MAP-IT (Mobilize, Assess, Plan, Implement, Track)—a rapid cycle QI method for outlining change—is presented.(4)

RAPID CYCLE QI METHODOLOGY

MOBILIZE, ASSESS, PLAN, IMPLEMENT, TRACK (MAP-IT)

☐ **Step 1**
Mobilize Quality Improvement Team
Recruit champions: clinical staff who visualize the ideal, set goals and follow through to realize defined aims

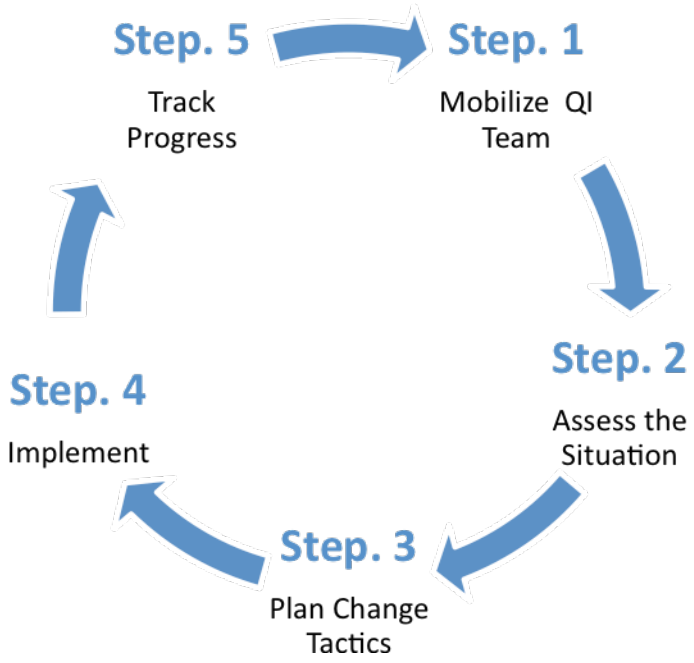
☐ **Step 2**
Assess the Situation
Determine current practices for response to hemorrhage; identify ***QI Data—process and outcome measures—*** that inform baseline assessment, guide appropriate implementation, and provide data sufficient to track progress (see Fishbone Diagram, Pareto Chart, Process Flow Maps below)

☐ **Step 3**
Plan Change Strategies and Tactics
Policy, Scheduling Process, Empowered Physician Leadership: Implement relevant policies and procedures (P&P) or changes to P&P (e.g., ongoing quantitative measurement of blood loss, drills and debriefs) that support a protocol to respond quickly and effectively to obstetric hemorrhage

☐ **Step 4**
Implement Strategies and Tactics
Conduct ***Clinician Education*** and training about ongoing quantitative measurement of blood loss, drills and debriefs; education drives convergent department culture, supports buy-in and contributes to successfull rollout of change tactics to accomplish the goal

☐ **Step 5**
Track Progress
Analyze data (see Audit Tools in Appendix) and present results to clinical staff via ***Trend Charts*** about obstetric hemorrhage (e.g, transfusions, massive transfusions). Review and repeat steps; when necessary, revise newly implemented tactics to ensure sustainable results

Figure 1: MAP-IT QI Methodology



GETTING STARTED

Mobilize

STEP 1. MOBILIZE QUALITY IMPROVEMENT TEAM

Essential team members include individuals with the following roles or skills:

- System Leadership
- Technical Expertise
- Day-to-Day Leadership

In obstetric service units, doctor and nurse leaders would fulfill these essential roles and skills. Utilizing the expertise and tacit knowledge of the front-line leaders and personnel, including nurses, general obstetricians, unit clerks, blood bank technicians is critical to successful implementation. A first step toward designating a team is identifying a system or administrative leader who leads MAP-IT cycles; e.g., meetings held, data collected, assignments completed, monitoring occurred. The following is a sample draft form to document your team:

The Obstetric (OB) Hemorrhage System or Administrative Leader for our birthing facility is:
_____

The nurse leader is:_____

The physician leader is:_____

The members of the team that will work with the system/administrative, nurse, and physician leaders to improve readiness, recognition, response, and reporting are:

NAME	TITLE	eMAIL ADDRESS

Assess

STEP 2. ASSESS THE SITUATION

In order to identify and prioritize quality improvement needs and next steps, teams can use these and other tools and methods:

- **Fishbone Cause and Effect Diagrams:** A team analysis of how individual process "problem areas" interact as a "whole"(5-7)
- **Process Flowcharts**: A team analysis of the numerous steps needed to complete a process. For example, the number of tasks a nurse must perform in order to obtain emergency medications(5, 7)
- **Failure Modes and Effects Analysis (FMEA):** A systematic analysis of the potential ways in which a failure, e.g., delay in recognition of excessive treatment and delay in adequate treatment of a woman bleeding will occur. The FMEA includes classification by severity or the "effects" of the failure based on the "mode" or type of failure that could occur.(5)
- **Pareto Analysis and Diagrams:** A method to quantify and rank which of the identified opportunities for improvement are the most problematic. The Pareto Principle is the 80/20 rule, e.g., 80% of the failures are caused by only 20% of the processes.(5)

Examples of the Fishbone and Pareto tools are described below.

A. Fishbone Cause and Effect Diagrams:

Quality improvement begins by looking at the "Big Picture" then narrowing down the problem to specific tasks that are reasonable and achievable starting points for change. The fishbone diagram is a common tool for seeing both elements—the whole and its parts.(5) The head of the fish points to the project goal and six (or more) bones extend from the side to capture the inter-relationships between PEOPLE, PROCEDURES, EQUIPMENT, MATERIALS, ENVIRONMENT AND MISCELLANEOUS factors that contribute to the problem. Fishbone diagrams are a good way to get group feedback and insights into the root cause of a problem.

Example:

Use a Fishbone Diagram (Figures 2a, 2b) to identify areas for Quality Improvement using OB Hemorrhage Care Guidelines Checklist, starting with "Pre-Admission" and working through Stages of Hemorrhage to identify problems.

Diagrams can be as extensive and detailed as needed; alternately, diagrams can be drafted for each stage of hemorrhage; e.g., create one diagram that identifies processes of care surrounding Stage 1 Hemorrhage; create a second diagram that identifies processes of care surrounding Stage 2 Hemorrhage, etc.

First drafts can be simple, hand-written versions that are edited, honed and vetted within leadership teams and front line staff to finalize plans for changes.

Labor and Delivery leaders and staff identify processes of care in need of improvement by filling in the “fishbone diagram” based on a step-by-step review of the OB Hemorrhage Care Guidelines Checklist (Figures 2a, 2b). This approach is a useful framework to:

- Identify and define clinical roles and assignments of responsibility during each stage (People, Management)
- Identify medications—usage and dosage—during each stage of hemorrhage; assess that all Obstetric Services clinicians at all levels know and understand medications, usage and dosage (Materials, Process); assess availability and ease of access to critical medication supplies.
- Identify procedures, such as fundal massage, intrauterine balloon, B-Lynch suturing, quantification of blood loss during each stage of hemorrhage (Process, Materials, Equipment)
- Identify blood products and blood replacement during each stage of hemorrhage (Process, Equipment, Materials, Environment); identify availability and ease of access to these products and the supplies needed to administer them.
- Identify procedures for communication between all areas of obstetric care including, but not limited to, communications with the Blood Bank.

Figure 2a.

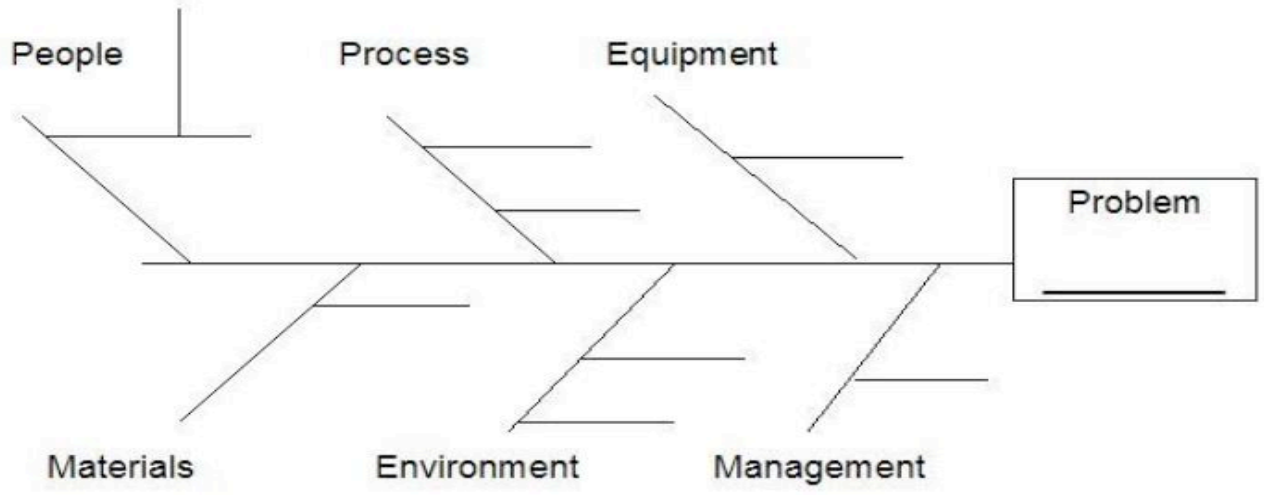
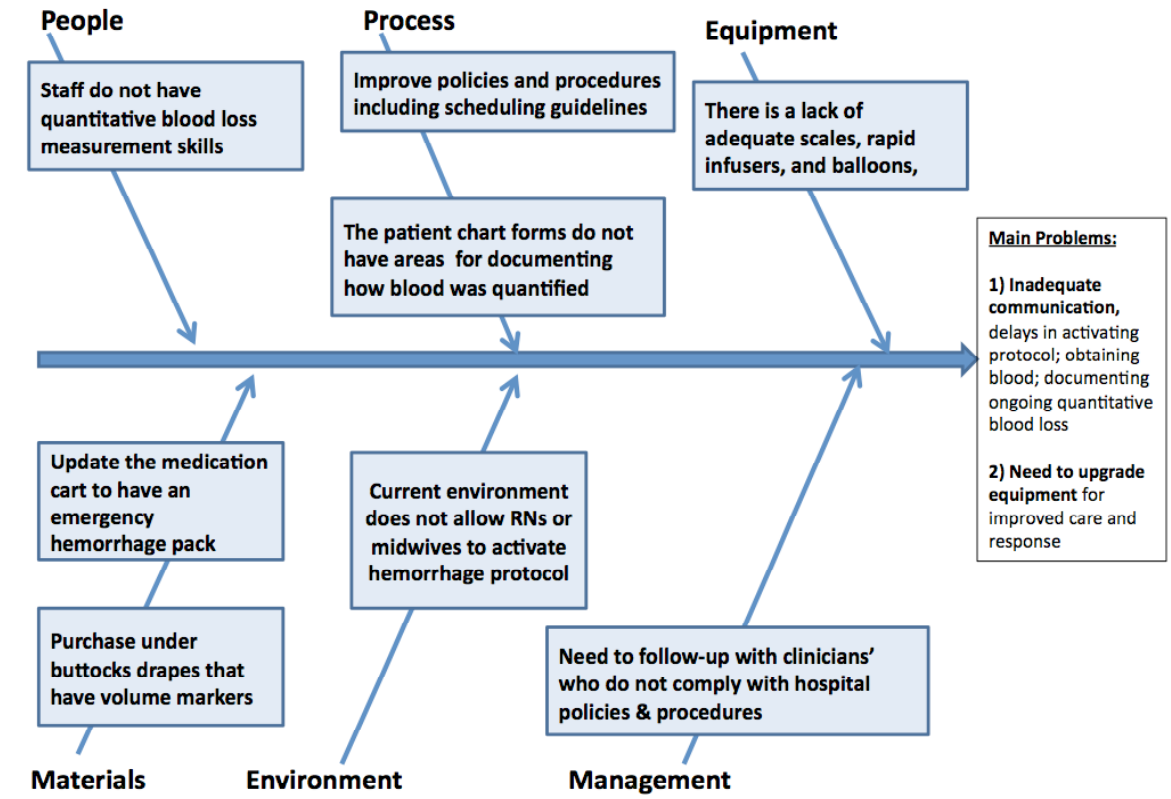


Figure 2b.



B. Pareto Analysis and Diagrams

Pareto analysis, developed by Italian economist Vilfredo Pareto, is a statistical technique in decision-making to select limited tasks that will have a significant overall effect. The technique is based on the "Pareto Principle" or the "80/20" rule, which states, in quality improvement terms, that most (80%) of the problems are caused by a few (20%) key causes. There are many applications of the Pareto Principal in quality control including the Pareto Diagram, a key tool in Six Sigma (Motorola's popular business management strategy).(5)

Example: *Use Pareto Analysis to create a Pareto Diagram (Figure 3) to identify areas for Quality Improvement using OB Hemorrhage Care Guidelines Checklist.*

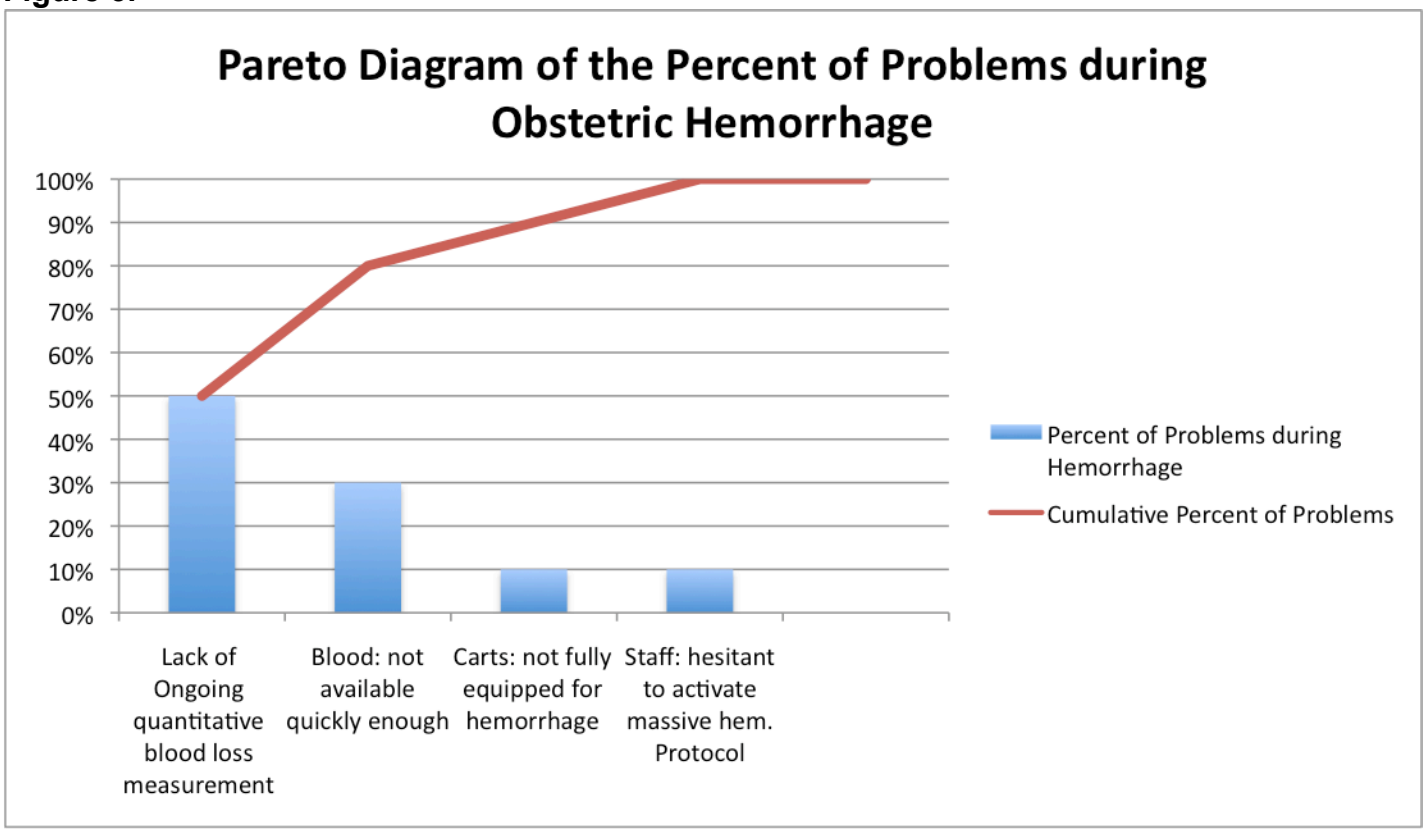
Use the following steps (8) for completing a Pareto Analysis:

- Form a table (e.g., in a spreadsheet program) listing key causes of quality problems and their frequency as a percentage.
- Arrange the rows in the decreasing order of importance of the causes, i.e. the most important problems first.
- Add a cumulative percentage column to the table.
- Plot with causes on x-axis and cumulative percentage on y-axis.
- Join the above points to form a curve.
- Plot (on the same graph) a bar graph with causes on x-axis and percent frequency on y-axis.

- Draw a line at 80% on y-axis parallel to x-axis. Then drop the line at the point of intersection with the curve on x-axis (not shown). This point on the x-axis separates higher priority problems on the left of the line; to the right of the line are problems to be addressed after the higher priority items.

Example:
Use Pareto Analysis to create a Pareto Diagram (Figure 3) to Identify areas for Quality Improvement using OB Hemorrhage Care Guidelines Checklist. Note that in this example, a line drawn on the y-axis at 80% and then dropped down to intersect with the x-axis would bisect the "Carts" bar. Lack of ongoing quantification of blood loss and delayed availability of blood products become the higher priority issues to be addressed, followed by equipping carts for hemorrhage and fostering education and empowerment for staff about activating a massive hemorrhage protocol.

Figure 3.



Plan

STEP 3. DEVELOP A PLAN TO MEET YOUR PROJECT AIMS

An essential component of a plan is to develop aims or project objectives. The aims or project objectives include the use of specific terms, numerical goals and a time frame or deadline. Teams should work toward consensus agreement for the aims for your facility and have a willingness to refocus and modify the aims as needed.

As an example, the following are aims of the first CMQCC Obstetric Hemorrhage Multi-Hospital Collaborative that began in October 2009 (Appendix E):

- **Aim 1:** Reduce the number of massive hemorrhages and the number of major complications from massive hemorrhage, including transfusions and hysterectomies, for all birthing women in participating hospitals by 75% by September 30, 2010.

- **Aim 2:** All collaborative participants develop and implement a multidisciplinary team response to every massive obstetric hemorrhage by September 30, 2010.

Complete a MAP-IT planning worksheet for your project (See Appendix F). The plan should focus on specific objectives that will help you achieve the overall aims of the project. Developing a plan for each objective facilitates communication and tracking of the project. The MAP-IT plan needs to be regularly reviewed and re-adjusted based on feedback obtained during the rapid cycles of change and small tests of improvement. In Appendix F is a sample of a completed MAP-IT Plan for the objective to quantify blood loss in order to recognize an obstetric hemorrhage.

Implement

STEP 4. IMPLEMENT STRATEGIES AND TACTICS TO MITIGATE BARRIERS

A. Implementation Strategies and Tactics

There are three broad types of implementation strategies the project team can utilize during implementation: 1) Education, 2) Data, and 3) Discourse or Communication

Within each strategy there are multiple implementation tactics that leaders can choose from. Tables 1, 2 and 3 below outline some specific strategies and tactics for improving obstetric hemorrhage practices.(9, 10)

Table 1. Examples of Implementation EDUCATION Tactics

Educational Tactics Examples	Definition and Examples Specific to OB Hemorrhage
Grand Rounds	*Physician educational sessions that are often held once a week.* • **Hold a multi-disciplinary Obstetric Hemorrhage grand rounds using the standard toolkit slide set** • **Make a copy of the slides and put them in a binder in L&D for all staff to review**
Classes or Conferences	*Formal educational sessions developed on specific topics.* • **Develop a class and skills station on quantification of blood loss – use hospital specific products**
Simulation Training	*Simulation training is education that allows clinicians to practice skills and knowledge through a fabricated situation that mimics a complicated situation that they will face and need to practice how to respond.* • **Organize and run multi-disciplinary drills that help teams learn to follow the CMQCC Obstetric Hemorrhage checklist so they have a more organized and systematic approach to hemorrhage** • **This strategy also helps teams uncover hidden systems problems within their facility and get teams excited about finding solutions.**
Competency Fairs, Tests, Learning Fairs, Return Demonstrations	*Clinicians demonstrate their knowledge of a new concept or demonstrate their ability to perform a clinical skill.* • **Develop methods of measuring and tracking competency of team members for the quantification of blood loss** • **Be creative and make learning fun**
On-Line Learning	*The use of the internet for the transfer of information.* • **Provide clinicians with information on how to log-in to CMQCC's website and have access to all of the CMQCC OB Hemorrhage resources: Table Chart, Check-list, Flow Chart, Compendium of Best Practices, and research articles**

Table 2. Examples of Implementation DATA Tactics

Examples of Data Tactics	Definition and Examples Specific to OB Hemorrhage
Audit and feedback (group and individual)	*An examination of clinical records in order to gather specific pre-determined information. The information gathered are summarized and shared with the relevant group or individuals.* • **Revise charting methods to track critical data** • **Develop a quality improvement data collection plan using audit tools (refer to Appendices E1-E5)** • **Develop a quality improvement measurement grid (refer to Appendix F)**
Public Release of Data	*Details of care patterns and outcomes are reported openly to the community in such a way that anyone can access this information.* • **Improve how obstetric hemorrhage is defined and coded to make it comparisons among hospitals more accurate**

*Adapted from Bingham D. Measuring and increasing the effectiveness of the quality improvement implementation change practices of front-line maternity physician and nurse leaders, The University of North Carolina at Chapel Hill, 2009, 316 pages; AAT 3352932.

Table 3. Examples of Implementation COMMUNICATION Tactics

Examples of Communication Tactics	Definition
Meetings	*Group discussions, e.g., staff meetings.* • **Regularly discuss the goals of the project and chart audit results at staff meetings and at other gatherings** • **Present project data to senior leadership at hospital wide meetings**
One-to-One Discussions	*A discussion between a change leader and someone else that they are seeking to influence to change.* • **Team members can promote the change by explaining the project goals during one-to-one discussions**
Debriefs	*A team discussion that takes place as soon as possible after an emergency as possible.* • ***Complete a debrief form for every stage 2 and 3 obstetric hemorrhage emergency (refer to Appendix E.5)***
Academic Detailing	*A review of relevant academic research by one leader meeting with one clinician at a time. A common tactic utilized by pharmaceutical representatives.*
Policy and Procedure	*A document utilized by a hospital to set and communicate clinical standards.* • **Update policies and procedures**
Reminders	*A method for helping someone remember to perform specific tasks, e.g., checklists, order set.* • **Have blood loss markings added to the pouch on the under buttocks drape**

Table 3. Examples of Implementation COMMUNICATION Tactics, *continued*

Examples of Communication Tactics	Definition
Newsletters	*A formal written update that is periodically distributed.*
Posters and Bulletin Boards	*A collection of data and information that are organized for display on poster board or a bulletin board.* • **Develop posters and post on the unit.**
Emails	*Electronic communications either one-to-one or by means of a "listserv" that is broadcast to many recipients.*
Rewards	*Something given in compensation for reaching a pre-determined goal, e.g., professional recognition, a bonus.* • **Make learning fun – have some contests on assessing quantification of blood loss**
Disciplinary Discussions	*A discussion that is held by someone in the position to give employee feedback and a formal review of performance in order to outline how current behavior do not meet required expectations of job performance.* • **Follow-up with individuals who refuse to adopt the new practice standards**

*Adapted from Bingham D. Measuring and increasing the effectiveness of the quality improvement implementation change practices of front-line maternity physician and nurse leaders, The University of North Carolina at Chapel Hill, 2009, 316 pages; AAT 3352932.

B. Potential Implementation Barriers

The most effective implementation plans include targetted strategies to mitigate potential and identified barriers. (10) Some types of barriers that have been identified are outlined in Table 4.

Table 4. Examples of Potential Implementation Barriers*

Leader Barriers	
Lack of Leader Knowledge to:	Design, plan, and implement Quality Improvement (QI)
	Perform QI data analysis
	Assess how to enhance their individual QI leadership abilities
Leader Attitudes (Beliefs and Assumptions) that Affect:	Topic selection
	QI topic goals
	Selection of QI implementation tactics
	Definitions of success
Leader Practices	Lack of clarity of QI project goals
	Backing down or stop trying
	Lack of time and other resources
	Inadequate practices to ensure sustainability, e.g., new hires, staff returning from vacation, leaves of absences
Clinician Barriers	
Lack of Clinician Knowledge:	About their own practices (lack adequate feedback)
	New or inexperienced
	Lack knowledge of the QI project
Clinician Attitudes (Beliefs and Assumptions):	Not persuaded to change
	Want autonomy
Clinician Practices:	Inertia – no motivation to change
	Forget
	Changes add more work or slow down usual work flow
Characteristics of the QI Project	
	Positive or negative effect(s) on clinician income or time
	Complexity of the QI project, e.g., how many groups' work flow is affected by the QI project changes
Implementation Climate/Culture	
	Type of hospital
	Amount of resources, e.g., workload, lack of organizational support for time or supplies needed to implement change
	Type of community or population of patients
	History of previous unsuccessful change attempts or minimal previous history of successful change attempts

*Adapted from Bingham D. Measuring and increasing the effectiveness of the quality improvement implementation change practices of front-line maternity physician and nurse leaders, The University of North Carolina at Chapel Hill, 2009, 316 pages; AAT 3352932.

Track

STEP 5. TRACK PROGRESS USING ESTABLISHED MEASURES

Essential components of measures include outcome, process and balance measures. When creating measures, teams should consider: What measures will be useful at your specific hospital based on your population of patients?

Below are some definitions of different types of measures.

- **Outcome Measures:** These measures tell you whether changes are actually leading to improvement – that is, helping to achieve the overall aim of reducing major complications of OB hemorrhage. Outcome measures answer questions like, "How many women had injuries?" and "How many women had markers that indicate potential morbidities (e.g., transfusions?"). Outcome measures can sometimes be collected from administrative data.

- **Process Measures:** To affect the outcome measures of reducing major complications of OB hemorrhage, changes will be made to improve many core processes in the care system, as well as changes to improve the culture as it relates to safety. We will want to know if the parts/steps in the system are performing as planned. Measuring the results of these process changes will tell you if the changes are leading to an improved, safer system.

- **Balancing Measures:** Measures to make sure that changes to improve one part of the system are not causing new problems in other parts of the system. Balancing measures can also help teams to draw reasonable conclusions about the sustainability of the changes.

CMQCC developed Obstetric Hemorrhage quality improvement measurements for a multi-hospital collaborative. These measures are outlined in Appendix G. Hospital leaders can choose which of these measures are critical for tracking progress and whether they are achieving their aims and objectives.

The tracking phase can also utilize the analysis tools outlined under the assessment phase.

Repeat the MAP-IT Process

Evaluating results early and often at each stage of implementation—before, during and after—will guide decision-making for small tests of change. Small tests of change done over a short time frame and reviewed frequently provide necessary feedback to the team leaders. The feedback will help leaders re-adjust the MAP-IT Plan appropriately.

APPENDICES

APPENDIX A. SAMPLE HEMORRHAGE POLICY AND PROCEDURE

Obstetric Hemorrhage Care Guidelines: Sample Policy and Procedure

POLICY INDEX: O	**Page 1 of X**
POLICY TITLE: Obstetric Hemorrhage Care Guidelines	
DEPARTMENT AND USERS DISTRIBUTION: Maternal Child Health, Labor and Delivery, Emergency Department, Operating Room, Blood Bank, Intensive Care Unit, Post-Anesthesia Care Unit(s)	

Original Date of Issue: _____

Reviewed Date						
Revised Date						

PURPOSE

The purpose of this protocol is to provide guidelines for the optimal response of the multidisciplinary team in the event of obstetric hemorrhage. This protocol will also aid in recognizing patients at risk for hemorrhage and identifying stages of hemorrhage and primary treatment goals.

POLICY STATEMENTS

Optimal response to obstetric hemorrhage requires the coordination of effort of team members from multiple disciplines and departments.

- Obstetric unit, anesthesia department, blood bank, operating room, and other appropriate services work together to identify necessary system supports and processes for mounting an efficient and coordinated response to obstetric hemorrhage.
- Obstetric physicians, obstetric RNs, certified nurse midwives, anesthesiologists, and other appropriately qualified clinicians are authorized to mobilize the team to respond to an obstetric hemorrhage.
- The OB hemorrhage critical pack/cart are always kept stocked, not expired, and available for an emergency in all areas of the hospital where women are treated for OB hemorrhage. Note: the assignments for stocking and checking the cart need to be clearly delineated by each hospital. For example: medications will be kept together in an emergency packet in the pharmacy cart on the unit; the emergency medication packet will be maintained by pharmacy; the adult resuscitation cart or a separate resuscitation cart will be designed with an OB hemorrhage supply component.
- The Obstetric (OB) Hemorrhage general and massive policies and procedures will be updated at least every three years.

DEFINITIONS

General Hemorrhage: ≥500 ml blood loss for vaginal birth; ≥1000 ml blood loss for cesarean birth
Massive Hemorrhage: ≥1500 ml blood loss for any birth

MONITORING

Perform annual assessment of readiness to respond to an obstetric hemorrhage.

SUMMARY OF STAGES OF OBSTETRIC HEMORRHAGE AND PRIMARY TREATMENT GOALS

Prenatal Screening and Treatment:

Risk assessment
Aggressive treatment of anemia
Risk appropriate blood work on admission

Stage 0: Prevention and Recognition of OB Hemorrhage in All Births
Active Management of Third Stage Labor
Ongoing Quantitative Evaluation of Blood Loss
Ongoing Evaluation of Vital Signs

Stage 1: Cumulative Blood Loss >500 ml vaginal birth or >1000 ml cesarean birth **–OR-**
Vital Signs>15% change or HR ≥110, BP ≤85/45, O_2 sat <95% **-OR-**
Increased bleeding during recovery or postpartum
ACTIVATE HEMORRHAGE PROTOCOL, INITIATE PREPARATIONS, GIVE METHERGINE IM ONCE; IF NO RESPOSE, MOVE TO PROSTAGLANDINS (HEMABATE, CYTOTEC) (See Uterotonic Agent Information Table; Addendum A)

Stage 2: Continued Bleeding or Vital Sign instability and 1000-1500 ml cumulative blood loss
SEQUENTIALLY ADVANCE THROUGH MEDICATIONS AND PROCEDURES;
MOBILIZE HELP & BLOOD BANK SUPPORT;
KEEP AHEAD WITH VOLUME AND BLOOD PRODUCTS

Stage 3: Cumulative Blood Loss >1500 ml, >2 units PRBCs given, Vital Signs unstable of suspicion for Disseminated Intravascular Coagulopathy
ACTIVATE MASSIVE TRANSFUSION PROTOCOL AND INVASIVE SURGICAL APPROACHES TO CONTROL BLEEDING

PROCEDURES

Prenatal, Admission and Ongoing Risk Assessment

- Identify and prepare for patients with special considerations: Placenta Preview/Accreta, Bleeding Disorder, or those who decline blood products
- Screen and aggressively treat severe anemia: if oral iron fails, initiate IV Iron Sucrose Protocol (Best Practice: Iron Sucrose Protocol) to reach desired Hgb/Hct, especially for at-risk mothers

Admission Assessment & Planning	
Verify Type & Antibody Screen from prenatal record ***If not available***, ☐Order Type & Screen (lab will notify if 2nd clot needed for confirmation) ***If prenatal or current antibody screen positive (if not low level anti-D from Rho-GAM)***, ☐Type & Crossmatch 2 units PRBCs ***All other patients***, ☐Send Clot to blood bank	Evaluate for ***Risk Factors*** (see below) ***If medium risk***: ☐Order Type & Screen ☐Review Hemorrhage Protocol ***If high risk:*** ☐Order Type & Crossmatch 2 units PRBCs ☐Review Hemorrhage Protocol ☐Notify OB Anesthesia ***Identify*** women who may decline transfusion ☐Notify OB provider for plan of care ☐Early consult with OB anesthesia ☐Review Consent Form

Ongoing Risk Assessment
☐**Evaluate for development of additional risk factors in labor**: • Prolonged 2nd Stage labor • Prolonged oxytocin use • Active bleeding • Chorioamnionitis • Magnesium sulfate treatment ☐**Increase Risk level** (see below) **and convert to Type & Screen or Type & Crossmatch** ☐**Treat multiple risk factors as High Risk**

Admission Hemorrhage Risk Factor Evaluation		
Low (Clot only)	**Medium (Type and Screen)**	**High (Type and Cross)**
No previous uterine incision	Prior cesarean birth(s) or uterine surgery	Placenta previa, low lying placenta,
Singleton pregnancy	Multiple gestation	Suspected placenta accreta or percreta
≤4 previous vaginal births	>4 previous vaginal births	Hematocrit <30 AND other risk factors
No known bleeding disorder	Chorioamnionitis	Platelets <100,000
No history of PPH	History of previous PPH	Active bleeding (greater than show) on admit
	Large uterine fibroids	Known coagulopathy
	Estimated fetal weight greater than 4 kg	
	Morbid obesity (BMI >35)	

**If admitted patients are started on magnesium sulfate they are at higher risk of postpartum hemorrhage.*

PROCEDURES, CONTINUED

STAGE 0
Prevention & Recognition of Hemorrhage during all births

Active Management of Third Stage of Labor

1. Administer Oxytocin infusion: 10-20 Units/1000 ml solution for women with IV access. Note that the dosage and rates should be clearly specified by each hospital.
    a. Titrate infusion rate to uterine tone.
    b. Use 10 units IM for women without IV access.
    c. **Do not give oxytocin as IV push**
2. Provide vigorous fundal massage for at least 15 seconds

Ongoing Quantitative Measurement of Blood Loss at all Births

1. Assess blood loss at birth, prior to delivery of the placenta whenever possible.
2. Reassess cumulative blood loss after delivery of the placenta
3. Use formal methods to assess blood loss:
    a. Use graduated under-buttock drapes
    b. Weigh blood soaked materials on gram scale (1 gm = 1ml)
        i. Subtract known dry weight of materials
        ii. Use a hemorrhage report or Early Warning Chart (National Health Survey, NHS)

**NOTE: if a dry chux is used to protect scale from blood-soaked material, ZERO the scale after placing dry chux and prior to placing saturated item(s).*

Ongoing Evaluation of Vital Signs and Clinical Triggers

STAGE 1
Cumulative Blood Loss >500 ml vaginal birth or >1000 ml C/S -OR- Vital Signs >15% change or HR ≥110, BP ≤85/45, O2 sat <95% -OR- Increased bleeding during recovery or postpartum

Interventions:
Follow Obstetric hemorrhage care guidelines checklist to mobilize response, act to mitigate bleeding, and move sequentially through treatment.

Evaluate patient response to interventions:
1. If the patient is stable following Stage 1 interventions then perform increased postpartum surveillance.

STAGE 2

Proceed to STAGE 2 *for any of the following* when cumulative blood loss is <1500 mL:

1. Continued bleeding
2. Continued vital sign instability

Evaluate patient response to interventions:

1. If stabilized during Stage 2 (<1500 ml cumulative blood loss) then perform increased postpartum surveillance

STAGE 3

Proceed to STAGE 3 if cumulative blood loss >1500 mL OR:

1. >2 units PRBCs administered
2. Unstable vital signs after stage 2 interventions
3. Suspicion of DIC

Evaluate patient response to interventions:

1. If stabilized during Stage 3 (cumulative blood loss >1500 ml) then perform increased postpartum surveillance, consult with intensivist and/or transfer to ICU

Do not delay other interventions while waiting for response to medication(s).

Do not wait for laboratory values to initiate transfusions:

1. Transfuse based on clinical signs and patient response.
2. Transfuse aggressively with a high ratio of Fresh Frozen Plasma to PRBCs for massive hemorrhage (>1500 mL cumulative blood loss); key is high ratio of FFP to PRBC
    - Either 6:4:1 PRBCs:FFP:Platelets
    - Or 4:4:1 PRBCs:FFP:Platelets

COMMUNICATION and DOCUMENTATION

1. Verbally acknowledge actions you will take and orders received.
2. Provide ongoing updates about patient's status with other departments.
3. Record intake and output records.

REFERENCES and RELATED DOCUMENTS:

CMQCC Obstetric Hemorrhage Tool-Kit, April 2009, www.cmqcc.org.

1. CMQCC OB Hemorrhage Task Force: Care Guidelines and Compendium of Best Practices, OB Hemorrhage Care Guidelines Checklist: use the checklist to help think through possible etiologies and anticipate next steps and to identify Risk Factors: Prenatal, Admission and Ongoing Assessment
2. Lyndon, A., et al, Ongoing Quantitative Measurement of Blood Loss at all births
3. Casper, L., Lee, R., Carts, Kits and Trays
4. Gregory, K., et al, Definitions, Early Recognition, and Rapid Response Using Triggers

Addendum A

UTEROTONIC AGENTS for POSTPARTUM HEMORRHAGE						
Drug	**Dose**	**Route**	**Frequency**	**Side Effects**	**Contraindications**	**Storage**
Pitocin® (Oxytocin) 10 units/ml	10-40 units per 1000 ml, rate titrated to uterine tone	IV infusion	Continuous	Usually none Nausea, vomiting, hyponatremia ("water intoxication") with prolonged IV admin. ↓ BP and ↑ HR with high doses, esp IV push	Hypersensitivity to drug	Room temp
Methergine® (Methylergonivine) 0.2mg/ml	0.2 mg	IM (**not** given IV)	-Q 2-4 hours -If no response after first dose, it is unlikely that additional doses will be of benefit	Nausea, vomiting Severe hypertension, esp. with rapid administration or in patients with HTN or PIH	Hypertension, PIH, Heart disease Hypersensitivity to drug **Caution** if multiple doses of ephedrine have been used, may exaggerate hypertensive response w/possible cerebral hemorrhage	Refrigerate Protect from light
Hemabate® (15-methyl PG F2a) 250mcg/ml	250 mcg	IM or intra-myometrial (**not** given IV)	-Q 15-90 min -Not to exceed 8 doses/24 hrs -If no response after several doses, it is unlikely that additional doses will be of benefit.	Nausea, vomiting, Diarrhea Fever (transient), Headache Chills, shivering Hypertension Bronchospasm	Caution in women with hepatic disease, asthma, hypertension, active cardiac or pulmonary disease Hypersensitivity to drug	Refrigerate
Cytotec® (Misoprostol) 100 or 200mcg tablets	800-1000mcg	Per rectum (PR)	One time	Nausea, vomiting, diarrhea Shivering, Fever (transient) Headache	Rare Known allergy to prostaglandin Hypersensitivity to drug	Room temp

APPENDIX B: CMQCC OB HEMORRHAGE CARE GUIDELINES CHECKLIST

CMQCC CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

Obstetric Hemorrhage Care Guidelines: Checklist Format

version 1.4

Prenatal Assessment & Planning

☐**Identify and prepare for patients with special considerations:** Placenta Previa/Accreta, Bleeding Disorder, or those who Decline Blood Products

☐**Screen and aggressively treat severe anemia:** if oral iron fails, initiate IV Iron Sucrose Protocol to reach desired Hgb/Hct, especially for at risk mothers.

Admission Assessment & Planning

Verify Type & Antibody Screen from prenatal record
- ***If not available***,
  - ☐Order Type & Screen (lab will notify if 2nd clot needed for confirmation)
- ***If prenatal or current antibody screen positive (if not low level anti-D from Rho-GAM)***,
  - ☐Type & Crossmatch 2 units PRBCs
- ***All other patients***,
  - ☐Send Clot to blood bank

Evaluate for ***Risk Factors*** (see below)
- ***If medium risk***:
  - ☐Order Type & Screen
  - ☐Review Hemorrhage Protocol
- ***If high risk:***
  - ☐Order Type & Crossmatch 2 units PRBCs
  - ☐Review Hemorrhage Protocol
  - ☐Notify OB Anesthesia
- ***Identify*** women who may decline transfusion
  - ☐Notify OB provider for plan of care
  - ☐Early consult with OB anesthesia
  - ☐Review Consent Form

Ongoing Risk Assessment

☐**Evaluate for development of additional risk factors in labor**:
- Prolonged 2nd Stage labor
- Prolonged oxytocin use
- Active bleeding
- Chorioamnionitis
- Magnesium sulfate treatment

☐**Increase Risk level** (see below) **and convert to Type & Screen or Type & Crossmatch**

☐**Treat multiple risk factors as High Risk**

Admission Hemorrhage Risk Factor Evaluation

Low (Clot only)	**Medium** (Type and Screen)	**High** (Type and Crossmatch)
No previous uterine incision	Prior cesarean birth(s) or uterine surgery	Placenta previa, low lying placenta
Singleton pregnancy	Multiple gestation	Suspected Placenta accreta or percreta
≤4 previous vaginal births	>4 previous vaginal births	Hematocrit <30 AND other risk factors
No known bleeding disorder	Chorioamnionitis	Platelets <100,000
No history of PPH	History of previous PPH	Active bleeding (greater than show) on admit
	Large uterine fibroids	Known coagulopathy
	Estimated fetal weight greater than 4 kg	
	Morbid obesity (BMI >35)	

STAGE 0: All Births: Prevention & Recognition of OB Hemorrhage

Active Management of Third Stage
- ☐ Oxytocin infusion: 10-20 units oxytocin/1000ml solution titrate infusion rate to uterine tone; or 10 units IM; do not give oxytocin as IV push
- ☐ Vigorous **fundal** massage for at least 15 seconds

Ongoing Quantitative Evaluation of Blood Loss
- ☐ Using formal methods, such as graduated containers, visual comparisons and weight of blood soaked materials (**1gm = 1ml**)

Ongoing Evaluation of Vital Signs

If: Cumulative Blood Loss >500ml vaginal birth or >1000ml C/S -OR-
Vital signs >15% change or HR ≥110, BP ≤85/45, O2 sat <95% -OR-
Increased bleeding during recovery or postpartum,
proceed to STAGE 1

California Maternal Quality Care Collaborative (CMQCC): Hemorrhage Taskforce (2009) visit: www.CMQCC.org for details
This project was supported by Title V funds received from the State of California Department of Public Health, Center for Family Health: Maternal Child and Adolescent Health Division

APPENDIX B: CHECKLIST, continued

STAGE 1: OB Hemorrhage

Cumulative Blood Loss >500ml vaginal birth or >1000ml C/S -OR-
Vital signs >15% change or HR ≥110, BP ≤85/45, O2 sat <95% -OR-
Increased bleeding during recovery or postpartum

MOBILIZE	ACT	THINK
Primary nurse, **Physician or Midwife** to: ☐ Activate OB Hemorrhage Protocol and Checklist **Primary nurse** to: ☐ Notify obstetrician (in-house and attending) ☐ Notify charge nurse ☐ Notify anesthesiologist	**Primary nurse**: ☐ Establish IV access if not present, at least 18 gauge Increase IV fluids rates (Lactated Ringers preferred) and increase Oxytocin rate (500 mL/hour of 10-40 units/1000mL solution); Titrate Oxytocin infusion rate to uterine tone ☐ Continue vigorous fundal massage ☐ Administer Methergine 0.2 mg IM per protocol (if not hypertensive); give once, if no response, move to alternate agent; if good response, may give additional doses q 2 hr ☐ Vital Signs, including O2 sat & level of consciousness (LOC) q 5 minutes ☐ Weigh materials, calculate and **record** cumulative blood loss q 5-15 minutes ☐ Administer oxygen to maintain O2 sats at >95% ☐ Empty bladder: straight cath or place Foley with urimeter ☐ Type and Crossmatch for 2 units Red Blood Cells STAT (if not already done) ☐ Keep patient warm **Physician or midwife:** ☐ Rule out retained Products of Conception, laceration, hematoma **Surgeon (if cesarean birth and still open)** ☐ Inspect for uncontrolled bleeding at all levels, esp. broad ligament, posterior uterus, and retained placenta	Consider potential etiology: • Uterine atony • Trauma/Laceration • Retained placenta • Amniotic Fluid Embolism • Uterine Inversion • Coagulopathy • Placenta Accreta • Uterine Rupture **Once stabilized:** Modified Postpartum management with increased surveillance

If: Continued bleeding or Continued Vital Sign instability, and <1500 mL cumulative blood loss proceed to STAGE 2

UTEROTONIC AGENTS for POSTPARTUM HEMORRHAGE

Drug	Dose	Route	Frequency	Side Effects	Contraindications	Storage
Pitocin® (Oxytocin) 10 units/ml	10-40 units per 1000 ml, rate titrated to uterine tone	IV infusion	Continuous	Usually none Nausea, vomiting, hyponatremia ("water intoxication") with prolonged IV admin. ↓ BP and ↑ HR with high doses, esp IV push	Hypersensitivity to drug	Room temp
Methergine® (Methylergonivine) 0.2mg/ml	0.2 mg	IM (**not** given IV)	-Q 2-4 hours -If no response after first dose, it is unlikely that additional doses will be of benefit	Nausea, vomiting Severe hypertension, esp. with rapid administration or in patients with HTN or PIH	Hypertension, PIH, Heart disease Hypersensitivity to drug **Caution** if multiple doses of ephedrine have been used, may exaggerate hypertensive response w/possible cerebral hemorrhage	Refrigerate Protect from light
Hemabate® (15-methyl PG F2a) 250mcg/ml	250 mcg	IM or intra-myometrial (**not** given IV)	-Q 15-90 min -Not to exceed 8 doses/24 hrs -If no response after 3 doses, it is unlikely that additional doses will be of benefit.	Nausea, vomiting, Diarrhea Fever (transient), Headache Chills, shivering Hypertension Bronchospasm	Caution in women with hepatic disease, asthma, hypertension, active cardiac or pulmonary disease Hypersensitivity to drug	Refrigerate
Cytotec® (Misoprostol) 100 or 200mcg tablets	800-1000mcg	Per rectum (PR)	One time	Nausea, vomiting, diarrhea Shivering, Fever (transient) Headache	Rare Known allergy to prostaglandin Hypersensitivity to drug	Room temp

California Maternal Quality Care Collaborative (CMQCC): Hemorrhage Taskforce (2009) visit: www.CMQCC.org for details

APPENDIX B: CHECKLIST, continued

STAGE 2: OB Hemorrhage

Continued bleeding or Vital Sign instability, and <1500 mL cumulative blood loss

MOBILIZE	ACT	THINK
Primary nurse (or charge nurse): ☐ Call obstetrician to bedside ☐ Call Anesthesiologist ☐ Activate Response Team: **PHONE #:**_____ ☐ Notify Blood bank of hemorrhage; order products as directed **Charge nurse:** ☐ Notify Perinatologist or 2nd OB ☐ Initiate OB Hemorrhage Record ☐ If selective embolization, call-in Interventional Radiology Team and second anesthesiologist ☐ Notify nursing supervisor ☐ Assign single person to communicate with blood bank ☐ Call medical social worker or assign other family support person	**Team leader** (OB physician): ☐ Additional uterotonic medication: Hemabate 250 mcg IM [if not contraindicated] **OR** Misoprostol 800-1000 mcg PR ○ Can repeat Hemabate up to 3 times every 20 min; (note-75% respond to first dose) **Do not delay other interventions (see right column) while waiting for response to medications** ☐ Bimanual uterine massage ☐ Move to OR (if on postpartum unit, move to L&D or OR) ☐ Order 2 units PRBCs and bring to the bedside ☐ Order labs STAT (CBC/Plts, Chem 12, PT/aPTT, Fibrinogen, ABG) ☐ **Transfuse PRBCs based on clinical signs** and response, **do not wait** for lab results **Primary nurse**: ☐ Establish 2nd large bore IV, at least 18 gauge. Maintain adequate fluid volume with Lactated Ringers and adequate uterine tone with oxytocin infusion ☐ Assess and announce Vital Signs and cumulative blood loss q 5-10 minutes ☐ Set up blood administration set and blood warmer for transfusion ☐ Administer meds, blood products and draw labs, as ordered ☐ Keep patient warm **Second nurse** (or charge nurse): ☐ Place Foley with urimeter (if not already done) ☐ Obtain portable light and OB procedure tray or Hemorrhage cart ☐ Obtain blood products from the Blood Bank ☐ Assist with move to OR (if indicated) **Blood Bank:** ☐ Determine availability of thawed plasma, fresh frozen plasma, and platelets; initiate delivery of platelets if not present on-site ☐ Consider thawing 2 FFP (takes 30 min), use if transfusing >2 units PRBCs ☐ Prepare for possibility of massive hemorrhage	**Sequentially advance through procedures** and other interventions based on etiology: **Vaginal birth** If **trauma (vaginal, cervical or uterine):** • Visualize and repair If **retained placenta**: • D&C If **uterine atony** or lower uterine segment bleeding: • Intrauterine Balloon If **above measures unproductive:** • Selective embolization (Interventional Radiology if available & adequate experience) **C-section**: • Uterine hemostatic suture, e.g.,B-Lynch Suture, O'Leary, Multiple Squares • Intrauterine Balloon If **Uterine Inversion**: • Anesthesia and uterine relaxation drugs for manual reduction If **Amniotic Fluid Embolism**: • Maximally aggressive respiratory, vasopressor and blood product support If **vital signs are worse than estimated or measured blood loss**: possible uterine rupture or broad ligament tear with internal bleeding; **move to laparotomy** **Once stabilized:** Modified Postpartum management with increased surveillance

Re-Evaluate Bleeding and Vital Signs
If cumulative blood loss >1500ml, >2 units PRBCs given, VS unstable or suspicion for DIC, proceed to STAGE 3

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This project was supported by Title V funds received from the State of California Department of Public Health, Center for Family Health; Maternal Child and Adolescent Health Division

APPENDIX B: CHECKLIST, continued

STAGE 3: OB Hemorrhage

Cumulative blood loss >1500ml, >2 units PRBCs given, VS unstable or suspicion for DIC

MOBILIZE	ACT	THINK
Nurse or Physician: ☐ Activate Massive Hemorrhage Protocol **PHONE #:_____** **Charge Nurse or designee:** ☐ Notify advanced Gyn surgeon (e.g. Gyn Oncologist) ☐ Notify adult intensivist ☐ Call-in second anesthesiologist ☐ Call-in OR staff ☐ Reassign staff as needed ☐ Call-in supervisor, CNS, or manager ☐ Continue OB Hemorrhage Record (In OR, anesthesiologist will assess and document VS) ☐ If transfer considered, notify ICU **Blood Bank:** ☐ Prepare to issue additional blood products as needed – **stay ahead**	**Establish team leadership and assign roles** **Team leader** (OB physician + OB anesthesiologist, anesthesiologist and/or perinatologist and/or intensivist): ☐ **Order Massive Hemorrhage Pack** (RBCs + FFP + 1 pheresis pack PLTS—see note in right column ☐ **Move to OR** if not already there ☐ Repeat CBC/PLTS, Chem 12, PT/aPTT, Fibrinogen, ABG STAT q 30-60 min **Anesthesiologist** (as indicated): ☐ Arterial blood gases ☐ Central hemodynamic monitoring ☐ CVP or PA line ☐ Arterial line ☐ Vasopressor support ☐ Intubation **Primary nurse:** ☐ Announce VS and cumulative measured blood loss q 5-10 minutes ☐ Apply upper body warming blanket if feasible ☐ Use fluid warmer and/or rapid infuser for fluid & blood product administration ☐ Apply sequential compression stockings to lower extremities ☐ Circulate in OR **Second nurse and/or anesthesiologist:** ☐ Continue to administer meds, blood products and draw labs, as ordered **Third Nurse (or charge nurse):** ☐ Recorder	• **Selective Embolization (IR)** • **Interventions based on etiology not yet completed** • **Prevent hypothermia, Acidemia** **Conservative or Definitive Surgery:** • Uterine Artery Ligation • Hysterectomy **For Resuscitation:** **Aggressively Transfuse** **Based on Vital Signs, Blood Loss** **KEY: HIGH RATIO of FFP to RBC** **Either: 6:4:1 PRBCs: FFP: Platelets** **Or: 4:4:1 PRBCs: FFP: Platelets** **Unresponsive Coagulopathy:** • After 8-10 units PRBCs and coagulation factor replacement may consider risk/benefit of rFactor VIIa **Once Stabilized:** Modified Postpartum Management; consider ICU

BLOOD PRODUCTS

Packed Red Blood Cells (PRBC) *(approx. 35-40 min. for crossmatch—assuming no sample is in the lab and assuming no antibodies are present)* Transfuse O Negative blood if you cannot wait	Best first-line product for blood loss 1 unit = 450ml volume If antibody positive, may take 1-24 hrs. for crossmatch 1 unit=450 ml volume and typically increases Hct by 3%
Fresh Frozen Plasma (FFP) *(approx. 35-45 min. to thaw for release)*	Highly desired if >2 units PRBCs given, or for prolonged PT, aPTT >1.5x control 1 unit = 180ml volume and typically increases Fibrinogen by 10mg/dL
Platelets (PLTS) *Local variation in time to release (may need to come from regional blood bank)*	Priority for women with Platelets <50,000 Single-donor Apheresis unit (= 6 units of platelet concentrates) provides 40-50k transient increase in platelets
Cryoprecipitate (CRYO) *(approx. 35-45 min. to thaw for release)*	Priority for women with Fibrinogen levels <80 10 unit pack typically raises Fibrinogen 80-100mg/dL Best for DIC with low fibrinogen and don't need volume replacement Caution: 10 units come from 10 different donors, so infection risk is proportionate.

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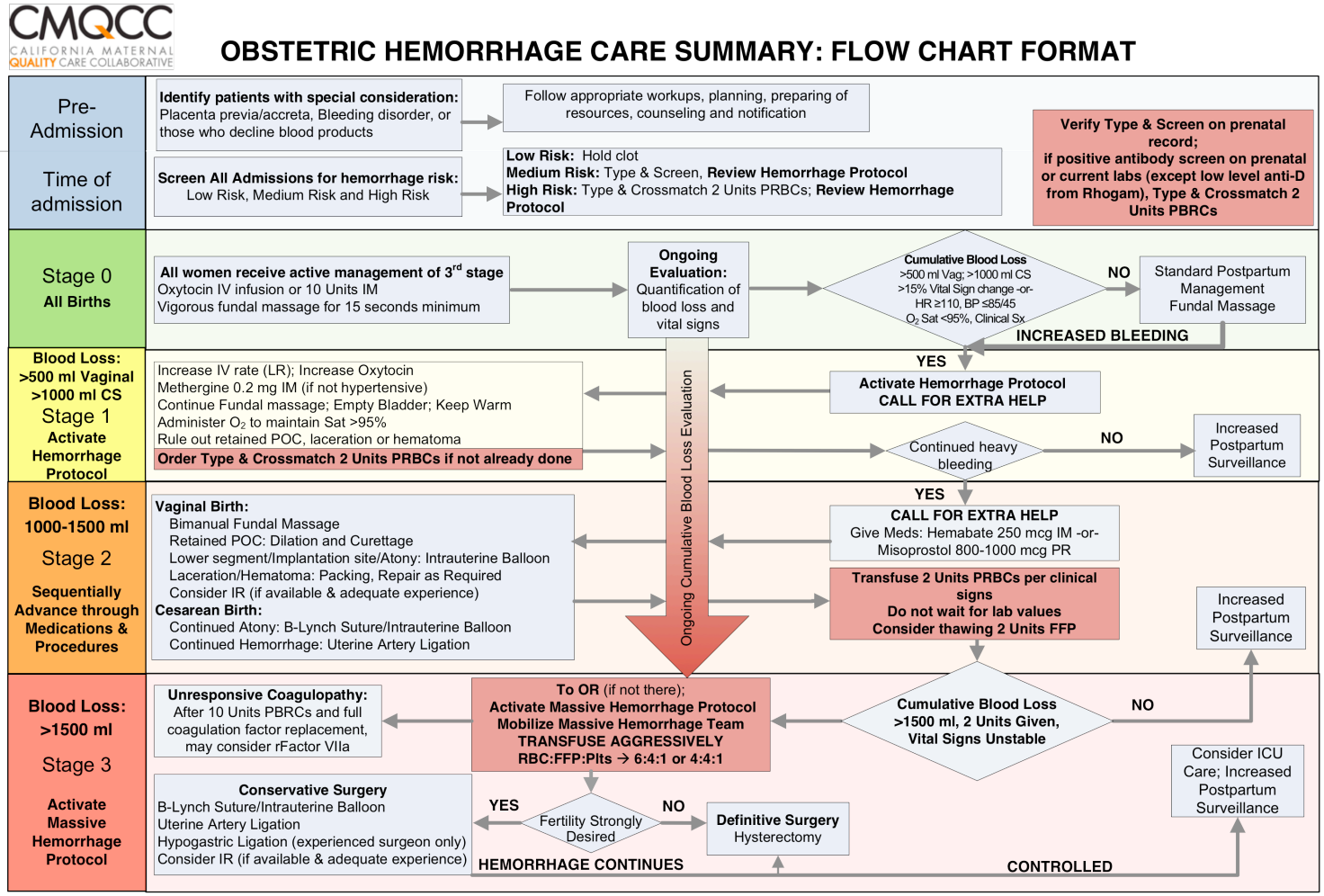
APPENDIX C. CMQCC OBHEMORRHAGE CARE GUIDELINES FLOW CHART



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APPENDIX D. CMQCC OB HEMORRHAGE CARE GUIDELINES TABLE CHART

CMQCC CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

Obstetric Hemorrhage Care Summary: Table Chart Format version 1.4

	Assessments	Meds/Procedures	Blood Bank
Stage 0	**Every woman in labor/giving birth**		
Stage 0 focuses on risk assessment and active management of the third stage.	• Assess every woman for **risk factors** for hemorrhage • **Ongoing quantitative evaluation of blood loss** on every birth	**Active Management 3rd Stage:** • **Oxytocin** IV infusion or 10u IM • **Fundal Massage**- vigorous, 15 seconds min.	• If **Medium Risk:**T&Scr • If **High Risk:** T&C 2 U • If **Positive Antibody Screen** (prenatal or current, exclude low level anti-D from RhoGam):T&C 2 U
Stage 1	**Blood loss: >500 ml vaginal or >1000 ml Cesarean, or VS changes (by >15% or HR ≥110, BP ≤85/45, O2 sat <95%)**		
Stage 1 is short: activate hemorrhage protocol, initiate preparations and give Methergine IM.	• Activate OB Hemorrhage Protocol and Checklist • Notify Charge nurse, Anesthesia Provider • VS, O2 Sat q5' • Calculate **cumulative** blood loss q5-15' • **Weigh** bloody materials • Careful inspection with good exposure of vaginal walls, cervix, uterine cavity, placenta	• **IV Access:** at least 18gauge • Increase IV fluid (LR) and **Oxytocin** rate, and repeat **fundal massage** • **Methergine** 0.2mg IM (if not hypertensive) May repeat if good response to first dose, BUT otherwise **move on** to 2nd level uterotonic drug (see below) • Empty bladder: straight cath or place foley with urimeter	• **T&C 2 Units PRBCs** (if not already done)
Stage 2	**Continued bleeding with total blood loss under 1500ml**		
Stage 2 is focused on sequentially advancing through medications and procedures, mobilizing help and Blood Bank support, and keeping ahead with volume and blood products.	**OB back to bedside** (if not already there) • **Extra help**: 2nd OB, Rapid Response Team (per hospital), assign roles • VS & **cumulative** blood loss q 5-10 min • Weigh bloody materials • **Complete evaluation** of vaginal wall, cervix, placenta, uterine cavity • Send additional labs, including DIC panel • If in Postpartum: Move to L&D/OR • Evaluate for special cases: -Uterine Inversion -Amn. Fluid Embolism	**2nd Level Uterotonic Drugs:** • **Hemabate** 250 mcg IM or • **Misoprostol** 800-1000 mcg PR **2nd IV Access** (at least 18gauge) Bimanual massage **Vaginal Birth:** (typical order) • Move to OR • Repair any tears • D&C: r/o retained placenta • Place intrauterine balloon • Selective Embolization (Interventional Radiology) **Cesarean Birth:** (still intra-op) (typical order) • Inspect broad lig, posterior uterus and retained placenta • B-Lynch Suture • Place intrauterine balloon	• **Notify Blood Bank of OB Hemorrhage** • **Bring 2 Units PRBCs to bedside, transfuse per clinical signs – do not wait for lab values** • Use blood warmer for transfusion • Consider thawing 2 FFP (takes 35+min), use if transfusing >2u PRBCs • Determine availability of additional RBCs and other Coag products
Stage 3	**Total blood loss over 1500ml, or >2 units PRBCs given or VS unstable or suspicion of DIC**		
Stage 3 is focused on the Massive Transfusion protocol and invasive surgical approaches for control of bleeding.	• **Mobilize team** -Advanced GYN surgeon -2nd Anesthesia Provider -OR staff -Adult Intensivist • **Repeat labs** including coags and ABG's • 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 -Sequential compression stockings	**Transfuse Aggressively** Massive Hemorrhage Pack • Near 1:1 PRBC:FFP • 1 PLT pheresis pack per 6units PRBCs **Unresponsive Coagulopathy:** After 10 units PRBCs and full coagulation factor replacement: may consider **rFactor VIIa**

California Maternal Quality Care Collaborative (CMQCC): Hemorrhage Taskforce (2009) visit: www.CMQCC.org for details

This Project was supported by Title V funds received from the State of California, Department of Public Health, Center for Family Health; Maternal, Child and Adolescent Health Division

APPENDIX E. CMQCC OBSTETRIC HEMORRHAGE QUALITY IMPROVEMENT COLLABORATIVE

CMQCC initiated a statewide Obstetric Hemorrhage Quality Improvement (QI) Collaborative in October 2009. The OB Hemorrhage QI Collaborative is using the Institute for Healthcare Improvement (IHI) Breakthrough Series Model for Improvement, which includes intensive expert and peer mentoring. The Expert Panel, with input from the collaborating hospitals, developed specific goals or aims for the 12-month initiative. The aims guided the development of measures that assess improvement over the life of the collaborative and beyond.

Aims and measures from this Collaborative are presented as a guide, but can be changed to meet facilities' needs.

Refer to the appendix for checklists, flowcharts, audit tools and additional documents to use during implementation and change.

APPENDIX E.1. CMQCC IN HOSPITAL AUDIT TOOL: RISK ASSESSMENT FOR OB HEMORRHAGE

Topic: Risk Assessment for obstetric hemorrhage is documented in the chart at admission.
Goal: 100% of women are assessed for risk of obstetric hemorrhage on admission by [date].
Instructions: Audit 20 *randomly selected* charts per month (10 Vaginal, 10 cesarean).

Risk Assessment is documented in the chart	MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery	
	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐
Risk Assessment is documented in the chart	MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery	
	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐
Risk Assessment is documented in the chart	MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery	
	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐
Risk Assessment is documented in the chart	MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery		MR# ☐Vaginal Delivery ☐ Cesarean Delivery	
	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐	Yes ☐	No ☐

Total number of audited charts with:
Numerator: ________ Risk Assessment Documented in Chart
Denominator: _________Total Number of Charts Audited

APPENDIX E.2. CMQCC IN HOSPITAL AUDIT TOOL: ACTIVE MANAGEMENT OF THIRD STAGE LABOR

Topic: Active Management of Third Stage Labor* is documented in the chart at admission.
Goal: 100% of women are assessed for risk of obstetric hemorrhage on admission by [date].
Instructions: Audit 20 _randomly selected_ charts per month (10 Vaginal, 10 cesarean). Select “All are recorded” check box ***only if all 3 elements*** of Active Management* were documented in the chart.

*Active Management of Third Stage Labor is defined as including ALL of the following:

1. Oxytocin (IV or IM) at delivery of shoulders or delivery of placenta (identify when administered)
2. Fundal Massage for 15 seconds minimum
3. Gentle Cord Traction

MR# ☐Vaginal Delivery ☐ Cesarean Delivery	MR# ☐Vaginal Delivery ☐ Cesarean Delivery	MR# ☐Vaginal Delivery ☐ Cesarean Delivery	MR# ☐Vaginal Delivery ☐ Cesarean Delivery	MR# ☐Vaginal Delivery ☐ Cesarean Delivery
☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction	☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction	☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction	☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction	☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction
MR# ☐Vaginal Delivery ☐ Cesarean Delivery	MR# ☐Vaginal Delivery ☐ Cesarean Delivery	MR# ☐Vaginal Delivery ☐ Cesarean Delivery	MR# ☐Vaginal Delivery ☐ Cesarean Delivery	MR# ☐Vaginal Delivery ☐ Cesarean Delivery
☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction	☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction	☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction	☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction	☐ ALL are recorded (check if Yes): • Oxytocin IV/IM *Administered at delivery of (check one):* ☐ Shoulders -OR- ☐ Placenta • Fundal Massage (≥ 15 sec) • Cord Traction

Total number of audited charts with:
Numerator: ___________***All 3 elements of*** Active Management of Third Stage Labor Documented in Chart
Denominator: _________Total Number of Charts Audited

APPENDIX E.3. METHODS FOR DEVELOPING TRAINING AND TOOLS FOR QUANTITATIVE MEASUREMENT OF BLOOD LOSS

Recommended methods for ongoing quantitative measurement of blood loss:

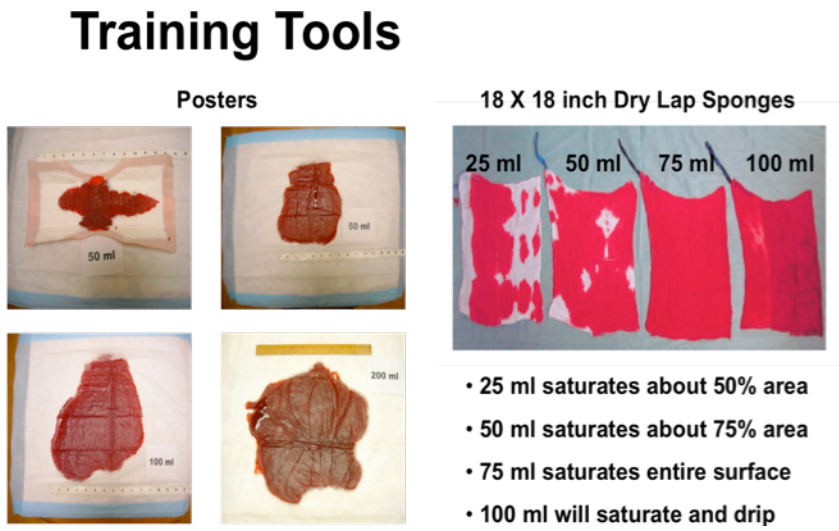
1. Formally estimate blood loss by recording percent (%) saturation of blood soaked items with the use of visual cues such as pictures/posters to determine blood volume equivalence of saturated/blood soaked pads, chux, etc.
2. Formally measure blood loss by weighing blood soaked pads/chux
3. Formally measure blood loss by collecting blood in graduated measurement containers

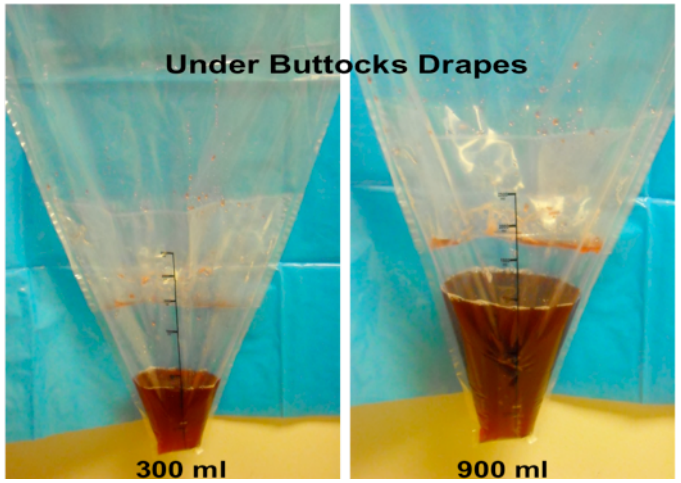
Quantifying blood loss by weighing (see images at right and below)

- Establish dry weights of common items
- Standardize use of pads
- Build weighing of pads into routine practice
- Develop worksheet for calculations

Quantifying blood loss by measuring (see image below right)

- Use graduated collection containers (C/S and vaginal deliveries)
- Account for other fluids (amniotic fluid, urine, irrigation)





Used with kind permission of Bev VanderWal, CNS

APPENDIX E.4. CMQCC IN HOSPITAL AUDIT TOOL: CUMULATIVE BLOOD LOSS AND QUANTITATIVE MEASUREMENT METHODS

CMQCC CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

QI Chart Review Data Collected by:________________________ **Date Collected: _______**

IN HOSPITAL AUDIT TOOL: CUMULATIVE BLOOD LOSS AND QUANTITATIVE MEASUREMENT METHODS

Topic: Cumulative blood loss is recorded in patient chart (in mls) during labor and delivery, until status is routine postpartum and patient is physiologically stable.
Goal: 100% of birthing mothers have on-going cumulative quantification of blood loss by September 30, 2010.
Instructions: Audit 20 *randomly selected* charts per month (10 Vaginal, 10 Cesarean; identify method of delivery below). Identify whether blood loss was evaluated; identify if blood loss was evaluated by visual estimation only; identify if blood loss was quantitatively evaluated using one or more of three recommended methods.*

Submit Cumulative Blood Loss Audit Data to CMQCC monthly using EXTRANET (do not submit medical record numbers)

Four methods for Ongoing cumulative blood loss measurement:
1. Estimating blood loss by visual estimation methods only

Recommended methods:
2. Formally estimate blood loss by recording percent (%) saturation of blood soaked items with the use of visual cues such as pictures/posters to determine blood volume equivalence
3. Formally measure blood loss by weighing blood soaked pads/chux
4. Formally measure blood loss by collecting blood in graduated measurement containers

MR #	☐ Vaginal Delivery ☐ Cesarean Delivery
Cumulative blood loss is recorded in patient chart in milliliters during labor and delivery and until status changes to routine postpartum and patient is physiologically stable. ***Select the Measurement Method(s) Recorded in Patient Chart***	☐ Measurement NOT recorded in chart ☐ Estimated with Visual Cues ***Only*** ***If you select Visual Estimation Only, do not select methods below*** ***Select All that Apply:*** ☐ Formally estimated by % saturation ☐ Formally measured by weighing ☐ Formally measured by collection

MR #	☐ Vaginal Delivery ☐ Cesarean Delivery
Cumulative blood loss is recorded in patient chart in milliliters during labor and delivery and until status changes to routine postpartum and patient is physiologically stable. ***Select the Measurement Method(s) Recorded in Patient Chart***	☐ Measurement NOT recorded in chart ☐ Estimated with Visual Cues ***Only*** ***If you select Visual Estimation Only, do not select methods below*** ***Select All that Apply:*** ☐ Formally estimated by % saturation ☐ Formally measured by weighing ☐ Formally measured by collection

MR #	☐ Vaginal Delivery ☐ Cesarean Delivery
Cumulative blood loss is recorded in patient chart in milliliters during labor and delivery and until status changes to routine postpartum and patient is physiologically stable. ***Select the Measurement Method(s) Recorded in Patient Chart***	☐ Measurement NOT recorded in chart ☐ Estimated with Visual Cues ***Only*** ***If you select Visual Estimation Only, do not select methods below*** ***Select All that Apply:*** ☐ Formally estimated by % saturation ☐ Formally measured by weighing ☐ Formally measured by collection

MR #	☐ Vaginal Delivery ☐ Cesarean Delivery
Cumulative blood loss is recorded in patient chart in milliliters during labor and delivery and until status changes to routine postpartum and patient is physiologically stable. ***Select the Measurement Method(s) Recorded in Patient Chart***	☐ Measurement NOT recorded in chart ☐ Estimated with Visual Cues ***Only*** ***If you select Visual Estimation Only, do not select methods below*** ***Select All that Apply:*** ☐ Formally estimated by % saturation ☐ Formally measured by weighing ☐ Formally measured by collection

Total number of audited charts with Blood Loss:

Numerator 1: _________ Not Measured
Numerator 2: _________ Estimated with Visual Cues Only
Numerator 3: _________ Measured using one or more of three recommended formal measurements (estimate by % saturation; measure by weight; measure by collection)
Denominator (for all 3 numerators above) ________Total Number of Charts Audited

This project was supported by Title V funds received from the California Department of Public Health; Maternal, Child and Adolescent Health Division

APPENDIX E.5. CMQCC OBSTETRIC HEMORRHAGE TEAM DE-BRIEFING FORM

Topic: The de-brief form provides an opportunity for maternity service teams to review then document sequence of events, successes and barriers to a swift and coordinated response to obstetric hemorrhage.

Goal: De-brief completed in 100% of all obstetric hemorrhages that progress to Stage 2 or 3. All de-briefs have at least Primary RN, and Primary MD who participates in the de-briefing session.

Instructions: Complete as soon as possible, but no later than 24 hours after any Stage 2 or 3 hemorrhages. During de-brief, obtain input from participants (all or as many as possible).

Stage 2 or 3 hemorrhages are defined as bleeding that continues after administration of IV or IM Oxytocin, vigorous fundal massage, emptied bladder and Methergine 0.2 mg IM.

PRINT THIS FORM DOUBLE-SIDED; PATIENT STAMP ON BACK OF FORM WILL NOT BE FAXED WITH COMPLETED FORM. *- **Attach additional pages with notes as needed*** **Were the following medications, procedures or blood products used?** ***(Check if yes, check all that apply)***

Medications

☐ High dose misoprostol (800-1000 mcg)
☐ Carboprost tromethamine (Hemobate

Blood Volume/Options

☐ Invasive hemodynamic monitoring
☐ Blood warmer
☐ Rapid fluid infuser (level one machine)
☐ Blood cell salvage machine (cell saver)
☐ Factor VIIa (non-standard treatment)

Procedures

☐ Intrauterine balloons
☐ B-Lynch suture
☐ Uterine artery ligation
☐ Uterine artery embolization
☐ Non-pneumatic Anti-shock Garments (NASG; non-standard treatment)

COMMENTS about medications, procedures, or blood products:

☐ Primary MD participated in de-brief? *(Check if yes)*
☐ Primary RN participated in de-brief? *(Check if yes)*

Post-hemorrhage, the patient required…
(Check if yes, check all that apply)

☐ Intubation
☐ Pressors
☐ Admission to ICU
☐ Central Line
☐ Arterial Line
☐ Admission to higher acuity unit (e.g., PACU)

Volume of blood lost: _____ mls

Method of Blood Loss Measurement ***(Check all that apply)***

☐ Visually Estimated Only
☐ Formal Estimate using Posters/Pictures
☐ Formal Measure by weight
☐ Formal Measure by volume collection

Blood Product Transfusion Ratios - Active Hemorrhage Treatment and Resuscitation Period (~the first 4-6 hours PP)

Units of PRBCs: _____ Units of FFP: _____
Units of Platelets: _____ Units of Cryo: _____

Thinking about how the obstetric hemorrhage was managed…

Identify what went well (*Check if yes, describe)*

☐ Communication went well
☐ Teamwork went well
☐ Leadership went well
☐ Decision-making went well
☐ Assessing the situation went well
☐ Other
Briefly describe:

Identify opportunities for improvement: "human factors" ***(Check if yes, describe)***

☐ Communication needed improvement
☐ Teamwork needed improvement
☐ Leadership needed improvement
☐ Decision-making needed improvement
☐ Assessing needed improvement
☐ Other
Briefly describe:

Identify opportunities for improvement: "non-human factors" ***(Check if yes, describe)***

☐ Delay in blood products availability
☐ Equipment issues
☐ Medications issues
☐ Inadequate support (in-unit or other areas of the hospital)
☐ Delays in transporting the patient (within the hospital or to another facility)
☐ Other
Briefly describe:

APPENDIX F. CMQCC MAP-IT PLANNING WORKSHEET, SAMPLE WORKSHEET

Change Project MAP-IT Worksheet – Blank Form

MAP-IT Action Plan for:_____(Hospital Name)
Date Created:____ Developed by: _____

Aims Statement or Objective: *By (month)___ (day)____ (year)____ we will quantify blood loss on all women who give birth at our hospital.*

M: Mobilize

A: Assess

P: Plan

I: Implement

T: Track

First Cycle Due Date: _____

Guidry, M., Vischi, T., Han, R., & Passons, O. *Healthy people in healthy communities: A community planning guide using healthy people 2010.* Washington, D.C.: U.S. Department of Health and Human Services. The Office of Disease Prevention and Health Promotion. http://www.healthypeople.gov/Publications/HealthyCommunities2001/default.htm.

APPENDIX F. CMQCC MAP-IT PLANNING WORKSHEET, SAMPLE WORKSHEET

SAMPLE of COMPLETED
OB Hemorrhage Change Project MAP-IT Planning Worksheet

MAP-IT Action Plan for:_California's Best Medical Center_____(Hospital Name)
Date Created:____ Developed by: OB Hemorrhage QI Team

Aims Statement or Objective: *By (month)___ (day)____ (year)____ we will quantify blood loss on all women who give birth at our hospital.*

M: Mobilize

Get your change team together on a regular basis. Have the perspectives of a Hospital Administrator, Labor & Delivery leader and staff, Anesthesia, Blood Bank, Emergency Department, etc. represented on your team so that they can develop a plan for each of their departments.

A: Assess

Complete the Fishbone cause and effect diagram on quantification of blood loss. Complete a process flow chart on the current state of blood loss calculation and accuracy.

P: Plan

1. Review the policy and procedures to determine how they need to be revised.
2. Raise awareness among the staff of how inaccurate the blood loss measurements currently are. A. In a room on or near the unit set up a "Quantification of Blood Loss Skills Lab". The skills lab can have multiple stations where there are pads, chux, etc. stained and saturated with red fluid. Have the clinicians guess the amounts of fluid on each of the items. Post the results for everyone to see. Make it fun! B. Have team members make rounds on all shifts and ask the clinicians who were at a delivery to quantify the blood loss. Weigh the items saturated with blood and compare the actual amounts to the estimated amounts.
3. Revise the chart forms to include method of determination of blood loss.
4. Identify who will be responsible to accomplish each of the above items.

I: Implement

1. Revise the policy and procedure to outline how blood loss will be quantified. Have a select group of staff test the draft procedure to see how the procedure needs to be refined and adjusted and what barriers are identified. Eliminate the barriers identified and revise the procedure as needed.
2. Assess all staff on their ability to accurately assess blood loss. Randomly compare estimated blood loss to actual blood loss.
3. Revise charting forms. Trial the new forms. Re-adjust as needed.
4. Keep each other apprised of the work that is accomplished and any barriers identified. Provide each other support for the implementation efforts.

T: Track

After implementing the above steps, assess the number of staff who quantify blood loss. Develop a new plan and implement that plan. Track progress and re-adjust the plan again and again until the goal is met and the change has become "how things are done around here."

First Cycle Due Date: _____

Guidry, M., Vischi, T., Han, R., & Passons, O. *Healthy people in healthy communities: A community planning guide using healthy people 2010.* Washington, D.C.: U.S. Department of Health and Human Services. The Office of Disease Prevention and Health Promotion. http://www.healthypeople.gov/Publications/HealthyCommunities2001/default.htm

APPENDIX G. CMQCC QUALITY IMPROVEMENT COLLABORATIVE OBSTETRIC HEMORRHAGE MEASUREMENT GRID

CMQCC Quality Improvement Collaborative Obstetric Hemorrhage Measurement Grid

OB Hemorrhage Multi-Hospital Change Collaborative

Aim 1: Reduce the number of massive hemorrhages and the number of major complications from massive hemorrhage, including transfusions and hysterectomies, for all birthing women in participating hospitals by 75% by September 30, 2010.

Aim 2: All collaborative participants develop and implement a multidisciplinary team response to every massive obstetric hemorrhage by September 30, 2010.

Purpose of the Measurement Grid:
The measurement grid outlines the measures to be collected over the 12-month life of the OB Hemorrhage multi-hospital collaborative. The grid includes the specific parameters for each measure.

Measurement for Improvement:
CMQCC multi-hospital improvement collaboratives are about making hospital systems safer for patients. Measurements play an important role. Always remember that measurements should be designed to accelerate improvement, not slow it down.

Timeline for Measurement:
The measurement grid is broken down into three categories: Outcome, Process and Balancing Measures. Teams may also develop additional measures based on the issues that are of most interest and importance to their hospital and patient population needs. Only the measures in the grid below will be submitted to CMQCC.

Outcome Measures: These measures tell you whether changes are actually leading to improvement – that is, helping to achieve the overall aim of reducing major complications of OB hemorrhage. Outcome measures answer questions like, “How many women had injuries?” and “How many women had markers that indicate potential morbidities (e.g., transfusions?”). Outcome measures can sometimes be collected from administrative data.

Process Measures: To affect the outcome measures of reducing major complications of OB hemorrhage, changes will be made to improve many core processes in the care system, as well as changes to improve the culture as it relates to safety. We will want to know if the parts/steps in the system are performing as planned. Measuring the results of these process changes will tell you if the changes are leading to an improved, safer system.

Balancing Measures: We will use these measures to make sure that changes to improve one part of the system are not causing new problems in other parts of the system. Balancing measures can also help us to draw reasonable conclusions about the sustainability of the change

Measure	Calculation	Data Collection Plan/Sample Size	Data Collection Method	Goal
Aim 1. *Blood Product Transfusions* **Measures A, B. REQUIRED** **Measure Types: Outcome**				
REQUIRED **A.1.** Percent of women (who gave birth ≥20 0/7 weeks gestation) who were transfused with any blood product during the birth admission	**A.1. Numerator:** Number of women (who gave birth ≥20 0/7 weeks gestation) who were transfused with any blood product during the birth admission per month. **Denominator:** Total Number of Births (≥20 0/7 weeks gestation) per month	**Hospital Baseline:** Collect A1, A2, B for January 9, 2009 to September 30, 2009 **Concurrent:** Report monthly data as defined (starting with October 2009)	**Blood Transfusion:** data from internal source such as blood bank data, patient charts, medical records, Electronic Medical Record (EMR), etc. If available: Blood loss data recorded in patient record or delivery log.	Reduce the number of major complications from massive hemorrhage, including transfusions, for all birthing women in participating hospitals by 75% by September 30, 2010.
A.2. Total units of each type of blood product (PRBCs, Platelets, Plasma/FFP, Cryo) transfused during birth admissions per total births	**A.2. Numerators:** Total units of each type of blood product (PRBCs, Platelets, Plasma/FFP, Cryo) transfused during birth admissions per month. Select each blood product within the series from the drop-down menu: • **Series 1*: PRBCs units/month** • **Series 2: Platelets units/month** • **Series 3: Plasma/FFP units/month** • **Series 4: Cryo units/month** ***Series are categories of data within a single measure*** **Denominator:** Total Number of Births (≥20 0/7 weeks gestation) per month	**OPTIONAL Additional Measurement:** Number of Births/Days between occurrences of massive hemorrhage	**ICD-9 Procedure Code for transfusions: 99.0** **CPT Code: 36430: Transfusion, blood or blood components** *Note that these codes typically do not accurately identify transfusions. We recommend obtaining data from the Blood Bank when possible.* Data entered to Extranet	
REQUIRED **B.** Percent of women (who gave birth ≥20 0/7 weeks gestation) who were transfused with ≥5 units PRBCs during the birth admission ***NOTE: B is a subset of A.1***	**B) Numerator**: Number of women (who gave birth ≥20 0/7 weeks gestation) who were transfused with ≥5 units PRBCs during the birth admission per month. **Denominator:** Total Number of Births (≥20 0/7 weeks gestation) per month.		***De-brief Form:*** *For women who experience Stage 2 or 3 hemorrhage, identify units of PRBCs, Platelets, Plasma/FFP, Cryo (for each woman) on the De-brief Form*	

Measure	Calculation	Data Collection Plan/Sample Size	Data Collection Method	Goal
Aim 1. *Peripartum Hysterectomies* **Measure C. REQUIRED** **Measure Type: Outcome**				
C. Rate of peripartum hysterectomies in women (who gave birth ≥20 0/7 weeks gestation) per 1000 births (hysterectomy performed during birth admission) stratified by risk of Placenta Previa and/or Placenta Accreta/percreta	**C. Numerator:** Number of peripartum hysterectomies (performed during birth admission) in women (who gave birth ≥20 0/7 weeks gestation) per month stratified by: • **Series 1*:** Women **with** Placenta Previa and/or Placenta Accreta/Percreta • **Series 2:** Women **without** Placenta Previa and/or Placenta Accreta/Percreta ***Series are categories of data within a single measure*** **Denominator:** Total Number of Births (≥20 0/7 weeks gestation) per month **Risk Stratification/Adjustment:** Women who had a hysterectomy and placenta previa and/or accreta/percreta are reported separately from women who had a hysterectomy (and NO placenta previa/accreta/percreta) **Annotate** for each hysterectomy:** a) Indication for hysterectomy b) Number of prior cesarean sections c) Number of Days Post-Delivery (Days = 0 if procedure done on day of delivery)	**Hospital Baseline:** Number of peripartum hysterectomies (performed during birth admission) in women who gave birth ≥20 0/7 weeks gestation Between 1/1/09 to 9/30/09 **Concurrent:** Report monthly data as defined	Peripartum Hysterectomy: Data Collection from internal source such as EMR, medical records, or other method determined by each site **ICD-9 Procedure Codes** **68.3** Subtotal abdominal hysterectomy **68.39** Other and unspecified subtotal abdominal hysterectomy **68.4** Total abdominal hysterectomy **68.49** Other and unspecified total abdominal hysterectomy **CPT Codes** **59525** Cesarean Hysterectomy **58150** Hysterectomy Total/Partial (Use Post-Partum or with Vaginal) **59160** D&C after delivery Data entered to Extranet ****Annotation** is available in the Data Entry fields for this measure; identify a), b), and c) (from Calculation column) for each patient in the Annotation Field	Reduce the number of major complications from massive hemorrhage, including peripartum hysterectomies, for all birthing women in participating hospitals by 75% by September 30, 2010.

Measure	Calculation	Data Collection Plan/Sample Size	Data Collection Method	Goal
Aim 1. *Quantification of Blood Loss* **Measures D, E, F. REQUIRED** **Deliverables 1, 2, 3. REQUIRED** **Measure Types: Outcome and Process**				
D. Percent of Audited Charts in which quantification and documentation of blood loss is performed (during and after all births until immediate recovery status changes to routine postpartum care and woman is physiologically stable) using one or more of three preferred methods: **1.** Formally estimate blood loss by recording percent (%) saturation of blood soaked items with the use of visual cues such as pictures/posters to determine blood volume equivalence of saturated/blood soaked pads, chux, etc. **2.** Formally measure blood loss by weighing blood soaked pads/chux **3.** Formally measure blood loss by collecting blood in graduated measurement containers **Process Measures:** **E.** % Non-MD clinicians and staff who are educated about Cumulative Blood Loss and Quantitative Measurement Methods	**D. Numerator:** Number of charts per month where on-going quantification is: • **Series 1:** NOT recorded • **Series 2:** Recorded ***using visualization only*** • **Series 3:** Recorded using one of three preferred formal methods (1, 2, or 3 in Measure Column) **Denominator:** Number of charts audited per month **E. Numerator:** Number of non-MD clinicians, (e.g., RNs, midwives) and staff (e.g., clerks, aides) who are educated about Cumulative Blood Loss and Quantitative Measurement Methods Audit Tool per month **Denominator:** Number of Non-MD clinicians and staff who care for	Audit 20 randomly selected charts per month (10 vaginal births and 10 cesarean births)	**Chart Review:** Refer to sample audit tool entitled: "In Hospital Audit Tool: Cumulative Blood Loss and Quantitative Measurement Methods" Data entered to Extranet	100% of birthing women will have on-going cumulative quantification of blood loss by September 30, 2010.

	women giving birth in your facility per month			
F. % MDs (e.g., obstetricians, anesthesiologists) who are educated about Cumulative Blood Loss and Quantitative Measurement Methods	**F. Numerator:** Number of MDs (e.g., obstetricians, anesthesiologists) who are educated about Cumulative Blood Loss and Quantitative Measurement Methods per month **Denominator:** Number of MDs who care for women giving birth in your facility per month			
Deliverables: **1.** Sign-off report among Labor & Delivery and Post-partum MD and Nursing staff includes whether a woman had a Stage 2 or Stage 3 hemorrhage **2.** Blood loss is measured until the woman's immediate recovery status changes to routine postpartum care and woman is physiologically stable **3.** Documentation forms are updated for #1, #2	**1.** Deliverable: Submit in Extranet when completed **2.** Deliverable: Submit in Extranet when completed **3.** Deliverable: Submit in Extranet when completed	**1. Deliverable: Due 5/1/2010** **2. Deliverable: Due 5/1/2010** **3. Deliverable: Due 5/1/2010**		

Measure	Calculation	Data Collection Plan/Sample Size	Data Collection Method	Goal
Aim 1. *OB Hemorrhage Risk Assessment on Admission* **Measure G. RECOMMENDED** **Measure Type: Process**				
Percent of women (from audited charts) who are assessed for risk of obstetric hemorrhage on admission	**Numerator:** Among the audited charts, the number of women admitted to Labor and Delivery whose risk of obstetric hemorrhage assessment is recorded in the medical record **Denominator:** Total number of admission charts audited per month	**Suggestion:** Audit 20 randomly selected charts per month (10 vaginal births and 10 cesarean births)	Chart Review Determined by individual hospital. **Refer to Risk Assessment Audit Tool.** Data entered to Extranet	100% of women are assessed for risk of obstetric hemorrhage on admission by September 30, 2010
Aim 1. *Active Management of Third Stage* **Measure H. RECOMMENDED** **Measure Type: Process**				
Percent of women (from audited charts) who receive Active Management of Third Stage Labor	**Numerator:** Total number of women who receive Active Management of Third Stage Labor including • Oxytocin (IV or IM) at delivery of shoulders or delivery of placenta (identify when administered) • Fundal Massage ***for 15 seconds minimum*** • Gentle Cord traction *Note: Need all three to be considered Active Management* **Denominator:** Total number of charts audited per month	**Suggestion:** Audit 20 randomly selected charts of women who gave birth vaginally per month	Chart review Determined by individual hospital. **Refer to Active Management of Third Stage Labor Audit Tool.** Data entered to Extranet	100% of women giving birth will receive active management of labor by September 30, 2010

Measure	Calculation	Data Collection Plan/Sample Size	Data Collection Method	Goal
Aim 2. *Policies and Procedures and Drills* **Measure I, J, K, L. REQUIRED** **Deliverables 4, 5, 6, 7, 8. REQUIRED** **Measure Type: Process**				
Deliverables: **4.** General and massive hemorrhage policies and procedures (P&P) were updated after April 30, 2009.	**4. Deliverable:** Submit in Extranet when completed; Date completed; date received by CMQCC	**4.** Determined by hospital, **Due: 2/1/2010**	Hospital records and forms	100% of the collaborative participating hospitals will meet 100% of the P&Ps and drills measurements by September 30, 2010
5. Identify roles and multi-disciplinary team responders for stage 1, 2, and 3 hemorrhages	**5. Deliverable:** Roles defined for stage 1, 2, or 3 hemorrhages: Submit in Extranet when completed; date completed; date received by CMQCC	**5.** Determined by hospital, **Due: 3/1/2010**		
6. Determine and implement the most desirable method for maintaining accessibility to the needed OB hemorrhage supplies	**6. Deliverable:** Provide the emergency supply maintenance plan to CMQCC: Submit in Extranet when completed; date completed; date received by CMQCC	**6.** Determined by hospital, **Due: 2/1/2010**		
<u>Measures</u> **I. %** Non-MD clinicians and staff who are educated to the hemorrhage P&Ps	**I. Numerator:** Number of non-MD clinicians, (e.g., RNs, midwives) and staff (e.g., clerks, aides) who receive education on the hemorrhage P&Ps per month **Denominator:** Number of Non-MD clinicians and staff who are in the pool of possible responders per month (defined by hospital)	**I.** Determined by hospital		

J. % MDs (e.g., obstetricians, anesthesiologists) who are educated to the hemorrhage P&Ps	**J. Numerator:** Number of MDs (e.g., obstetricians, anesthesiologists) who receive education on the hemorrhage P&Ps per month **Denominator:** Number of MDs who are in the pool of possible responders per month (defined by hospital)	**J.** Determined by hospital		
Deliverables				
7. Create drills tailored to your hospital P&Ps and responder roles	**7. Deliverable:** Drill scenarios created: Submit in Extranet when completed; date completed; date received by CMQCC	**7.** Determined by hospital, **Due: 5/1/2010**		
8. After Deliverables 4-7 are completed, run 1 multi-disciplinary drill per month for four consecutive months (two on night/evening shift and two on day shift) to identify system and process improvement opportunities. After each drill complete a drill de-brief form	**8. Deliverable:** Drills are performed: Submit in Extranet when completed; dates completed. Maintain a list of problems identified by the drills and document how and when the problem is resolved. Submit the list to CMQCC.	**8.** Determined by hospital **Due: 8/1/2010**		
Measure **K. %** Non-MD clinicians and staff who are involved drill de-brief discussions	**K. Numerator:** Number of non-MD clinicians (e.g., RNs, midwives) and staff (e.g., clerks, aides) who are involved in drill de-brief discussions per month	**K.** Determined by hospital		

	Denominator: All Non-MD clinicians and staff who are in the pool of possible de-brief participants per month (defined by hospital)			
L. % MDs (e.g., obstetricians, anesthesiologists) who are involved in drill de-brief discussions	**L. Numerator:** Number of MDs (e.g., obstetricians, anesthesiologists) who are involved in drill de-brief discussions per month **Denominator:** Number of MDs who are in the pool of possible de-brief participants per month (defined by hospital)	**L.** Determined by hospital		

Measure	Calculation	Data Collection Plan/Sample Size	Data Collection Method	Goal
Aim 2. ***De-Briefing after OB Hemorrhages*** **Measures M, N, O. REQUIRED** **Measure Type: Process**				
M. Frequency of de-brief sessions that occurred after any hemorrhage with ≥500 mls for vaginal births and ≥1000 mls for cesarean section births that advanced beyond stage 1 to stage 2 or 3 hemorrhages. **Note:** Stage 2 or 3 are defined as hemorrhages with bleeding that continues after the patient received IV or IM Oxytocin, vigorous fundal massage, emptied bladder,	**M. Numerator:** Number of de-brief forms submitted to CMQCC **Denominator:** Number of hemorrhages each month that required interventions, treatments, procedures outlined in Stage 2 or 3 of the CMQCC OB Hemorrhage checklist ***Recommendation:*** Completion of de-brief is encouraged to occur	**M.** RN who took care of the patient leads the de-briefing session and fills out de-briefing form	**M.** The CMQCC "Obstetric Hemorrhage Team De-Briefing Form" or any form that captures the elements contained on this form Fax de-brief form to CMQCC Data entered to Extranet **(for Measures M, N, O)**	De-brief completed in 100% of all obstetric hemorrhages that progress to Stage 2 or 3 All de-briefs have at least one MD who participates in the de-briefing session. Improve communication, teamwork, use of equipment and overall management by de-briefing after every stage 2 and 3 hemorrhages. Identify barriers to and

and Methergine 0.2mg IM	immediately after the patient is stabilized, but no later than 24 hours after event.			solutions for: a. Communication; Teamwork; Leadership; Decision-making; Assessment (situational) b. Delays in blood product availability; Equipment issues; Medications issues; In-unit (and other) Support; Delays in patient transport
N. Percent of de-briefs during which at least one primary MD participated (as checked on de-brief form)	**Numerator:** Number of Primary MDs who participated in de-brief **Denominator:** Total number of de-brief forms completed	Determined by hospital		
O. Percent of de-briefs during which at least one primary RN participated (as checked on de-brief form)	**O. Numerator:** Number of Primary RNs who participated in de-brief **Denominator:** Total number of de-brief forms completed	Determined by hospital		

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