New Jersey Hospital Association
Perinatal Quality Collaborative

Reducing Maternal Morbidity and Mortality Toolkit

A Collaborative Quality Improvement Initiative

Focus: Obstetric Hemorrhage and Hypertension

Version 1: January 2018

Acknowledgements:

The NJHA Perinatal Quality Collaborative would like to thank our partner organizations for their support for the initiatives and educational activities including of the collaborative. These organizations provide the foundation upon which our work can be done. They are: The New Jersey Department of Health, The Alliance for Innovation in Maternal Health, New Jersey Obstetrical & Gynecological Society (NJOGS), American Congress of Obstetricians and Gynecologists New Jersey Section (ACOG NJ), Association of Women's Health, Obstetric and Neonatal Nurses of New Jersey (AWHONN NJ), American College of Nurse Midwives NJ (ACNM NJ), Tara Hansen Foundation, the Maternal Child Health Consortia and The Robert Wood Johnson Medical School.

NJHA would also like to acknowledge the following organizations for sharing materials, expertise and guidance to assist in the development of this toolkit: Mississippi Perinatal Quality Collaborative, Florida Perinatal Quality Collaborative, California Maternal Quality Care Collaborative, ACOG District II, Association of Maternal and Child Health Programs, The Centers for Disease Control Division of Reproductive Medicine and the Association of Women's Health Obstetric and Neonatal Nurses.

Funding:
The New Jersey AIM Initiative is funded in part by the ACOG through a cooperative agreement with the Maternal and Child Health Bureau (MCHB) - Health Resource Services Administration (HRSA).

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I. Introduction

A. Background& Goals

The Alliance for Innovation in Maternal Health (AIM) program was founded as a solution to help improve maternal outcomes across the United States. AIM is a national data-driven quality improvement initiative based on proven approaches to improving maternal safety. The importance of culture, teamwork, communication and a focus on patient centric care has been demonstrated in improving patient safety.

Research has shown that maternal deaths from obstetric hemorrhage are often associated with adjustable provider and system level factors such as gaps in communication, delays in care and ineffective treatment strategies. Obstetric hemorrhage is the leading cause of maternal morbidity and mortality in the US[1] and impacted 2.9 percent of all women who gave birth in 2006[2]. Most deaths associated with hemorrhage are preventable[3].

According to *Deadly Delivery, The Maternal Health Care Crisis in the USA (2010)*, New Jersey ranks 35 out of 51 states (including the District of Columbia) with a maternal mortality rate of 11.2 deaths per 100,000 live births[4].

Severe hypertension is also a leading cause of maternal morbidity and mortality in the US and New Jersey. Indeed, maternal mortality reviews have consistently revealed problems with recognition, communication and effective application of interventions as contributory factors in deaths from maternal hemorrhage and severe hypertension. Birth facilities and health systems that have implemented systematic protocols for recognizing and responding to hemorrhage and hypertension have demonstrated improved outcomes such as decreased use of both blood products and higher level interventions, such as uterine artery embolization and hysterectomy. This toolkit will assist participants with the adoption of the National Partnership for Maternal Safety Hemorrhage Bundles by developing systems that promote readiness, recognition, and response to obstetric hemorrhage and hypertension.

The overall goals of the NJHA Perinatal Quality Collaborative NJ AIM Initiative are:

- To reduce severe maternal morbidity and mortality related to obstetric hemorrhage and hypertension among women who give birth in New Jersey.
- To guide and support obstetric care providers and birthing facilities in New Jersey in implementing evidence-based, collaborative, patient-centered practices to prevent and manage obstetric hemorrhage and hypertension.

Participation with the New Jersey AIM project is voluntary. Hospitals are open to focus on either hemorrhage, hypertension, or both. Participating hospitals will receive expert guidance, tools and resources all free of charge through a grant from AIM with NJHA Perinatal Quality Collaborative.

Participating hospitals will be asked to:

- Complete the AIM baseline survey.
- Establish a team to lead the obstetric/hypertension hemorrhage bundle implementation.
- Engage in regular monthly calls for education, feedback and collaboration.
- Actively work to implement the obstetric hemorrhage/hypertension bundle during the project period.

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[1] Berg CJ, Callaghan WM, Syverson C, Henderson Z. Pregnancy-related mortality in the United States, 1998 to 2005. Obstet Gynecol 2010; 116:1302

[2] Callaghan, W.M., Kuklina, E.V., Berg, C.J. Trends in postpartum hemorrhage: United States, 1994–2006. American Journal of Obstetrics and Gynecology. 2010;202:353.e1–353.e6

[3] Della Torre M, et al. Assessing preventability for obstetric hemorrhage. 2011 Dec;28(10):753-60.

[4] Amnesty International. Deadly delivery: the maternal health care crisis in the USA, 2010 Mar. Amnesty International Publications.

- Submit process and structure measures to the AIM data portal on a monthly basis.

B. How to Use This Toolkit

This toolkit is organized according to the 4-R's of the AIM Patient Safety Bundles: **R**eadiness, **R**ecognition & Prevention, **R**esponse and **R**eporting/Systems Learning. This is not an exhaustive compilation of tools; it does, however, provide the core components needed for a facility to successfully implement the obstetric hemorrhage and hypertension bundle and meet the goals of this Initiative.

THIS TOOLKIT CONTAINS :

- **PowerPoint slide decks with specific implementation guidance**
- **Visual aids for the obstetric unit**
- **Risk assessment guidelines**
- **Management algorithms & checklists**
- **Medication & transfusion guidelines**
- **Debriefing forms**
- **Sample hospital policies and protocols**
- **Sample simulation scenarios**
- **Support tools for patients, families and staff**

We fully encourage providers and hospitals to review and utilize the resources from the following organizations, as they each offer valuable tools and guidance for addressing obstetric hemorrhage and hypertension:

- The Alliance for Innovation on Maternal Health (AIM): http://safehealthcareforeverywoman.org/aim-program/
- Mississippi Perinatal Quality Collaborative (MSPQC) - http://mspqc.org/
- Florida Perinatal Quality Collaborative Hemorrhage Initiative Toolkit: http://health.usf.edu/NR/rdonlyres/2506A40D-E89A-4A18-AB4F-B4045F6E5FD4/0/FLOHIToolkitv122014.pdf www.health.suf.edu/publichealth/chiles/fpqc/OHI.htm
- California Maternal Quality Care Collaborative (CMQCC) - Toolkit to Transform Maternity Care: www.cmqcc.org/projects
- American Congress of Obstetricians and Gynecologists (ACOG), District II, Safe Motherhood Initiative Obstetric Hemorrhage Toolkit: http://www.acog.org/About-ACOG/ACOG-Districts/District-II/SMI-OB-Hemorrhage
- Association of Women's Health Obstetric and Neonatal Nurses Postpartum Hemorrhage Project: www.pphproject.org
- CMQCC – Preeclampsia Toolkit: https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit
- CMQCC – Chronic Hypertension in Pregnancy Toolkit: https://www.cmqcc.org/resource/chronic-hypertension-pregnancy-toolkit-pdf
- ACOG, District II, Safe Motherhood Initiative Severe Hypertension in Pregnancy: https://www.cmqcc.org/resource/chronic-hypertension-pregnancy-toolkit-pdf
- Implementing Quality Improvement Projects Toolkit

https://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Implementing-Quality-Improvement-Projects-Toolkit-V1-May-2016.pdf

C. What is AIM?

The Alliance for Innovation on Maternal Health (AIM) is a national partnership of organizations poised to reduce severe maternal morbidity by 100,000 events and maternal mortality by 1,000 deaths by 2018. The AIM program is funded by Grant #UC4MC28042 through a cooperative agreement with the Maternal and Child Health Bureau (MCHB) and Health Resources & Services Administration (HRSA).

- AIM aligns national, state, and hospital level efforts to improve maternal health and safety
- AIM develops maternal safety bundles and promotes their implementation in all birth facilities to ensure consistent maternity care

Maternal Safety Bundles

- **Obstetric Hemorrhage**
- **Severe Hypertension/Preeclampsia**
- **Maternal Prevention of Venous Thromboembolism**
- **Safe Reduction of Primary C/S | Support for Intended Vaginal Birth**
- **Reduction of Peripartum Racial Disparities**
- **Postpartum Care Basics for Maternal Safety**
- **Patient, Family, and Staff Support after a Severe Maternal Event**

- AIM supports multidisciplinary and interagency collaboration between states and hospitals
- AIM supports harmonized data-driven continuous quality improvement processes
- AIM provides evidence-based implementation resources to streamline bundle implementation

When you team up with AIM you will receive Patient Safety Bundle implementation support, training, peer-to-peer engagement opportunities, and access to AIM's national data center to track your success.

Core AIM Partners Include:


CMQCC
CALIFORNIA MATERNAL
QUALITY CARE COLLABORATIVE


The Health Resources
and Services Administration
Maternal and Child
Health Bureau


Society for
Maternal-Fetal
Medicine

How Does AIM Work?

AIM provides implementation support and data tracking for open access Patient Safety Bundles and Tools. Enrollment is based on voluntary participation and has a rolling onboarding process.

Connect with your state or hospital system coordinator

Take a short Maternal Safety Needs Assessment Survey

Learn about AIM-supported Patient Safety Bundles and Tools that fit your needs

Receive Bundle implementation support through technical assistance and a vibrant online community

Track and benchmark your progress through the AIM Data Center

ALLIANCE FOR INNOVATION ON MATERNAL HEALTH AIM

Contact us to see how you and your hospital can get involved.
safehealthcareforeverywoman.org/aim

AIM is funded by Grant #UC4MC28042 through a cooperative agreement with the Maternal and Child Health Bureau (MCHB) and Health Resources & Services Administration (HRSA).

AIM core partners include: The American College of Obstetricians and Gynecologists, AMCHP, astho, AWHONN, CMQCC California Maternal Quality Care Collaborative, Society for Maternal-Fetal Medicine, American College of Nurse-Midwives

II. Obstetric Hemorrhage Bundle

COUNCIL ON PATIENT SAFETY IN WOMEN'S HEALTH CARE
safe health care for every woman

PATIENT SAFETY BUNDLE

Obstetric Hemorrhage

READINESS

Every unit

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

RECOGNITION & PREVENTION

Every patient

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

RESPONSE

Every hemorrhage

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

REPORTING/SYSTEMS LEARNING

Every unit

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

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

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

 July 2014

For more information visit the Council's website at www.safehealthcareforeverywoman.org

READINESS

There are 5 domains of Readiness to be addressed by every facility to prevent delays and prepare for the optimal management of obstetric hemorrhage.

Recommendations for **Every Unit**:

- ✓ **Develop hemorrhage cart with supplies, checklist, and instruction cards for intrauterine balloons and compression stitches**
- ✓ **Facilitate immediate access to hemorrhage medications**
- ✓ **Establish an obstetric emergency response team**
- ✓ **Establish massive transfusion or emergency release of blood protocols**
- ✓ **Establish unit education on hemorrhage protocols with unit-based drills and debriefs for all members of the care team**

Recommended Resources:

- AIM eModule 2: Obstetric Hemorrhage Readiness: http://www.safehealthcareforeverywoman.org/eModules/eModule-2-Readiness/presentation.html
- ACOG Committee Opinion 590: Preparing for clinical emergencies in obstetrics and gynecology (ACOG): http://www.acog.org/-/media/Committee-Opinions/Committee-on-Patient-Safety-and-Quality-Improvement/co590.pdf?dmc=1&ts=20150424T1055548324
- Improving Health Care Response to Obstetric Hemorrhage (CMQCC): http://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Readiness-3-Improving-Health-Care-Response-to-Obstetric-Hemorrhage-CMQCC-1.pdf
- Massive transfusion protocols: the role of aggressive resuscitation versus product ratio in mortality reduction (ACS): http://www.journalacs.org/article/S1072-7515(09)00467-0/abstract
- Obstetric Hemorrhage Hospital Level Implementation Guide (CMQCC): http://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Readiness-3-Improving-Health-Care-Response-to-Obstetric-Hemorrhage-CMQCC.pdf
- Postpartum Hemorrhage Project (AWHONN): http://www.pphproject.org/resources.asp
- Safe Motherhood Initiative (ACOG): http://www.acog.org/About-ACOG/ACOG-Districts/District-II/Safe-Motherhood-Initiative
- TeamSTEPPS: National Implementation (AHRQ): https://www.ahrq.gov/teamstepps/index.html

A1. Hemorrhage Cart & Medication Access

The adequate and efficient response to postpartum hemorrhage (PPH) requires rapid access to instruments, tools and medications needed for treatment. Hemorrhage carts or kits are designed to consolidate all of the necessary resources for the rapid management of common causes of obstetric hemorrhage. Hemorrhage carts commonly include treatment algorithms and procedural technique instructions, instruments for improved visualization, laceration repair, uterine tamponade, IV access and fluid administration and necessary lab draws. Hemorrhage carts can be stored on labor and delivery units, postpartum floors, emergency rooms and obstetrical triage units. Each facility should develop its own hemorrhage cart with locally available resources and implement a process for regular inspection, stocking and staff education about its use and location. Units are encouraged to separately develop emergency hysterectomy trays for OR suites.

Medications should be stored together in a central location for immediate access. Units should work with pharmacy departments to determine storage and access policies and regularly monitor the time from medication request to administration as part of quality audits and drills.

Hemorrhage Cart Quality Measure

1. Does your hospital have OB hemorrhage supplies readily available, typically in a cart or mobile box? (Reported Annually or at project completion date)

CMQCC California Maternal Quality Care Collaborative

Tool: OB Hemorrhage Carts, Kits, Trays and Checklist

OB Hemorrhage Cart: Recommended Instruments

- Set of vaginal retractors (long right angle); long weighted speculum
- Sponge forceps (minimum: 2)
- Sutures (for cervical laceration repair and B-Lynch)
- Vaginal Packs
- Uterine balloon
- Banjo curettes, several sizes
- Long needle holder
- Uterine forceps
- Bright task light on wheels; behind ultrasound machine
- Diagrams depicting various procedures (e.g. B-Lynch, uterine artery ligation, Balloon placement)

OB Hemorrhage Medication Kit: Available in L&D and Postpartum Floor PYXIS/refrigerator

- Pitocin 10-40 units per 500-1000mL NS 1 bag
- Hemabate 250 mcg/mL 1 ampule
- Cytotec 200 mcg tablets 5 tabs
- Methergine 0.2 mg/mL 1 ampule

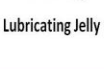
OB Hemorrhage Tray: Available on Postpartum Floor

- IV start kit
- 16 gauge angiocath
- 1 liter bag lactated Ringers
- IV tubing
- Sterile Speculum
- Urinary catheter kit with urimeter
- Flash light
- Lubricating Jelly
- Assorted sizes sterile gloves
- Lab tubes: red top, blue top, tiger top

POST PARTUM FLOOR HEMORRHAGE KIT

Recommendation
Labor and delivery units construct a sterile tray/kit that provides rapid access to instruments and supplies used to treat PPH. All OB staff are trained about contents, location and use of carts.


Sterile speculum


Lubricating Jelly


Ring Forceps

OB hemorrhage algorithm card


Flashlight

Urinary catheter kit with urimeter


Vaginal Packs/ Radiopaque gauze

IV tubing

Sterile gloves (assorted sizes)

1 liter bag Lactated Ringers


IV start Kit, 18 gauge angiocath

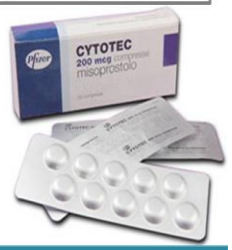
MEDICATIONS: L&D, OR ,POST PARTUM

Oxytocin 20 Units per linter NS 1 bag

Hemabate 250 mcg/ml 1 ampule

Hemabate 250 mcg/ml 1 ampule

Cytotec 200mg tablets 5 tabs



HEMORRHAGE CART INSTRUMENTS

Weighted Speculum

Ring Forceps

Long Needle Driver

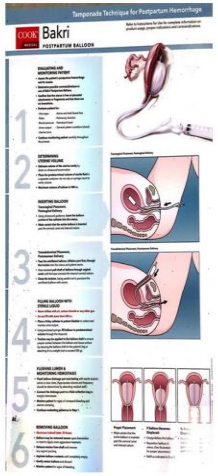
Grasping Forceps

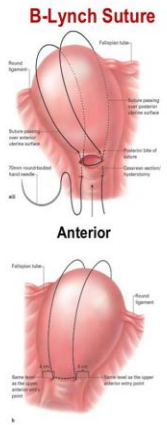
Long right angle vaginal retractors

Banjo Curettes
Various sizes

Uterine Balloon

Diagrams Depicting Various Procedures
(Balloon placement, B-Lynch)





Sutures (For laceration repair and B-Lynch)

CMQCC
California Maternal
Quality Care Collaborative

Source: California Maternal Quality Care Collaborative: Obstetric Hemorrhage Toolkit V2.0

OB HEMORRHAGE CARTS, KITS- RECOMMENDED INSTRUMENTS & SUPPLIES

A2. Obstetric Emergency Response Team

As a critical component to Readiness, each facility should establish a core obstetric hemorrhage response team based upon available resources and degree of hemorrhage severity. The patient and family members should be viewed as the central focus of the response team and be involved in care decisions, kept informed and be included in debriefings and updates.

Suggested Obstetric Hemorrhage Response Team Members:

- Obstetric provider
- Anesthesia provider
- Bedside nurse
- Rapid Response Team
- Blood Bank
- Pharmacist
- ICU Team
- General Surgeon
- ED Physician
- Neonatal Team
- Social Services/Chaplain

Core Activities of Obstetric Hemorrhage Response Team:

- Establish obstetric hemorrhage policies and guidelines
- Determining simple and reliable way to notify all team members of an obstetric hemorrhage
- Education of staff regarding guidelines and communication strategies

Suggested Resources:

- **ACOG Committee Opinion 590: Preparing for clinical emergencies in obstetrics and gynecology**
  http://www.acog.org/-/media/Committee-Opinions/Committee-on-Patient-Safety-and-Quality-Improvement/co590.pdf?dmc=1&ts=20150424T1055548324

- **CMQCC Obstetric Hemorrhage Hospital Level Implementation Guide**
  http://www.safehealthcareforeverywoman.org/downloads/Hemorrhage-Bundle/1-Readiness/Readiness-5-CMQCC-Obstetric-hemorrhage-hospital-level-implementation-guide.pdf

- **TeamSTEPPS: National Implementation (AHRQ)**
  http://www.ahrq.gov/teamstepps/index.html

A3. Massive Transfusion Protocol

Example Massive Transfusion Protocol: (See section E for additional examples)

EXAMPLE

BLOOD BANK:

Massive Transfusion Protocol (MTP)

In order to provide safe obstetric care, institutions MUST:

- Have a minimum of 4 units of O-negative PRBCs
- Have the ability to obtain 6 units PRBCs & 4 units FFP (compatible or type specific) for a bleeding patient
- Have a mechanism in place to obtain platelets & additional products in a timely fashion

Blood transfusion or crossmatching should not be used as a negative quality marker & is warranted for certain obstetric events.

1 Patient currently bleeding & at risk for uncontrollable bleeding

- A Activate MTP - call **(ADD NUMBER)** & say "activate massive transfusion protocol"
- B Nursing/anesthesia draw stat labs
  - type & crossmatch
  - hemoglobin & platelet count, PT (INR)/ PTT, fibrinogen, & ABG (as needed)

2 Immediate need for transfusion (type & crossmatch not yet available)

- A Give 2-4 units O-negative PRBCs
- B **"OB EMERGENCY RELEASE"**

3 Anticipate ongoing massive blood needs

- A Obtain massive transfusion pack
  - Consider using coolers
- B Administer as needed in a 6:4:1 ratio
  - 6 units PRBCs
  - 4 units FFP
  - 1 apheresis pack of platelets

4 Initial lab results

- A Normal > anticipate ongoing bleeding > repeat massive transfusion pack > bleeding controlled > deactivate MTP
- B Abnormal > repeat massive transfusion pack > repeat labs > consider cryoprecipitate and consultation for alternative coagulation agents (Prothrombin Complex Concentrate [PCC], recombinant Factor VIIa, tranexamic acid)

IMPORTANT PROTOCOL ITEMS TO BE DETERMINED AT EACH INSTITUTION:

- How to activate MTP: _____
- Blood bank # & location; notify ASAP:

  I will call: _____
- Emergency release protocol that both blood bank staff & ordering parties (MD/RN/CNM) understand: _____
- How will blood be brought to L&D? _____
- How will additional blood products/platelets be obtained? _____
- Mechanism for obtaining serial labs, such as with each transfusion pack, to ensure transfusion targets achieved: _____

REVISED OCTOBER 2015

Source: ACOG District II: Safe Motherhood Initiative

A4. Unit Education

All obstetric providers and nurses and supporting clinical staff should complete an educational program that covers the major components of obstetric hemorrhage risk assessment, prevention and treatment as well as training about planned or implemented protocols and policies on a regular basis; at least every 2 years. Online training, lectures and assigned readings are all potential approaches to standard unit education. A clinical leader for the OHHI within each facility should monitor progress of staff in completing the selected education program.

Unit Education Quality Measures- Provider & Nurses:

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

AIM eModules

The NJHA Perinatal Collaborative supports the use of AIM eModules for standardized education of all obstetric providers and clinical support staff involved in the care of pregnant and postpartum women. The AIM eModules have been designed to be interactive and collaborative. Each of the 4-R domains are addressed in the obstetric hemorrhage eModules. The eModules are available free of cost online at http://safehealthcareforeverywoman.org/aim-program/aim-emodules/ as well as within the HealthStream Catalog for subscribing healthcare facilities.

Each obstetric provider and obstetric nurse should complete the following eModules:

- AIM eModule Introduction
- AIM eModule 1: Maternal Early Warning System (MEWS)
- AIM eModule 2: Obstetric Hemorrhage

ACOG Practice Bulletin No. 7, October 2006: Postpartum Hemorrhage

Existing Slide Sets for Professional Education:

- Example #1: ACOG District II, Safe Motherhood Initiative, Obstetric Hemorrhage Slide Set
  Available online: http://www.acog.org/About-ACOG/ACOG-Districts/District-II/SMI-OB-Hemorrhage

- Example #2: CMQCC Planning for and Responding to Obstetric Hemorrhage, California Maternal Quality Care Collaborative Obstetric Hemorrhage Version 2.0 Task Force
  Available online: https://www.cmqcc.org/resource/ob-hemorrhage-toolkit-v20-educational-slideset

A5. Simulation & Drills

Simulation has been demonstrated to improve short term response to obstetric emergencies and improve long term recollection. The goal of performing simulation scenarios is to test preparedness for a clinical emergency, identify strengths and weaknesses in unit policies and procedure, provide hands-on training for less experienced staff and enhance teamwork and communication. Participants in the OHI are encouraged to arrange scheduled and unscheduled drills that involve all members of the clinical care and support team who may play a role in the management of an obstetric hemorrhage. Simulations can be performed in a simulation lab or classroom, while drills ideally take place 'in-situ' or on the involved unit (Labor and Delivery, Postpartum floor, Emergency Department).

Simulation & Drills Quality Measures- Provider & Nurses:

Report # of Drills and the drill topics

1. In this quarter, how many OB drills (In Situ and/or Sim Lab) were performed on your unit for any maternal safety topic?
2. In this quarter, what topics were covered in the OB drills?

Recommended Resources:

- **ACOG OB-GYN Simulations Curricula: Postpartum Hemorrhage: Uterine Atony**
  http://www.acog.org/About-ACOG/ACOG-Departments/Simulations-Consortium/OB-GYN-Simulations-Curricula

- **AWHONN OB Hemorrhage Webinars: Simulation Based Training Strategies**
  http://www.pphproject.org/resources.asp

- **CMQCC OB Hemorrhage Toolkit V 2.0**
  OB Hemorrhage Simulation Drills, Educational Tools #1- #4
  https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit

- **Wisconsin Association for Perinatal Care: Case Scenario for the Postpartum Hemorrhage Drill**
  http://www.perinatalweb.org/themes/wapc/assets/docs/participant_drill.pdf

- **Kaiser Permanente Postpartum Hemorrhage Perinatal Simulation Scenarios**
  http://kp.simmedical.com/sites/kaiser/resources/pdf/perinatal_postpartum_hemorrhage.pdf

SAMPLE CASE SCENARIO: Kaiser Permanente

PERINATAL
Postpartum Hemorrhage

KAISER PERMANENTE®

Perinatal Simulation Scenarios

SCENARIO OVERVIEW

Summary of case

Patient is a 29-year-old G5 P5, in LDR 1 hour after delivering a 4 kg (8.8 lb) male infant. There is a large amount of blood noted on pad underneath the patient and her uterus is boggy. Patient's quantified blood loss during delivery was 500 mls. Patient hemorrhages 2000 mls total. End point of scenario is administration of blood products.

Progressive Complexity

- PEA/Cardiac arrest due to hypovolemia
- Blood transfusion reaction
- To OR for D&C, laceration repair or hysterectomy
- To Interventional Radiology for embolization
- Patient experiences DIC

Potential Systems Explored

- Activation of emergency response system
- Response time of blood bank
- Availability and accessibility of hemorrhage kit/cart

Length

15-25 minutes

Target group

- Multidisciplinary OB Team
- Physician or Midwife
- Charge Nurse
- Primary Nurse
- Secondary Nurse
- Anesthesia Provider
- Neonatal Team

Confederates

Father of baby or support person

PERINATAL SCENARIO 3 PAGE 1

PERINATAL
Postpartum Hemorrhage

KAISER PERMANENTE

Perinatal Simulation Scenarios

LEARNING OBJECTIVES

General Learning Objectives

- Communicate effectively with patient/family
- Communicate effectively with team using crisis resource management skills
- Demonstrate safety initiatives including medication safety practices
- Demonstrate safety initiatives including workplace safety practices
- Maintain infection control standards

Scenario Specific Objectives

- Identify postpartum hemorrhage (>500 mls for vaginal delivery/>1000 ml for cesarean section)
- Prioritize care of patient with hemorrhage
- Perform interventions for postpartum hemorrhage according to hemorrhage protocol
- Quantify blood loss
- Initiate postpartum hemorrhage protocol
- Initiate massive transfusion protocol

Debriefing Overview

- Review learning objectives
- Review interventions for postpartum hemorrhage
- Review teamwork skills
- Review communication skills including use of SBAR

- What went well?
- What might have been done differently/better?
- Share key assessments and interventions/events
- What was learned that can be taken back to the real workplace?

PERINATAL
Postpartum Hemorrhage

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Perinatal Simulation Scenarios

LEARNER PREPARATION

Pre-session activity

- Review hemorrhage protocol
- Review CMQCC Toolkit: http://www.cmqcc.org/ob_hemorrhage

Briefing (patient story)

It is shift change. A G5 P5 patient delivered a 4 kg male infant vaginally approximately 1 hour ago. Currently, patient has a patent IV in her right arm of LR 1000 mls with 20 units of Oxytocin infusing at 50 ml/hr. Quantified blood loss at delivery was 500 mls.

Additional Information, Medical History

- Allergies: NKDA
- Medications: PCN
- OB History: G5 P5
- Wt: 90.9kg/200 lbs
- Past Surgical History: negative
- VS 1 hour ago: HR 84; RR 20; BP 110/70; T 98
- Glucose 116
- Hgb 8.8
- Hct 39
- HIV negative
- Plt 298
- Fundal height 2 fingerbreadths above umbilicus
- Lochia: large amount of bright red bleeding and moderate-sized clots
- Patient voided 15 minutes ago
- Social History: Family at bedside with newborn

PERINATAL
Postpartum Hemorrhage

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Perinatal Simulation Scenarios

EQUIPMENT PREPARATION

Equipment

- ❑ IV pump
- ❑ IV supplies/fluids
- ❑ Urinary catheterization supplies
- ❑ Hemorrhage cart
- ❑ Code Blue cart
- ❑ Pressure infusion equipment

Blood Products

- ❑ 4 - 6 Units Packed Red Blood Cells (PRBC)
- ❑ 4 Fresh Frozen Plazma (FFP)
- ❑ 1 Platelets (PLT)
- ❑ Blue pads with blood and perineal pads/napkins
- ❑ Vaginal packing
- ❑ Intrauterine tamponade device
- ❑ Fluid warmer
- ❑ Central line kit
- ❑ Sequential compression stockings
- ❑ OR Supplies for D&C, laceration repair, hysterectomy
- ❑ Interventional Radiology (IR) embolization equipment

Medications

- ❑ Oxytocin 60 units/Litre
- ❑ Methergine 0.2 mg IM
- ❑ Misoprostol 800 -1000 mcg PR
- ❑ Hemabate 250 mcg IM

Room Preparation

- ❑ Labor room
- ❑ OR
- ❑ Set up for cesarean section

Simulator Preparation

- ❑ Hybrid Simulation: Standardized Patient dressed in hospital gown and PROMPT simulator
- ❑ SimMan 3G dressed in hospital gown for OR case
- ❑ IV LR right arm at 50 ml/hr
- ❑ ID and allergy band
- ❑ Bloody pads under patient
- ❑ Simulated blood loss
- ❑ Use a balloon to simulate boggy fundus

PERINATAL
Postpartum Hemorrhage

KAISER PERMANENTE

Perinatal Simulation Scenarios

EVENTS / PROPOSED CORRECT TREATMENT

- ❑ Documentation: Electronic Patient Record/ Emergency Hemorrhage Checklist
- ❑ Assess fundus
- ❑ Assess blood loss
- ❑ Massage fundus
- ❑ Call for help
- ❑ Communicate effectively with patient/family
- ❑ Communicate effectively with team
- ❑ Communicate with Blood Bank
- ❑ Consider cause: e.g. retained placenta (POC), lacerations/tears, DIC
- ❑ Bimanual massage
- ❑ Intrauterine tamponade device
- ❑ Type and Cross 2 units of PRBCs
- ❑ Attach 3-lead ECG

BLOOD LOSS BETWEEN 500 TO 1000ML AND/OR HR 100 TO 120

___ Call for Assistance
___ Hemorrhage Kit and Tamponade Device in Room
___ O2 @ 4-6 Liters
___ IV Second Line Start and Draw Labs
___ 2 Litres NS (Warm Fluids and/or Warm Patient)
___ Vitals Q 5 Mintues, Call Out and Record
___ Foley Cath (Record Initial Amount of Urine)

Give Meds As Needed For Atony and Record Dose

___ PITOCIN 60 Units/Litre
___ METHERGINE 0.2 IM X 1
___ CYTOTEC 1000 Mcg PR
___ HEMABATE 250 Mcg IM Q 15 Minutes
___ Use Tamponade Device NOW!!!

BLOOD LOSS GREATER THAN 1500ML OR HR OVER 120

Move Patient to OR and Notify Anesthesia

___ Activate OB Hemorrhage Protocol: 4-6 PRBC/4FFP/1 PLT
___ Place in Trendelenberg
___ Blood/ Fluid Warmer
___ Keep Patient Warm (Patient Warming Device or Extra Blankets)
___ Vital Signs Q 5 Min and Total Fluids Q 15 Min
___ Labs: Ca/K/Bicarb/Lactic Acid/ABG/Repeat H/H/ Coags/Wall Clot
___ Get Crash Cart (If Not in OR)

Surgical Intervention Based On Cause

___ Tone: Tamponade Device or B-Lynch if Atony
___ Tissue: D & C if Retained Products
___ Trauma: Repair of Laceration if Trauma
___ Thrombin: Massive Transfusion (Recommend Factor Viia) If DIC
___ Transfusion Begins: Ratio 4-6 PRBCS: 4 FFP: 1 PLTS

Advanced Interventions

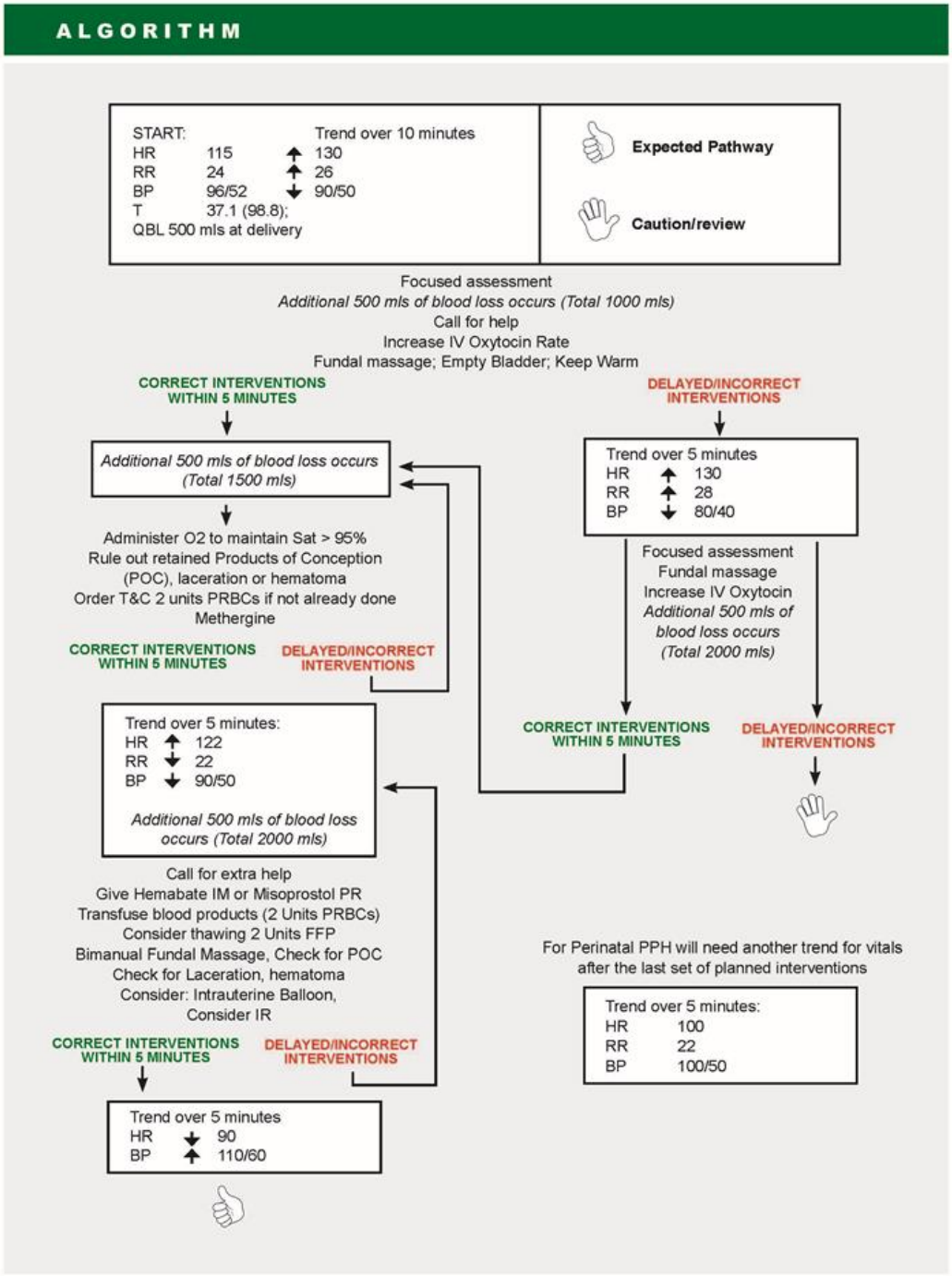
___ Call Interventional Radiology if Patient Stable
___ Laparotomy and Uterine Artery Ligation
___ Hysterectomy if Needed
___ Notify ICU Patient Will Need to Come Over

PERINATAL
Postpartum Hemorrhage

KAISER PERMANENTE®

Perinatal Simulation Scenarios

ALGORITHM



RECOGNITION & PREVENTION

There are three domains of Recognition and Prevention that should be implemented for every patient to reduce delays in care and maximize appropriate clinical planning and response.

Recommendations for **Every Patient**:

- ✓ **Assessment of hemorrhage risk at multiple points in care**
  - Antepartum (consideration for need of transfer of care for highest risk patients)
  - Admission to Labor & Delivery
  - During Labor
  - Transfer to postpartum care
- ✓ **Measurement of cumulative blood loss with quantitative methods**
- ✓ **Activate management of 3rd stage of labor**

Recognition and Prevention also require every facility to have a predefined system for identifying women in need of increased surveillance, treatment and care escalation.
Every unit should establish a Maternal Early Warning System to trigger escalated care.

Recommended Resources:

- **AWHONN Practice Brief 2: Oxytocin Administration for Management of Third Stage of Labor (AWHONN)** http://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Recognition-1-AWHONN-Oxytocin-Administration.pdf
- **Postpartum Hemorrhage Project (AWHONN)** http://www.pphproject.org/resources.asp
- **Postpartum Hemorrhage: Third Stage Pregnancy (AAFP)** http://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Recognition-3-AAFP-ALSO-Postpartum-Hemorrhage-Chapter-J.pdf
- **WHO Recommendations for the Prevention and Treatment of Postpartum Hemorrhage (WHO)** http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/9789241548502/en/

B1. Hemorrhage Risk Assessment

Risk assessment for obstetric hemorrhage should occur for every patient beginning with prenatal care and extending through the postpartum period. Adequate assessment of risk is at the cornerstone of preparing needed interventions, expertise and appropriate level of care to respond to potential degrees of hemorrhage. Hemorrhage risk can evolve for a patient over the course of her entire pregnancy as well as within minutes during a hospital admission and care providers should be prepared to continuously identify and respond to changes in risk level. Risk assessment guidelines should be incorporated into routine practice and where possible built into the electronic medical record for consistent documentation for every patient.

Hemorrhage Risk Assessment Quality Measure

1. At the end of this quarter, what cumulative proportion of mothers had a hemorrhage risk assessment with risk level assigned, performed at least once between admission and birth and shared among the team?

Recommended Resources:

AIM eModule 2: Obstetric Hemorrhage Recognition & Prevention
http://www.safehealthcareforeverywoman.org/aim-emodules-2.php

CMQCC OB Hemorrhage Toolkit V 2.0 - Risk Factor Assessment
https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit

Example Risk Assessment Tools:

California Maternal Quality Care Collaborative

Table 1: Pregnancy/Admission risk factors

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, percreta, increta
≤ 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 post partum hemorrhage	History of previous post partum hemorrhage	Active bleeding (greater than show) on admit
	Large uterine fibroids	Known coagulopathy

CMQCC
California Maternal
Quality Care Collaborative

Example Risk Assessment Tools:

ACOG District II Safe Motherhood Initiative

EXAMPLE

OBSTETRIC HEMORRHAGE

Risk Assessment Tables

PRENATAL		
RISK FACTORS	☐ Suspected previa/accreta/increta/percreta	
	☐ Pre-pregnancy BMI > 50	
	☐ Clinically significant bleeding disorder	
	☐ Other significant medical/surgical risk *(consider patients who decline transfusion)*[1]	
INTERVENTION	☐ Transfer to appropriate level of care for delivery[2]	

ANTEPARTUM		TIMING OF DELIVERY (WEEKS)
RISK FACTORS	☐ Placenta accreta	34 0/7 – 35 6/7
	☐ Placenta previa	36 0/7 – 37 6/7
	☐ Prior classical cesarean	36 0/7 – 37 6/7
	☐ Prior myomectomy	37 0/7 – 38 6/7
	☐ Prior myomectomy, if extensive	36-37
PLACENTA ACCRETA MANAGEMENT[3]	For 1 or more prior cesareans, placental location should be documented prior to delivery. Patients at **high risk** for placenta accreta, should:	
	☐ Obtain proper imaging to evaluate risk prior to delivery	
	☐ Be transferred to appropriate level of care for delivery if accreta is suspected	

[1] *See supplemental guidance document on patients who decline blood products*

[2] *Review availability of medical/surgical, blood bank, ICU, and interventional radiology support*

[3] *See supplemental guidance document on morbidly adherent placenta*

REVISED OCTOBER 2015

Safe Motherhood Initiative

ACOG THE AMERICAN CONGRESS OF OBSTETRICIANS AND GYNECOLOGISTS District II

EXAMPLE

OBSTETRIC HEMORRHAGE

Risk Assessment Tables

LABOR & DELIVERY ADMISSION

	MEDIUM RISK	HIGH RISK
RISK FACTORS	☐ Prior cesarean, uterine surgery, or multiple laparotomies	☐ Placenta previa/low lying
	☐ Multiple gestation	☐ Suspected accreta/percreta
	☐ > 4 prior births	☐ Platelet count < 70,000
	☐ Prior PPH	☐ Active bleeding
	☐ Large myomas	☐ Known coagulopathy
	☐ EFW > 4000 g	☐ 2 or more medium risk factors
	☐ Obesity (BMI > 40)	/
	☐ Hematocrit < 30% & other risk	/
INTERVENTION	☐ **Type & SCREEN, review protocol**	☐ **Type & CROSS, review protocol**

INTRAPARTUM

	MEDIUM RISK	HIGH RISK
RISK FACTORS	☐ Chorioamnionitis	☐ New active bleeding
	☐ Prolonged oxytocin > 24 hours	☐ 2 or more medium (admission and/or intrapartum) risk factors
	☐ Prolonged 2nd stage	/
	☐ Magnesium sulfate	/
INTERVENTION	☐ **Type & SCREEN, review protocol**	☐ **Type & CROSS, review protocol**

** Establish a culture of huddles for high-risk patients and post-event debriefing **

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B2. Maternal Early Warning Systems

Deaths from maternal hemorrhage are often preceded by delays in recognition, diagnosis and timely treatment of excess blood loss. The National Partnership for Maternal Safety as well as the Joint Commission support that every hospital have a predefined set of criteria representing early warning signs of a change in the patient's status and when an escalation of care is required. Maternal early warning systems have been proposed specifically for the obstetric population and obstetric facilities. An effective system includes guidelines followed for every obstetric patient on surveillance, triggers for response and clear communication and care escalation strategies. Facilities should also incorporate specific triggers for blood loss into their surveillance systems.

Recommended Resources:

AIM eModule 1: Maternal Early Warning Systems (MEWS)
http://www.safehealthcareforeverywoman.org/eModules/eModule-MEWS-1/presentation.html

The National Partnership for Maternal Safety: Maternal Early Warning Criteria[5]

Systolic BP (mm Hg)	<90 or >160
Diastolic BP (mm Hg)	>100
Heart rate (beats per min)	<50 or >120
Respiratory rate (breaths per min)	<10 or >30
Oxygen saturation on room air, at sea level, %	<95
Oliguria, mL/hr for ≥2 hours	<35
Maternal agitation, confusion, or unresponsiveness; Patient with preeclampsia reporting a non-remitting headache or shortness of breath	

BP, blood pressure.
These triggers cannot address every possible clinical scenario that could be faced by an obstetric clinician and must not replace clinical judgment. As a core safety principle, bedside nurses should always feel comfortable to escalate their concerns at any point.

[5] Mhyre, J., D'Oria, R., et. al.; The Maternal Early Warning Criteria: A Proposal from the National Partnership for Maternal Safety. Obstetrics & Gyncology. 124(4): 82-876, October 2014

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California Maternal
Quality Care Collaborative

Clinical Signs of Hypovolemia

Amount of Blood Loss	Clinical Signs
1000 mL	Slight change in blood pressure, heart rate normal, palpitations, respiratory rate normal, dizziness, normal urine output
1500 mL	Narrowed pulse pressure*, heart rate over 100, respiratory rate 20-30, diaphoretic, weak, urine output 20-30 mL/hr
2000 mL	Hypotension, narrowed pulse pressure, heart rate over 120, respiratory rate 30-40, pale, extremities cool, restlessness, urine output 5-15 mL/hr
≥ 2500 mL	Profound hypotension, heart rate over 140, respiratory rate over 40, slight urine output or anuria

*Pulse pressure is the difference between the systolic and diastolic blood pressure. With hemorrhage a rise in the diastolic pressure reflects vasoconstriction and narrows the pulse pressure.[4,11]

Source: CMQCC: Obstetric Hemorrhage Toolkit V 2.0: Recognition: Definition, Early Recognition and Rapid Response Using Triggers

B3. Quantification of Blood Loss

The accuracy in the estimation of actual blood loss during birth and the postpartum period can significantly contribute to delayed response that can result in preventable morbidity or death.

Studies have indicated that visual estimation of blood loss can underestimate blood loss by as much as 50%. Accurate assessment allows for the recognition of potentially life-threatening hemorrhage and managing blood product replacement and treatment response[6].

Two complimentary strategies can be employed:

1. Collection of blood in measurement containers
    - Calibrated under-buttocks drapes for vaginal delivery
    - Calibrated canisters for cesarean delivery
2. Weighing blood soaked items from delivery room, OR and throughout hemorrhage

Detailed guidelines for implementing quantification of blood loss strategies (QBL) can be found in existing toolkits. Implementation should involve a multidisciplinary approach that utilizes regular training, automated calculation tools to ensure accuracy and consistency across every patient.

Quantification of Blood Loss Quality Measure

In this quarter, what proportion of mothers had measurement of blood loss from birth through the recovery period using quantitative and cumulative techniques?

Recommended Resources:

- **AIM eModule 2: Recognition & Prevention**
  http://www.safehealthcareforeverywoman.org/eModules/eModule-2-Recognition/presentation.html
- **AWHONN Postpartum Hemorrhage Project: Quantification of Blood Loss Video:**
  http://www.safehealthcareforeverywoman.org/eModules/eModule-2-Recognition/presentation.html
- **Quantification of Blood Loss, Practice Brief Number 1 (see appendix)**
  http://www.jognn.org/article/S0884-2175(15)31768-8/fulltext
- **CMQCC: Obstetric Hemorrhage Toolkit V 2.0- Cumulative Quantitative Assessment of Blood Loss (see appendix)**
  https://www.cmqcc.org/resource/ob-hem-cumulative-quantitative-assessment-blood-loss
- **FPQC: Obstetric Hemorrhage Initiative**
  http://health.usf.edu/publichealth/chiles/fpqc/OHI.htm
- **Free Online course: Quality Improvement in Obstetric Hemorrhage Management. 1 CME/ 1.25 AMA**
  http://hscweb3.hsc.usf.edu/health/publichealth/news/obstetric-hemorrhage-management-online-course-available/
- **Lee Memorial Health System's Tips and Tricks on Quantification of Blood Loss After Vaginal Birth**
  https://vimeo.com/107626785

[6] AIM eModule 2, Obstetric Hemorrhage Recognition. http://www.safehealthcareforeverywoman.org/eModules/eModule-2-Recognition/presentation.html

Example Quantification of Blood Loss Charts and Learning Aids

Source: Florida Perinatal Quality Collaborative

Postpartum Hemorrhage Quantification of Blood Loss

Procedure for Quantification of Blood Loss (QBL)

- Weigh all bloody items in grams
- Subtract dry weights in grams
- Remaining weight in grams = ml blood loss

1 gram = 1 ml

Use of a calibrated under the buttocks drape clearly shows an amount of 275 ml of blood loss.

Dry Weights

Xtra Absorb Pad	130 g
Blue Chux	20 g
Lg Sanitary Pad	77 g
Sm Sanitary Pad	12 g
Lap Sponge	21 g
Mini Lap Sponge	7 g
Raytex 4x4	5 g
Blue Towel	55 g

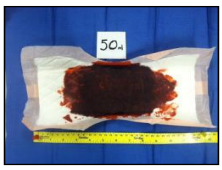
Visual Estimation of Blood Loss

25 ml blood saturates about 50% area

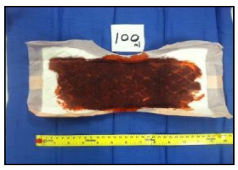
50 ml blood saturates about 75% area

75 ml blood saturates entire surface

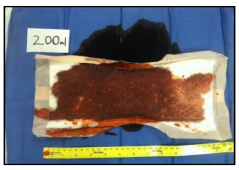
100 ml blood will saturate entire lap and drip



50 ml

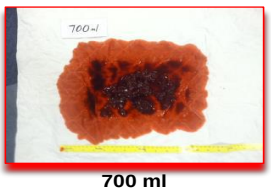


100 ml



200 ml

500 ml



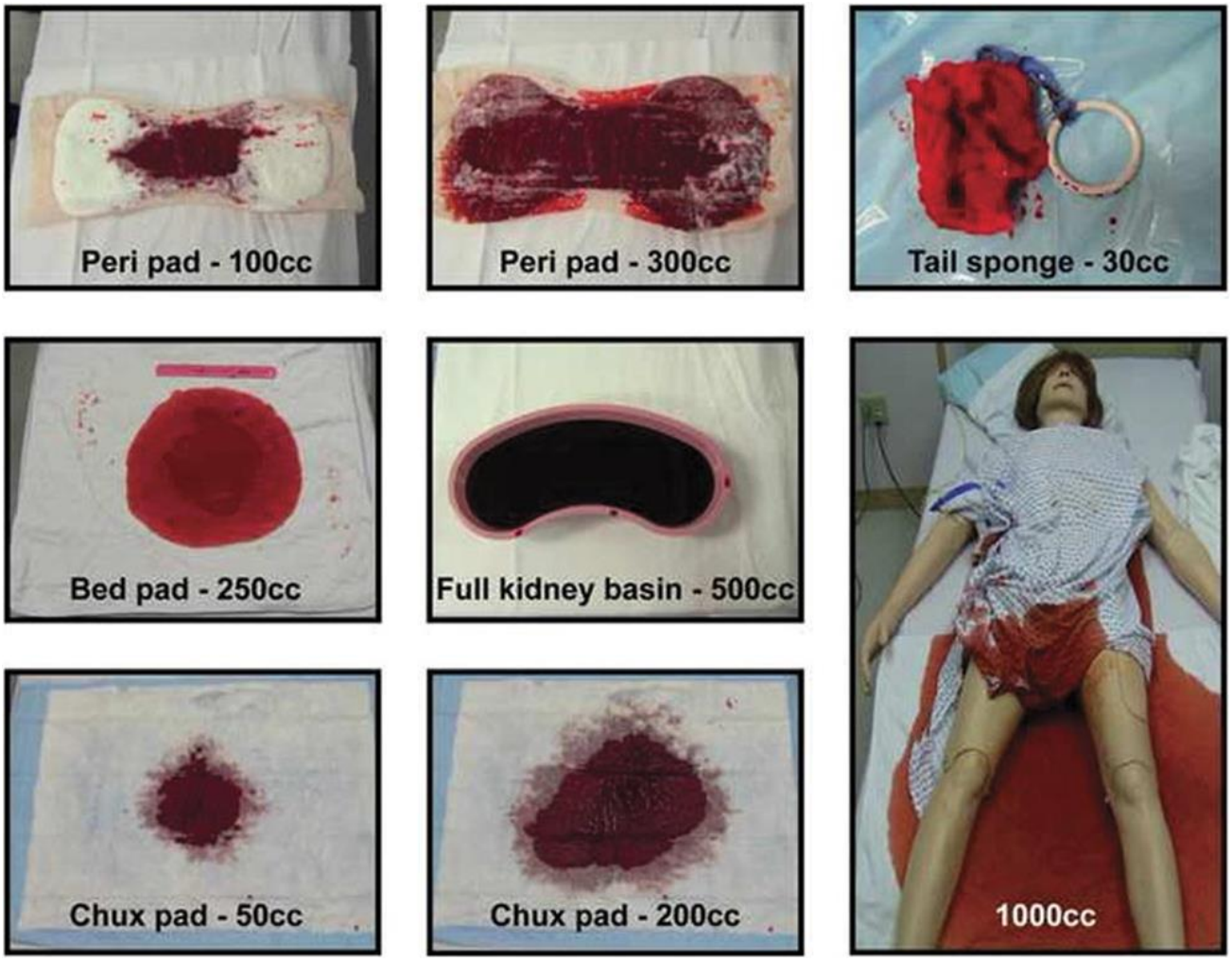
700 ml

Poster created by: Tricia Walton, RNC, BSN and Hedy Edmund, RNC, and the Florida Perinatal Quality Collaborative

* Dry weights provided as an example. Each facility is encouraged to weigh its own commonly used sponges and pads.

Note: Visual aids and training can improve visual estimation of blood loss in situations where measured or quantified methods are not readily available. However, visual estimation remains less accurate than measured assessments. All facilities are encouraged to adopt a regular system to measure blood loss.

Visual Estimation Pocket Card:



Source: Zuckerwise LC, Pettker CM, Illuzzi J, Raab CR, Lipkind HS. Use of a novel visual aid to improve estimation of obstetric blood loss. Obstet Gynecol. 2014;123(5):982–986.

Weighing Sponges Post Delivery

Source: AIM eModule 2, Photos provided by Jill Mhyer, Jill McNulty, A. Scott MSN

APPENDIX I: ROUTINE TWO STEP QUANTIFICATION OF BLOOD LOSS AT CESAREAN BIRTH

Routine Two Step Quantification of Blood Loss at CS

1 **Suctioned blood**
   a. Between delivery of infant and placenta;
      i. OB suctions drape of amniotic fluid
      ii. Scrub staff directs Circulator to change suction tubing to second canister
      iii. May omit switch to new canister if minimal amniotic fluid (patient is post AROM/SROM, in labor)
   b. Circulator records volume in second canister in spreadsheet calculator/EPIC calculator
      i. Best to record before irrigation used OR
      ii. If irrigation used and suctioned, Scrub staff communicates amount to Circulator to be subtracted from canister (but may lead to error if not all irrigation re-aspirated)
      iii. Consider omitting irrigation use during routine cesarean section

2 **Lap sponges**
   a. During case, bloody lap sponges passed off scrub table by Scrub staff
   b. Circulator places in hanging lap sleeve bags (5 sponges/sleeve)
   c. Circulator weighs bloody sponges and lap sleeve bags *all together* near end of case (sponges left in sleeves)
   d. Total weight, # sponges weighed, # hanging sleeves weighed, entered in spreadsheet calculator/EPIC calculator

3 **Spreadsheet calculator/EPIC calculator calculates QBL from entered data**

Staff trained to account for other large sources of blood loss if indicated and add to QBL (examples: large amount expressed blood from uterus in emesis basin post op, large floor spill of blood, etc.)

B4. Active Management of Third Stage of Labor

The purpose of the active management of the third stage of labor (AMTSL) is to reduce postpartum blood loss and reduce the risk of postpartum hemorrhage. While AMTSL has originally included three components including administration of uterotonics, gentle controlled cord traction and uterine massage, recent evidence supports prophylactic intravenous oxytocin use as the primary method of reducing PPH. The benefit of the other components is less well supported by evidence. AMTSL is a prophylactic strategy and is distinct from the treatment of hemorrhage.

Recommended Practice: All facilities offer prophylactic oxytocin administration after birth for the prevention of postpartum hemorrhage with an established written administration protocol.

Additional considerations:

- Oxytocin is recommended as the first-line uterotonic agent and is the most important component of AMTSL.
- Early skin-to-skin and breastfeeding supports physiologic uterine tone and should not be delayed or denied to complete other component of AMTSL.
- Delayed cord clamping has not been demonstrated to increase the risk of maternal hemorrhage and AMTSL should not interfere with delayed cord clamping where appropriate. Postponing oxytocin administration until delayed cord clamping is complete does not increase the risk of hemorrhage.
- Appropriately counseled low-risk women who are experiencing a physiologic birth that make an informed choice to decline prophylactic oxytocin should be supported in their decision.

Recommended Resources:

- **AWHONN Guidelines for Oxytocin Administration After Birth, Practice Bulletin Number 2 (see appendix)**
  http://www.jognn.org/article/S0884-2175(15)31765-2/fulltext

- **CMQCC: Obstetric Hemorrhage Toolkit v 2.0 - Active Management of Third Stage of Labor**
  https://www.cmqcc.org/resource/ob-hem-active-management-third-stage-labor

RESPONSE

There are two key response interventions that should be utilized with every hemorrhage.

Recommendations for every case of hemorrhage:

✓ **A unit-standard stage-based obstetric hemorrhage emergency management plan including:**

a. Triggering events within each hemorrhage stage ~ Established Early Warning System
b. Formal response teams
c. Communication plan for activation
d. Necessary medications/equipment and tools
e. Multidisciplinary design
f. Drills/debriefs/reviews

✓ **Support program for patients, family and staff for all significant hemorrhages**

Recommended Education:

- **AIM eModule 2: Obstetric Hemorrhage- Response**
  http://www.safehealthcareforeverywoman.org/eModules/eModule-2-Response/presentation.html
- **ACOG Committee Opinion 590: Preparing for clinical emergencies in obstetrics and gynecology (ACOG)**
  http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Patient-Safety-and-Quality-Improvement/Preparing-for-Clinical-Emergencies-in-Obstetrics-and-Gynecology
- **Improving Health Care Response to Obstetric Hemorrhage (CMQCC)**
  http://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Response-2-Improving-Health-Care-Response-to-Obstetric-Hemorrhage-CMQCC.pdf
- **Medically Induced Trauma Support Services. Tools for Building a Clinician and staff Support Program (MITSS)**
  http://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Response-3-Clinician-Support-Tool-Kit-for-Healthcare-05-07-2012.pdf
- **Obstetric Hemorrhage Initiative (OHI) Tool Kit for Hospital Implementation (FPQC)**
  http://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Response-4-FPQC-OHI-Toolkit.pdf
- **Postpartum Hemorrhage Project (AWHONN)**
  http://www.pphproject.org/resources.asp
- **Safe Motherhood Initiative (ACOG District II)**
  http://www.acog.org/About-ACOG/ACOG-Districts/District-II/Safe-Motherhood-Initiative

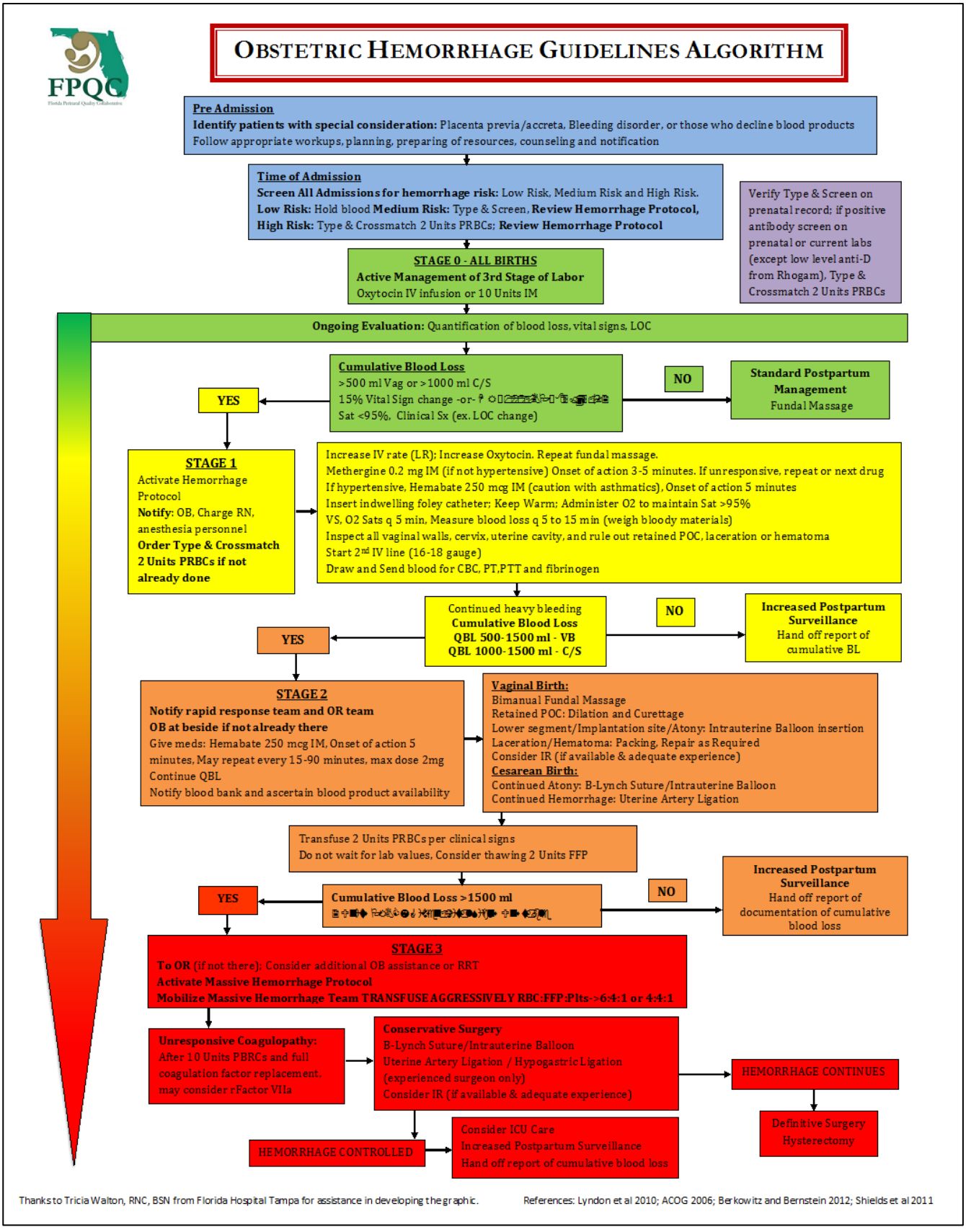
Example Obstetric Emergency Management Plans:

CMQCC CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

Obstetric Hemorrhage Emergency Management Plan: Table Chart Format

version 2.0

	Assessments	Meds/Procedures	Blood Bank
Stage 0 *Stage 0 focuses on risk assessment and active management of the third stage.*	**Every woman in labor/giving birth** • Assess every woman for **risk factors** for hemorrhage • Measure **cumulative quantitative 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 *Stage 1 is short: activate hemorrhage protocol, initiate preparations and give Methergine IM.*	**Blood loss: > 500ml vaginal or >1000 ml Cesarean, or VS changes (by >15% or HR ≥110, BP ≤85/45, O2 sat <95%)** • Activate OB Hemorrhage Protocol and Checklist • Notify Charge nurse, OB/CNM, Anesthesia • VS, O2 Sat q5' • Record **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 *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.*	**Continued bleeding with total blood loss under 1500ml** **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 mcg SL **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 *Stage 3 is focused on the Massive Transfusion protocol and invasive surgical approaches for control of bleeding.*	**Total blood loss over 1500ml, or >2 units PRBCs given or VS unstable or suspicion of DIC** • **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 apheresis pack per 4-6 units PRBCs **Unresponsive Coagulopathy:** After 8-10 units PRBCs and full coagulation factor replacement: may consult re rFactor VIIa risk/benefit



Thanks to Tricia Walton, RNC, BSN from Florida Hospital Tampa for assistance in developing the graphic.

References: Lyndon et al 2010; ACOG 2006; Berkowitz and Bernstein 2012; Shields et al 2011

C1. Hemorrhage Response Checklist & Algorithms

EXAMPLE

Obstetric Hemorrhage Checklist

Complete all steps in prior stages plus current stage regardless of stage in which the patient presents.

RECOGNITION:

☐ Call for assistance (Obstetric Hemorrhage Team)

Designate: ☐ Team leader _____ ☐ Checklist reader/recorder ☐ Primary RN

Announce: ☐ Cumulative blood loss ☐ Vital signs _____ ☐ Determine stage

STAGE 1: BLOOD LOSS > 500 mL vaginal OR blood loss > 1000 mL cesarean with normal vital signs and lab values

INITIAL STEPS:

☐ Ensure 16G or 18G IV Access
☐ Increase IV fluid (crystalloid without oxytocin)
☐ Insert indwelling urinary catheter
☐ Fundal massage

MEDICATIONS:

☐ Increase oxytocin, additional uterotonics

BLOOD BANK:

☐ Type and Crossmatch 2 units RBCs

ACTION:

☐ Determine etiology and treat
☐ Prepare OR, if clinically indicated (optimize visualization/examination)

Oxytocin (Pitocin):
10-40 units per 500-1000mL solution

Methylergonovine (Methergine):
0.2 milligrams IM

15-methyl $PGF_2\alpha$ (Hemabate, Carboprost):
250 micrograms IM
(may repeat in q15 minutes, maximum 8 doses)

Misoprostol (Cytotec):
800-1000 micrograms PR
600 micrograms PO or 800 micrograms SL

Tone (i.e., atony)
Trauma (i.e., laceration)
Tissue (i.e., retained products)
Thrombin (i.e., coagulation dysfunction)

STAGE 2: CONTINUED BLEEDING (EBL up to 1500mL OR > 2 uterotonics) with normal vital signs and lab values

INITIAL STEPS:

☐ Mobilize additional help
☐ Place 2nd IV (16-18G)
☐ Draw STAT labs (CBC, Coags, Fibrinogen)
☐ Prepare OR

MEDICATIONS:

☐ Continue Stage 1 medications

BLOOD BANK:

☐ Obtain 2 units RBCs (DO NOT wait for labs. Transfuse per clinical signs/symptoms)
☐ Thaw 2 units FFP

ACTION:

☐ Escalate therapy with goal of hemostasis

Huddle and move to Stage 3 if continued blood loss and/or abnormal VS

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Stage 3: Continued Bleeding (EBL > 1500mL OR > 2 RBCs given OR at risk for occult bleeding/coagulopathy OR any patient with abnormal vital signs/labs/oliguria)

Initial Steps:
- ☐ Mobilize additional help
- ☐ Move to OR
- ☐ Announce clinical status (vital signs, cumulative blood loss, etiology)
- ☐ Outline and communicate plan

Medicatons:
- ☐ Continue Stage 1 medications

Blood Bank:
- ☐ Initiate Massive Transfusion Protocol (If clinical coagulopathy: add cryoprecipitate, consult for additional agents)

Action:
- ☐ Achieve hemostasis, intervention based on etiology

Oxytocin (Pitocin):
10-40 units per 500-1000mL solution

Methylergonovine (Methergine):
0.2 milligrams IM

15-methyl $PGF_2\alpha$ (Hemabate, Carboprost):
250 micrograms IM
(may repeat in q15 minutes, maximum 8 doses)

Misoprostol (Cytotec):
800-1000 micrograms PR
600 micrograms PO or 800 micrograms SL

Stage 4: Cardiovascular Collapse (massive hemorrhage, profound hypovolemic shock, or amniotic fluid embolism)

Initial Step:
- ☐ Mobilize additional resources

Medications:
- ☐ ACLS

Blood Bank:
- ☐ Simultaneous aggressive massive transfusion

Action:
- ☐ Immediate surgical intervention to ensure hemostasis (hysterectomy)

Post-Hemorrhage Management
- Determine disposition of patient
- Debrief with the whole obstetric care team
- Debrief with patient and family
- Document

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Example Medication and Transfusion Guidelines:
CMQCC: Uterotonic Agents for Postpartum Hemorrhage

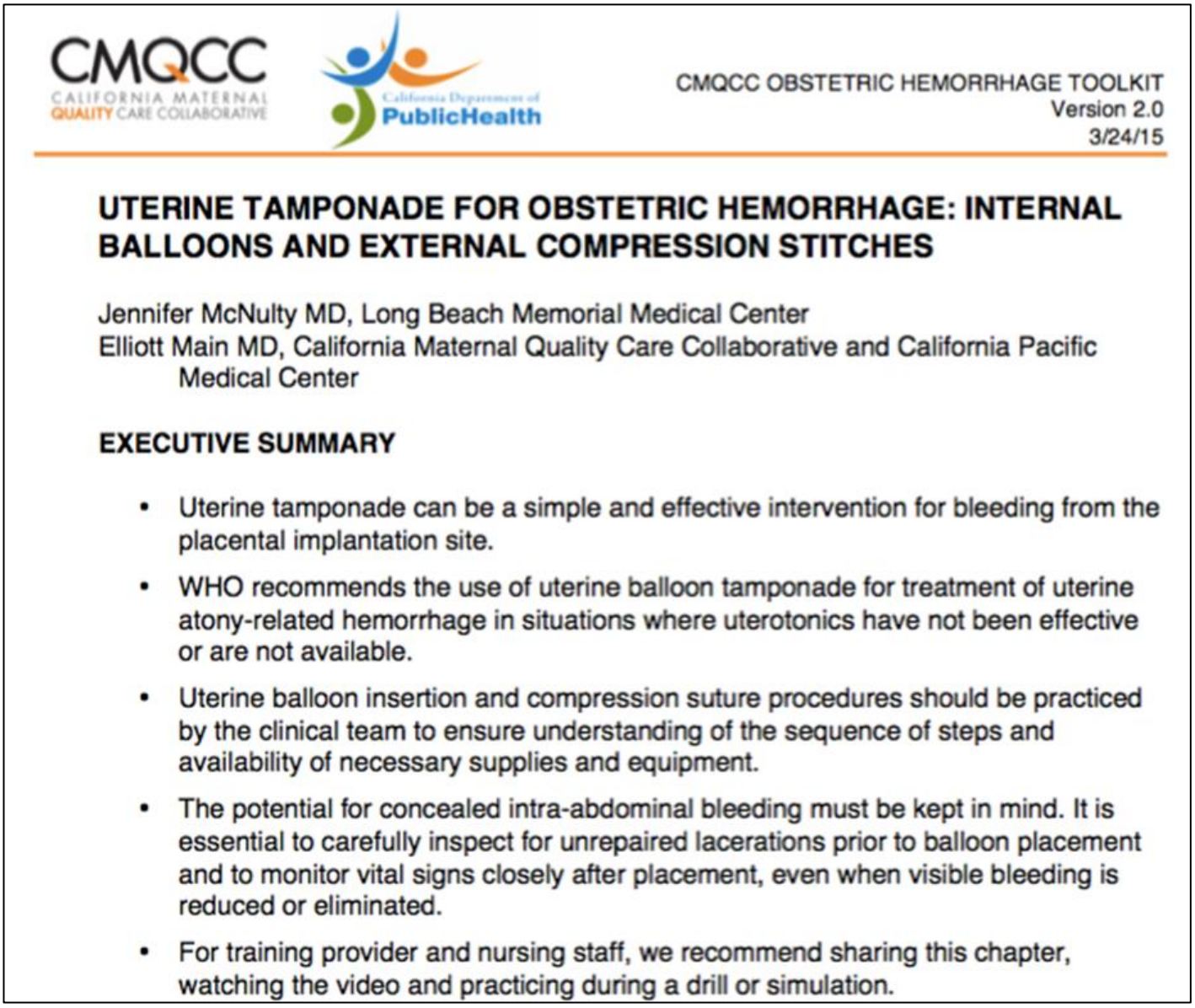
UTEROTONIC AGENTS for POSTPARTUM HEMORRHAGE

Drug	Dose	Route	Frequency	Side Effects	Contraindications	Storage
Pitocin® (Oxytocin) 10 units/ml	10-40 units per 500-1000 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) 0.2 mg/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. if given IV, which is not recommended	Hypertension, Preeclampsia, Cardiovascular 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) 250 mcg/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 200 mcg tablets	600-800 mcg	Sublingual or oral	One time	Nausea, vomiting, diarrhea Shivering, Fever (transient) Headache	Rare Known allergy to prostaglandin Hypersensitivity to drug	Room temp

BLOOD PRODUCTS

Packed Red Blood Cells (PRBC) (approx. 35-40 min. for crossmatch—once sample is in the lab and assuming no antibodies present)	Best first-line product for blood loss 1 unit = 200 ml volume If antibody positive, may take hours to days. for crossmatch, in some cases, such as autoantibody crossmatch compatible may not be possible; use "least incompatible" in urgent situations
Fresh Frozen Plasma (FFP) (approx. 35-45 min. to thaw for release)	Highly desired if > 2 units PRBCs given, or for prolonged PT, PTT 1 unit = 180 ml volume
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 40-50 k transient increase in platelets
Cryoprecipitate (CRYO) (approx. 35-45 min. to thaw for release)	Priority for women with Fibrinogen levels < 80 10 unit pack (or 1 adult dose) raises Fibrinogen 80-100 mg/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.

C3. Uterine Tamponade Surgical & Procedural Techniques



CMQCC OBSTETRIC HEMORRHAGE TOOLKIT
Version 2.0
3/24/15

UTERINE TAMPONADE FOR OBSTETRIC HEMORRHAGE: INTERNAL BALLOONS AND EXTERNAL COMPRESSION STITCHES

Jennifer McNulty MD, Long Beach Memorial Medical Center
Elliott Main MD, California Maternal Quality Care Collaborative and California Pacific Medical Center

EXECUTIVE SUMMARY

- Uterine tamponade can be a simple and effective intervention for bleeding from the placental implantation site.
- WHO recommends the use of uterine balloon tamponade for treatment of uterine atony-related hemorrhage in situations where uterotonics have not been effective or are not available.
- Uterine balloon insertion and compression suture procedures should be practiced by the clinical team to ensure understanding of the sequence of steps and availability of necessary supplies and equipment.
- The potential for concealed intra-abdominal bleeding must be kept in mind. It is essential to carefully inspect for unrepaired lacerations prior to balloon placement and to monitor vital signs closely after placement, even when visible bleeding is reduced or eliminated.
- For training provider and nursing staff, we recommend sharing this chapter, watching the video and practicing during a drill or simulation.

For complete resource see:

CMQCC Obstetric Hemorrhage Toolkit Version 2.0
https://www.cmqcc.org/resource/ob-hem-uterine-tamponade-ob-hem-internal-balloons-and-external-compression-stitches

Additional Resources:

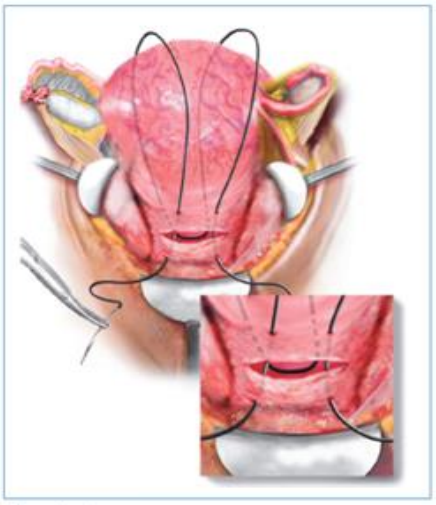
ACOG District II Safe Motherhood Initiative:
https://www.acog.org/-/media/Districts/District-II/Public/SMI/v2/HEMPosterSurgicalManagement.pdf?dmc=1&ts=20161108T2215318249

Example Surgical Management Visual Aids

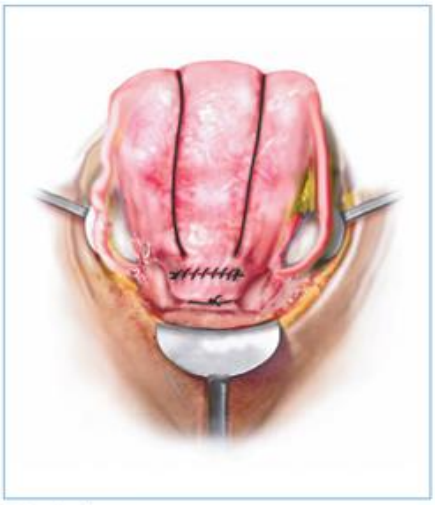
EXAMPLE

OBSTETRIC HEMORRHAGE

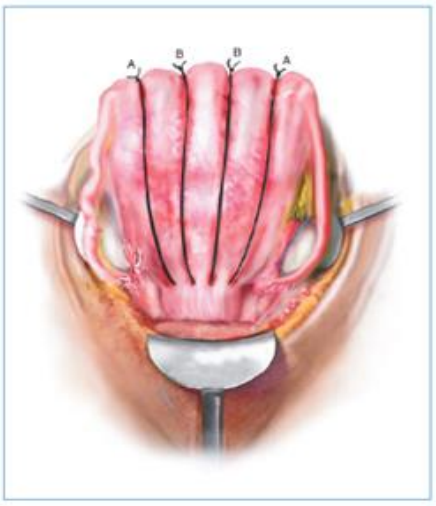
Surgical Management



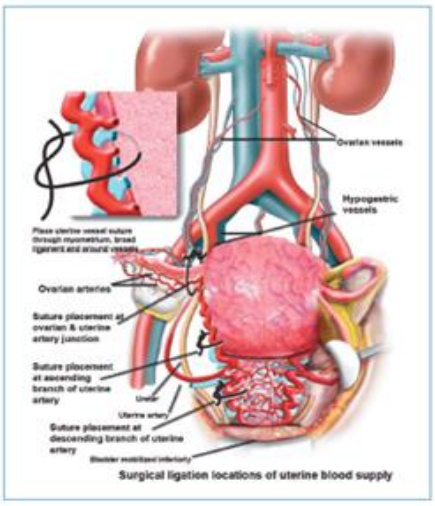
B-Lynch suture



B-Lynch suture



Hayman uterine compression suture



Surgical ligation locations of uterine blood supply

Used with permission from:
Female Pelvic Surgery Video Atlas Series, Mickey Karam, Series Editor
Management of Acute Obstetric Emergencies, Baha Sibai, MD (Copyright © 2011 by Saunders)

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Example Intrauterine Balloon Technique:

Tamponade Technique for Postpartum Hemorrhage

Refer to the Instructions for Use for complete information on product usage and proper indications and contraindications.

1 Evaluating and Monitoring the Patient

- Assess the patient's postpartum hemorrhage and its causes.
- Determine possible contraindications to the use of the Bakri Postpartum Balloon.
- Confirm that the uterus is free of placental attachments or fragments and that there are no lacerations.
- Evaluate the patient for:
  - Vital signs
  - Pallor
  - Blood pressure
  - Urine output
  - Uterine tone
  - Active and total blood loss
  - Pulmonary function
  - Hematocrit level
  - General patient condition (shock)
- Continue monitoring the patient carefully throughout the process.

2 Determining Uterine Volume

- **Estimate the uterine cavity's volume by direct or ultrasound examination.**
- **Place the predetermined volume of sterile fluid in a separate container. Do not rely on a syringe count to verify the volume.**
- **If using SOS-R, note the predetermined volume for rapid instillation.**
- **The maximum balloon volume is 500 mL.**

3 Inserting the Balloon

Tranavaginal Placement, Postvaginal Delivery (See Fig. 1)

- Insert the balloon portion of the catheter into the uterus, making certain that the entire balloon is inserted past the cervical canal and internal ostium.

Tranaabdominal Placement, Postcesarean Delivery (See Fig. 2)

- Pass the uninflated balloon, inflation port first, through the incision into the uterus and cervix. Remove the stopcock to facilitate placement, if desired.
- Have an assistant pull the balloon shaft through the vaginal canal until the base contacts the internal cervical ostium.
- Close the incision, being careful not to puncture the uninflated balloon with the suture.

4 Filling the Balloon with Sterile Liquid

- **Never inflate with air, carbon dioxide or any other gas.**
- **Do not fill with more than 500 mL. Over-inflation may result in the balloon being displaced into the vagina.**
- **Ensure that all product components are intact and that the hysterotomy is securely sutured prior to inflating the balloon.**

- Place a Foley catheter in the patient's bladder to collect urine and monitor urine output.
- Using the enclosed syringe, or rapid instillation components, fill the balloon to the predetermined volume through the stopcock.
- Traction may be applied to the balloon shaft to ensure proper contact between the balloon and the tissue surface by securing the balloon shaft to the patient's leg or attaching it to a weight (not to exceed 500 g).
- **Use ultrasound to confirm proper placement of the balloon once the balloon is inflated to the predetermined volume.**

5 Flushing the Lumen and Monitoring Hemostasis

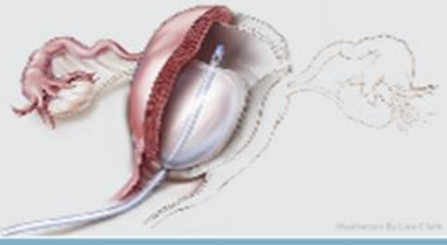
- Flush the balloon drainage port and tubing with sterile isotonic saline to clear clots. (The appropriate volume of saline and frequency of flushing should be determined by attending medical staff.)
- Connect the drainage port to a fluid collection bag to monitor hemostasis.
- Monitor the patient for signs of increased bleeding and uterine cramping.
- Continue evaluating the patient for the signs listed in Step 1.

6 Removing the Balloon

- **Maximum indwelling time: 24 hours.**
- **The timing of balloon removal should be determined by the attending clinician upon evaluation of the patient once bleeding has been controlled and the patient is stable.**

- Release the tension on the shaft and remove any vaginal packing.
- Aspirate balloon contents until the balloon is completely empty.
- Gently retract the balloon and discard it.
- Monitor the patient for signs of bleeding.

COOK MEDICAL www.cookmedical.com



Bakri®

POSTPARTUM BALLOON WITH RAPID INSTILLATION COMPONENTS

Illustrations for Inserting the Bakri Balloon [Step 3]

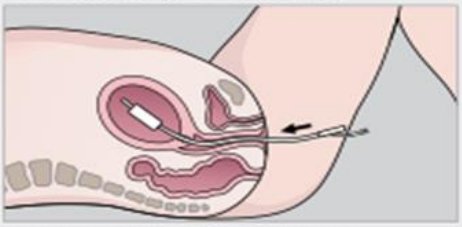


Fig. 1: Transvaginal Placement, Postvaginal Delivery

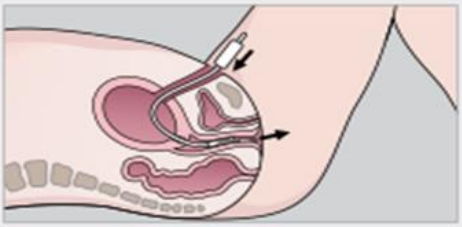


Fig. 2: Transabdominal Placement, Postcesarean Delivery

Explanation of Proper Placement

Proper Placement:

- Make sure that the entire balloon is inserted past the cervical canal and internal ostium.
- Use ultrasound to confirm proper placement of the balloon once the balloon is inflated to the predetermined volume.

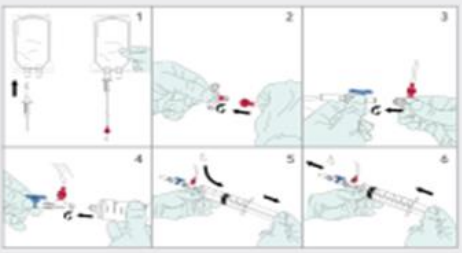
If the Balloon Becomes Displaced:

- Empty and deflate the balloon.
- Reposition the balloon in the uterus. (Reference illustration A for details.)
- Refill as indicated in Step 4.

To Prevent Displacement:

- If necessary, pack the vagina with iodine- or antibiotic-soaked gauze.
- Do not extend the packing into the uterus.

Steps for the Use of Rapid Instillation Components



C4. Patient, Family & Staff Support

Severe maternal hemorrhage can be a traumatic event for everyone involved including the patient, her family and members of the care team. Women and their families require emotional support before, during and after severe maternal events. Communication is critical, including providing the opportunity for women and families to know what happened during the event and why and to be listened to and have their experience acknowledge. Similarly, unexpected severe events and outcomes can have a significant emotional impact on clinical staff and require additional support.

Recommendation: All healthcare facilities include in their obstetric emergency plans, resources and guidelines for providing support to patients, families and clinical staff.

Patient, Family & Staff Support Quality Measure

At the completion of the project period, has your hospital developed OB specific resources and protocols to support patients, family and staff through major OB complications?

Recommended Resources:

- **ACOG District II Safe Motherhood Initiative: Support for Patients, Families, Staff** https://www.acog.org/-/media/Districts/District-II/Public/SMI/v2/PST-zs-03-AF-140519-BereavementResources.pdf

- **Medically Induced Trauma Support Services. Tools for Building a Clinician and Staff Support program.** http://www.mitsstools.org/tool-kit-for-staff-support-for-healthcare-organizations.html

- **Council on Patient Safety in Women's Healthcare: Patient Safety Bundle- Patient, Family and Staff Support after a Severe Maternal Event** (see appendix) http://www.safehealthcareforeverywoman.org/secure/patient-and-family-support-after-maternal-event-bundle.php

Example Patient, Family, Staff Support Tool - ACOG District II- Safe Motherhood Initiative

MATERNAL SAFETY BUNDLE

Tool for Staff after Severe Morbidity or Maternal Death

STEP 1 CLINICAL CARE:

- ☐ Assure patient stability
- ☐ Call for support for care of other patients & provider support (colleagues and leadership)
- ☐ Call for patient/family support and comfort (social worker, clergy, other staff member)

STEP 2a PLAN INITIAL PATIENT/FAMILY MEETING:

GATHER THE FACTS AND DEBRIEF:

- ☐ Review all medical records
- ☐ Review with other health care providers who were involved
- ☐ Clarify and understand the facts
- ☐ Avoid speculation and blame
- ☐ Assess cultural/religious practices and prep team

WHO SHOULD ATTEND THE MEETING:

- ☐ Patient and patient approved family members
- ☐ Other health care providers directly involved
- ☐ Skilled communicators, if needed
- ☐ Non-family member translator
- ☐ Meet any special needs of your patient
- ☐ Decide who will lead the discussion

LOCATION OF MEETING:

- ☐ Set the time and place for the meeting as soon as possible
- ☐ Choose a setting where you can meet face to face, seated
- ☐ Find a comfortable environment with confidentiality/privacy

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MATERNAL SAFETY BUNDLE

Tool for Staff after Severe Morbidity or Maternal Death

STEP 2b PLANNING WHAT TO SAY:

ORGANIZE YOUR THOUGHTS AND CONSIDER HOW YOU WILL:

- ☐ Manage your own emotions (but don't be afraid to show sorrow)
- ☐ Acknowledge that something unexpected has happened
- ☐ Express your concern and regret
- ☐ Respond to your patient's emotional reactions
- ☐ Respond to questions your patient is likely to ask
- ☐ Explain the process for any analysis of the adverse event

STEP 3 INITIAL PATIENT/FAMILY MEETING:

DURING MEETING:

- ☐ Find out what your patient/family already knows
- ☐ Acknowledge patient suffering and convey empathy
- ☐ Set agenda for the meeting
- ☐ Present the existing facts
- ☐ Describe clinical condition as it now exists
- ☐ Describe any future care requirements
- ☐ Express your concern and regret as appropriate
- ☐ Try not to overload with too much information
- ☐ Repeat key aspects, if needed
- ☐ Communicate in a clear, sensitive, and empathetic manner
- ☐ Welcome note taking, support persons, and questions
- ☐ Discuss how seriously you are taking the situation

END OF MEETING:

- ☐ Confirm the clinical next steps
- ☐ Summarize the discussion
- ☐ Test for understanding of information with open-ended questions
- ☐ Define what the next steps will be in process
- ☐ Answer any questions about how/why the event occurred
- ☐ Provide contact information
- ☐ Arrange a follow-up meeting

Safe Motherhood Initiative

ACOG District II

MATERNAL SAFETY BUNDLE

Tool for Staff after Severe Morbidity or Maternal Death

STEP 4 FOLLOW UP AND RECOVERY:

PATIENT/FAMILY:

- ☐ Keep patient and family aware of patient condition
- ☐ Continue to provide clinical and emotional support
- ☐ Ask what resources patient/family is using
- ☐ Provide resources for patient/family (religious, social, cultural as needed)
- ☐ Convey newly uncovered facts to your patient
- ☐ Discuss what steps have been taken to prevent similar harm
- ☐ Provide a further expression of regret

PROVIDERS:

- ☐ Inform Risk Management
- ☐ Inform primary providers of patient condition
- ☐ Arrange appropriate emotional support for all those involved
- ☐ Document the clinical care and discussions in a factual way

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Modified from:

Obstetric Communication Response Team (OCRT) Checklist, Montefiore Medical Center, 2014

Checklist for Disclosure. The Canadian Medical Protective Association (CMPA) 2008. http://www.cmpa-acpm.ca/cmpapd04/docs/resource_files/ml_guides/disclosure/checklist/index-e.html

Guidelines for Disclosure after an Adverse Event. Institute for Professionalism & Ethical Practice. The Risk Management Foundation of the Harvard Medical Institutions, Inc. 2009 https://www.rmf.harvard.edu/~/media/Files/_Global/KC/PDFs/adverse_event_guidelines.pdf

Disclosure and discussion of adverse events. Committee Opinion No. 520. American College of Obstetricians and Gynecologists. Obstet Gynecol 2012;119:686–9.

REPORTING / SYSTEMS LEARNING

There are three key domains of reporting and systems learning that every facility providing obstetric care should establish. These domains are focused upon learning from severe obstetric events in order to generate system-wide improvements.

Recommendation for every unit:

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

Recommended Education:

- **AIM eModule2: Obstetric Hemorrhage- Reporting**
  http://www.safehealthcareforeverywoman.org/eModules/eModule-2-Reporting/presentation.html
- **Facility-Based Identification of Women with Severe Maternal Morbidity: It is Time to Start – Available until 4/14/16**
  http://journals.lww.com/greenjournal/pages/articleviewer.aspx?year=2014&issue=05000&article=00012&type=abstract
- **Safe Motherhood Initiative (ACOG District II)**
  http://www.acog.org/About-ACOG/ACOG-Districts/District-II/Safe-Motherhood-Initiative
- **Standardized Severe Maternal Morbidity Review: Rationale and Process – Available until 4/14/16**
  http://journals.lww.com/greenjournal/pages/articleviewer.aspx?year=2014&issue=08000&article=00022&type=abstract

D1. Guidelines for Huddles & Debriefs

A culture of briefs, huddles and debriefs will provide obstetric teams with the opportunity to identify successes and opportunities for improvement after significant hemorrhage events. Briefs, huddles and debriefs improve role clarity, situational awareness and utilization of available resources. They should become a part of the routine culture for the unit.

Obstetric Hemorrhage Debrief Quality Measures

1. **At the project completion: Has your hospital established a system in your hospital to perform regular formal debriefs after cases with major complications?**
2. **Monthly: Proportion of obstetric hemorrhages that are followed by a debrief with key staff.**

Briefs are planning meetings that aim to:
1. Form the team
2. Designate roles and responsibilities
3. Establish goals
4. Engage the entire team in planning, including patients

Huddles are brief ad-hoc meetings that aim to:
1. Regain situational awareness and express team concerns
2. Discuss critical issues
3. Anticipate outcomes
4. Assign resources

Debriefs are feedback sessions that occur shortly after events including the involved care team.
Debriefs aim to:
1. Identify opportunities to improve teamwork, skills and outcomes

Recommended Resources:

CMQCC: Obstetric Hemorrhage Toolkit Version 2.0- Appendix C: Debriefing Tool
https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit

ACOG District II Safe Motherhood Initiative: Obstetric Debriefing Form
https://www.acog.org/-/media/Districts/District-II/Public/SMI/v2/PST-zs-02-AF-140513-DebriefingForm.pdf

Example Debriefing Tools:

APPENDIX C: DEBRIEFING TOOL

Directions: Form is to be completed immediately after patient situation by the designated team member. After completion, the form is given to _____(designated by unit/hospital). After the debrief, team members who want to provide additional input are encouraged to complete an incident report.

Goal: Allow team a debrief mechanism to talk immediately about a patient care situation to capture what went well, what could have been done better and what prevented the team from caring for the patient effectively.

Patient Name: _____ Form completed by:_____

Date: _____ Time: _____

Team members attending debriefing (Print Names):

	Yes	No	
Team Attendance			**Comments**
1. Help arrived in a timely manner	☐	☐	
2. Team members assumed or were assigned needed roles	☐	☐	
3. Team members stayed in role through situation	☐	☐	
4. Adequate help was present	☐	☐	
Medication Administration ☐ **N/A**	**Yes**	**No**	**Comments**
1. Medications arrived in a timely manner	☐	☐	
2. Medications were given in accordance with policy	☐	☐	
3. Adequate volume and type of medications were in room	☐	☐	
Device Placement ☐ **N/A**	**Yes**	**No**	**Comments**
1. Device was placed correctly	☐	☐	
2. More than one device was used	☐	☐	

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Fluid & Blood Product Administration	Yes	No	Comments
1. Second IV was started in a timely manner	☐	☐	
2. Was any type of blood product administered?	☐	☐	
3. Blood arrived in a timely manner	☐	☐	
4. Was massive transfusion policy activated?	☐	☐	
5. Was rapid transfuser used?	☐	☐	
6. Rapid transfuser arrived in a timely manner	☐	☐	
7. Rapid transfuser was used effectively and according to procedure	☐	☐	
8. Adequate amount of blood was available			
Surgical Treatment	**Yes**	**No**	**Comments**
1. Operating room ready in timely manner	☐	☐	
2. Adequate staff for procedure	☐	☐	
3. Support staff called to room arrived in time to assist with procedure	☐	☐	
4. Appropriate supplies for procedure were readily available	☐	☐	
	Yes	**No**	**Comments**
Other Issues to Report	☐	☐	

Obstetric Team Debriefing Form

Remember: Debriefing is meant to be a learning experience and a way to address both human factors and systems issues to improve the response for next time. There is to be no blaming/finger-pointing.

Type of event: _____ **Date of event:** _____

Location of event: _____

Members of team present: (check all that apply)

- ☐ Primary RN
- ☐ Primary MD
- ☐ Charge RN
- ☐ Resident(s)
- ☐ Anesthesia personnel
- ☐ Neonatology personnel
- ☐ MFM leader
- ☐ Patient Safety Officer
- ☐ Nurse Manager
- ☐ OB/Surgical tech
- ☐ Unit Clerk
- ☐ Other RNs

Thinking about how the obstetric emergency was managed,

Identify what went well: (Check if yes)

- ☐ Communication
- ☐ Role clarity (leader/supporting roles identified and assigned)
- ☐ Teamwork
- ☐ Situational awareness
- ☐ Decision-making
- ☐ Other: _____

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

- ☐ Communication
- ☐ Role clarity (leader/supporting roles identified and assigned)
- ☐ Teamwork
- ☐ Situational awareness
- ☐ Decision-making
- ☐ Other: _____

Identify opportunities for improvement: "systems issue" (Check if yes)

- ☐ Equipment
- ☐ Medication
- ☐ Blood product availability
- ☐ Inadequate support (in unit or other areas of the hospital)
- ☐ Delays in transporting the patient (within hospital or to another facility)
- ☐ Other: _____

FOR IDENTIFIED ISSUES, FILL IN TABLE BELOW

ISSUE	ACTIONS TO BE TAKEN	PERSON RESPONSIBLE
	1	
	2	
	3	
	4	

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D2. Severe Obstetric Hemorrhage Review

PROCESS FOR REVIEWING SEVERE MATERNAL MORBIDITY EVENTS[7]

What events should be reviewed?

- Pregnant, peripartum or postpartum women receiving 4 or more units of blood products
- Pregnant, peripartum or postpartum women who are admitted to an ICU as defined by the center.
- Other pregnant, peripartum or postpartum women who have an unexpected and severe medical event – at the discretion of the facility

Who should review the event?

Multidisciplinary standing committee at facility representing:

- Obstetrical providers (obstetricians, family physicians and/or advanced practice nurses)
- Anesthesia providers
- Obstetric care nurses
- Facility quality improvement team
- Facility administration
- Patient advocate (should be considered)
- Scribe
- If small center, consider partnering with regional perinatal center or outsourcing the review.

When to review?

- As close as possible to the time of the event
- The more severe the event, the closer the timing to review
- If large birthing facility with a number of events, consider scheduling regular meeting to do reviews.

How to review?

- Reviews should be sanction by the facility and protected from discovery. Confidentiality statements should be gathered from each committee member.
- Gather all past and current patient medical records and facility records regarding this patient and event.
- Engage a trained reviewer/abstractor to complete Part A, the Abstraction Form, including a pertinent synopsis of the event and objective information found in the records.
- Primary review is then presented to the review committee.
- Reviews follow a standard format, such as Part B – The assessment form
- Review concludes with recommendations.

Source: http://www.safehealthcareforeverywoman.org/secure/smm-forms.php
(See appendix for example severe maternal morbidity review form)

[7] Available at safehealthcareforeverywoman.org. This form was originally developed by the California Pregnancy-Associated Mortality Review (CA-PAMR) using Title V MCH funding and is adapted with permission from the California Department of Public Health, Maternal, Child and Adolescent health Division. Sacramento, CA.

D3. Process, Structure & Outcome Metrics

The goal of monitoring outcomes and process metrics is to reduce the number of hemorrhages that result in severe maternal morbidity and mortality.

Process Measures:
Measurement of specific steps that are implemented in order to achieve a desired outcome. Process measures typically document the frequency a new approach is used.

Recommended process measures:

P1: Unit Drills	**Report # of Drills and the drill topics** **P1a:** In this month**,** how many OB drills (In Situ and/or Sim Lab) were performed on your unit for any maternal safety topic? **P1b**: In this month, what topics were covered in the OB drills?
P2: Provider Education	**Report estimate in 10% increments (round up)** **P2a**: At the end of this month, what cumulative proportion of OB physicians and midwives has completed (within the last 2 years) an education program on Obstetric Hemorrhage? **P2b**: At the end of this month, what cumulative proportion of OB physicians and midwives has completed (within the last 2 years) an education program on the Obstetric Hemorrhage bundle elements and the unit-standard protocol?
P3: Nursing Education	**Report estimate in 10% increments (round up)** **P3a**: At the end of this month, what cumulative proportion of OB nurses has completed (within the last 2 years) an education program on Obstetric Hemorrhage? **P3b**: At the end of this month, what cumulative proportion of OB nurses has completed (within the last 2 years) an education program on the Obstetric Hemorrhage bundle elements and the unit-standard protocol?
P4: Risk Assessment	**Report estimate in 10% increments (round up)** At the end of this month, what cumulative proportion of mothers had a hemorrhage risk assessment with risk level assigned, performed at least once between admission and birth and shared among the team?
P5: Quantified Blood Loss	**Report estimate in 10% increments (round up)** In this month, what proportion of mothers had measurement of blood loss from birth through the recovery period using quantitative and cumulative techniques?

Source: Mississippi Perinatal Quality Collaborative Obstetric Hemorrhage Toolkit

Structure Measures:

Measurement of a feature of a healthcare organization related to the capacity to provide high quality health care. Structure measures include measures of the human and material resources available to the healthcare system and organizational factors such as staff deployment and protocols. (Agency for Healthcare Research and Quality)

Recommended structure measures include:

S1: Patient, Family & Staff Support	**Report Completion Date** Has your hospital developed OB specific resources and protocols to support patients, family and staff through major OB complications?
S2: Debriefs	**Report Start Date** Has your hospital established a system in your hospital to perform regular formal debriefs after cases with major complications?
S3: Multidisciplinary Case Reviews	**Report Start Date** Has your hospital established a process to perform multidisciplinary systems-level reviews on all cases of severe maternal morbidity (including women admitted to the ICU, receiving ≥4 units RBC transfusions, or diagnosed with a VTE)?
S4: Hemorrhage Cart	**Report Completion Date** Does your hospital have OB hemorrhage supplies readily available, typically in a cart or mobile box?
S5: Unit Policy and Procedure	**Report Completion Date** Does your hospital have an OB hemorrhage policy and procedure (reviewed and updated in the last 2-3 years) that provides a unit-standard approach using a stage-based management plan with checklists?
S6: EHR Integration	**Report Completion Date** Were some of the recommended OB Hemorrhage bundle processes (i.e. order sets, tracking tools) integrated into your hospital's Electronic Health Record system?

Source: Mississippi Perinatal Quality Collaborative Obstetric Hemorrhage Toolkit

Outcome Measures:

Evaluate the result of specific interventions against the intended goals to determine project success. For the OHI, this includes measurement of key indicators related to severe maternal morbidity resulting from obstetric hemorrhage.

Tracking of outcomes can be accomplished through medical record review, prospective data collection and/or surveillance of ICD.10 codes.

Recommended outcome measures include:

O1: Hemorrhage	Number of women experiencing obstetric hemorrhage this month.
O2: Transfusion	Number of women receiving 4 or more units of blood this month.
O3: ICU Transfer	Number of women experiencing obstetric hemorrhage that are transferred to an intensive care unit.

Source: Mississippi Perinatal Quality Collaborative Obstetric Hemorrhage Toolkit

E. Additional Maternal Hemorrhage Resources

E1. Example Massive Transfusion Protocols

POLICY

Title: Massive Transfusion Event Protocol Policy: Clinical Manual/General Clinical

Home Department: Inpatient Nursing and Transfusion Medicine

IMPORTANT NOTICE:
The official version of this document is contained in the Policy and Procedure Manager (PPM) and may have been revised since the document was printed.

I. POLICY:

Massive Transfusion Event (MTE) Protocol:

The MTE Protocol is initiated at the request of the anesthesiologist, surgeon or physician when rapid infusion of large volumes (> 6 units) of blood/blood components is urgently needed for an acutely bleeding patient.

The use of cryoprecipitate will be based on clinical assessment of the patient and current laboratory values. In an acute setting with ongoing active bleeding, initiation of this protocol assumes patients will receive PRBC's and FFP in an approximate 1:1 ratio.

Nursing will call Transfusion Medicine (TM) and request the initiation of the MTE Protocol and will ensure effective communications. He/she will provide:

- Patient name and MRN
- Verbal orders for any blood products that are needed

  Note: Orders for MTE protocol must be entered into CS-Link as soon as possible.
- STAT blood sample for cross match or confirming ABO (second sample) if required.
- Name and telephone number for the nursing contact person for the event.

Provision of Blood / Blood Components:

The patient requiring this protocol is given the highest priority over all other blood orders being concurrently processed.

Transfusion Medicine ensures the immediate availability of all required blood/blood components necessary for optimal patient management.

First MTE cooler will include:

- 6 units of uncross matched group O RBCs,
- 4 units of thawed AB plasma and
- 1 unit of plateletpheresis.

Subsequent MTE coolers will include (unless ordered otherwise by the physician):

- Six (6) units of uncrossmatched group O RBCs,
- Six (6) units of thawed AB plasma or type-specific plasma if specimen available
- One (1) unit of plateletpheresis

Page 1 of 7

7/13/2015 4:15 PM Printed copies are for temporary reference only

Source: Mississippi Perinatal Quality Collaborative Obstetric Hemorrhage Initiative Toolkit

POLICY

Title: Massive Transfusion Event Protocol Policy: Clinical Manual/General Clinical

Home Department: Inpatient Nursing and Transfusion Medicine

IMPORTANT NOTICE:
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	6 Units RBC O **negative**	6 Units RBC O **positive**	4 Units AB Plasma	1 Platelets	Immediate Availability
Females ≤ 50 yrs or whose age is unknown	✓		✓	✓	• The immediate need for uncross matched blood may be met by using the O positive or O negative blood stored in the "uncross matched blood" refrigerators. • The Blood Bank will continue to meet the patient's clinical needs with uncross matched O positive and O negative blood until the event is over or the physician requests cross matched blood.
All pediatric patients 15 years of age or under	✓		✓	✓	
Men and Postmenopausal Women		✓	✓	✓	

Patients who initially received group O, Rh negative RBCs and subsequently found to be Rh positive on current and confirmatory blood typing, are switched to group O, Rh positive RBCs.

Patients who initially received group O, Rh positive RBCs and subsequently found to be Rh negative on current and confirmatory blood typing, are given Rh positive RBCs for the rest of the event.

The Blood Bank will prepare additional components (plasma, platelets, and cryoprecipitate) as ordered by the physician and maintain 6 RBC and 6 FFP "to be available" at all times until the event is over.

Communication

One person from each area/department will be designated to communicate with the Technologist-in-Charge (TIC). This designated person must communicate with the TIC when the next set of blood components will be needed.

The TIC serves as the Transfusion Medicine contact person for **all** communication with the patient care area during this event and will only communicate with the designated patient care area contact person (nurse or physician).

To resolve any patient problems or questions:

- Trauma

POLICY

Title: Massive Transfusion Event Protocol Policy: Clinical Manual/General Clinical

Home Department: Inpatient Nursing and Transfusion Medicine

IMPORTANT NOTICE:
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- OR
- L & D
- Blood Bank Hotline

The TIC is responsible for reconciling the transfused/returned blood products with the inventory and coolers at the end of the event and for recording completion and any unexpected findings in the comments section of the MTE Worksheet.

Terminating the MTE

The physician in charge is responsible for halting the protocol and communicating this to the nurse in charge who in turn must notify the Blood Bank.

Return of Unused Blood/Blood Components

The charge nurse will assume the responsibility for returning all unused units of blood to the Blood Bank within 30 minutes.

II. PURPOSE:

To describe a protocol for managing a massive transfusion event, defined as the provision of uncross matched RBCs and blood components for an acutely bleeding patient who requires rapid infusion of large volumes of blood urgently.

III. PROCEDURE (see also Attachment 1):

A. Notify the Blood Bank of the MTE declared by the physician.

B. Obtain Equipment / Materials

Equipment

- Cooler with blue ice packs
- Cooler inserts or carriers

Materials

- TS5109 Massive Transfusion Protocol Patient Worksheet
- TS5092 Blood Bank - Patient & Product Identification Form (PPI Form)

Source: Mississippi Perinatal Quality Collaborative Obstetric Hemorrhage Initiative Toolkit

POLICY

Title: Massive Transfusion Event Protocol Policy: Clinical Manual/General Clinical

Home Department: Inpatient Nursing and Transfusion Medicine

IMPORTANT NOTICE:
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C. Obtain/receive blood/blood components immediately from the Blood Bank (see page 1 - **Provision of Blood / Blood Components**):
   - The first cooler will include 4 units of group AB plasma regardless of patient blood type.
   - ABO-compatible plasma will be provided if the patient's ABO/Rh type has been determined on a sample collected during the current admission.
   - The Blood Bank will thaw additional group AB plasma as needed until a blood type is determined.

D. Sign the "Uncross matched Blood Form" that lists all the RBC units in the cooler and return to Blood Bank (see Attachment 2).

E. Warm fluids and blood via rapid warmer infuser or other appropriate fluid warming device where possible to avoid hypothermia:
   1. Place patient on hypothermia mattress on the OR table and use a warming air-low blanket (e.g., "Blair Huggar" as per MD order)
   2. Provide environmental temperature control, e.g., warm room
   3. Warm saline for irrigation
   4. Use fluid warmers for blood and fluid (e.g. Level One or Rapid Infuser)
   5. Provide humidified O_2 for those patients on a ventilator

F. Continue to use uncross matched group O blood until the event is over or the patient's physician requests cross matched blood.

   Note: Blood Bank will:
   - Notify a TM physician when more than 6 units of uncross matched blood are issued for a massive transfusion event.
   - Perform a **STAT** type and screen if not already done, using tube test for ABO/Rh typing and manual gel test for antibody screening.
   - Tube to the unit a copy of the RBC unit tag for placement in the patient's medical record.
   - Keep at least six (6) units each of RBCs and thawed plasma allocated for the patient in the Blood Bank at all times until the bleeding episode is over.

IV. RELATED POLICIES AND PROCEDURES

- Blood and Blood Components: Administration (Transfusion) and Management

POLICY

Title: Massive Transfusion Event Protocol Policy: Clinical Manual/General Clinical

Home Department: Inpatient Nursing and Transfusion Medicine

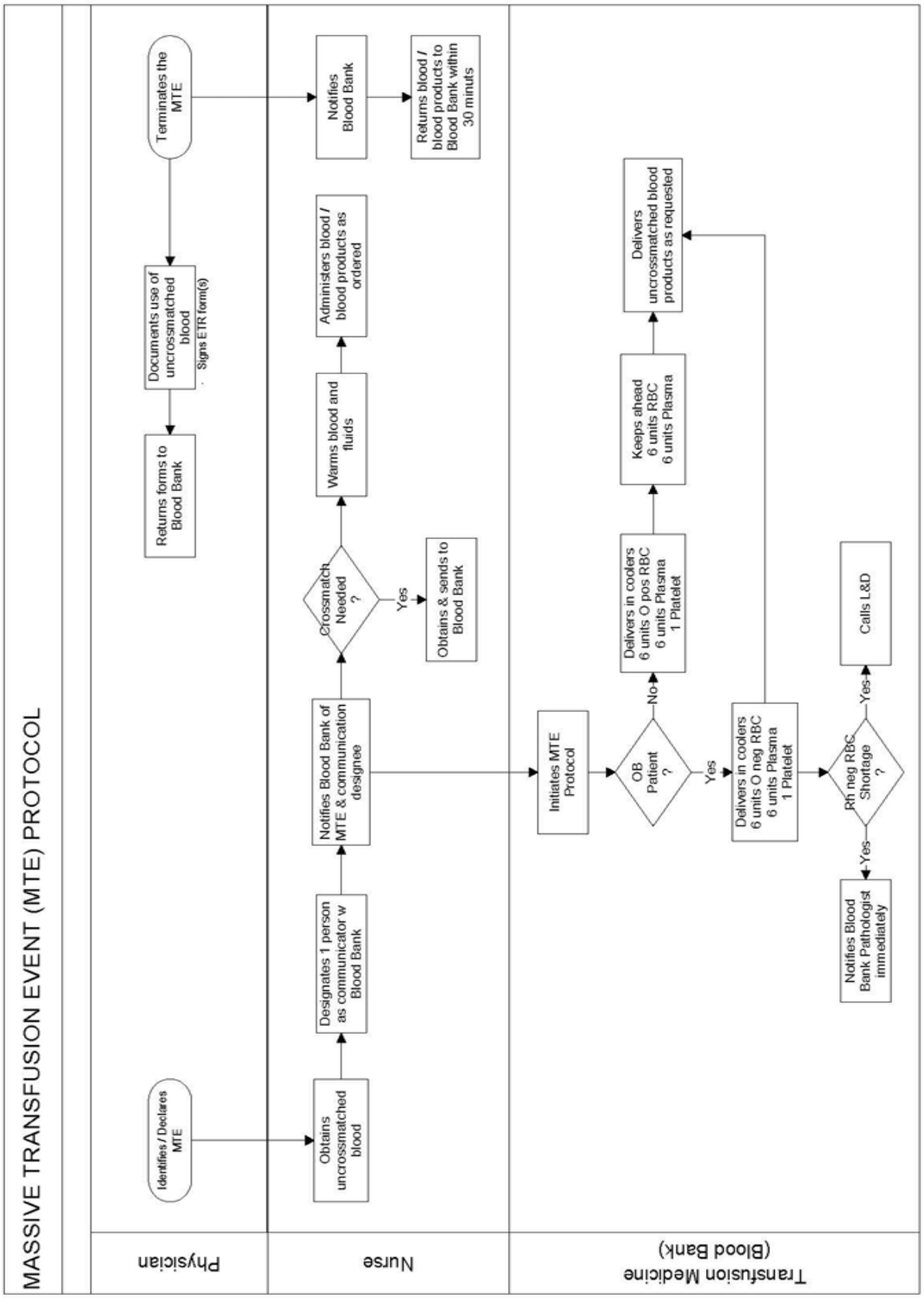
IMPORTANT NOTICE:
The official version of this document is contained in the Policy and Procedure Manager (PPM) and may have been revised since the document was printed.

- ABO Grouping (Tube Test)
- Rh (D) Typing and Weak D Testing (Tube Test)
- Antibody Screening by ID-MTS Gel Test

V. REFERENCES

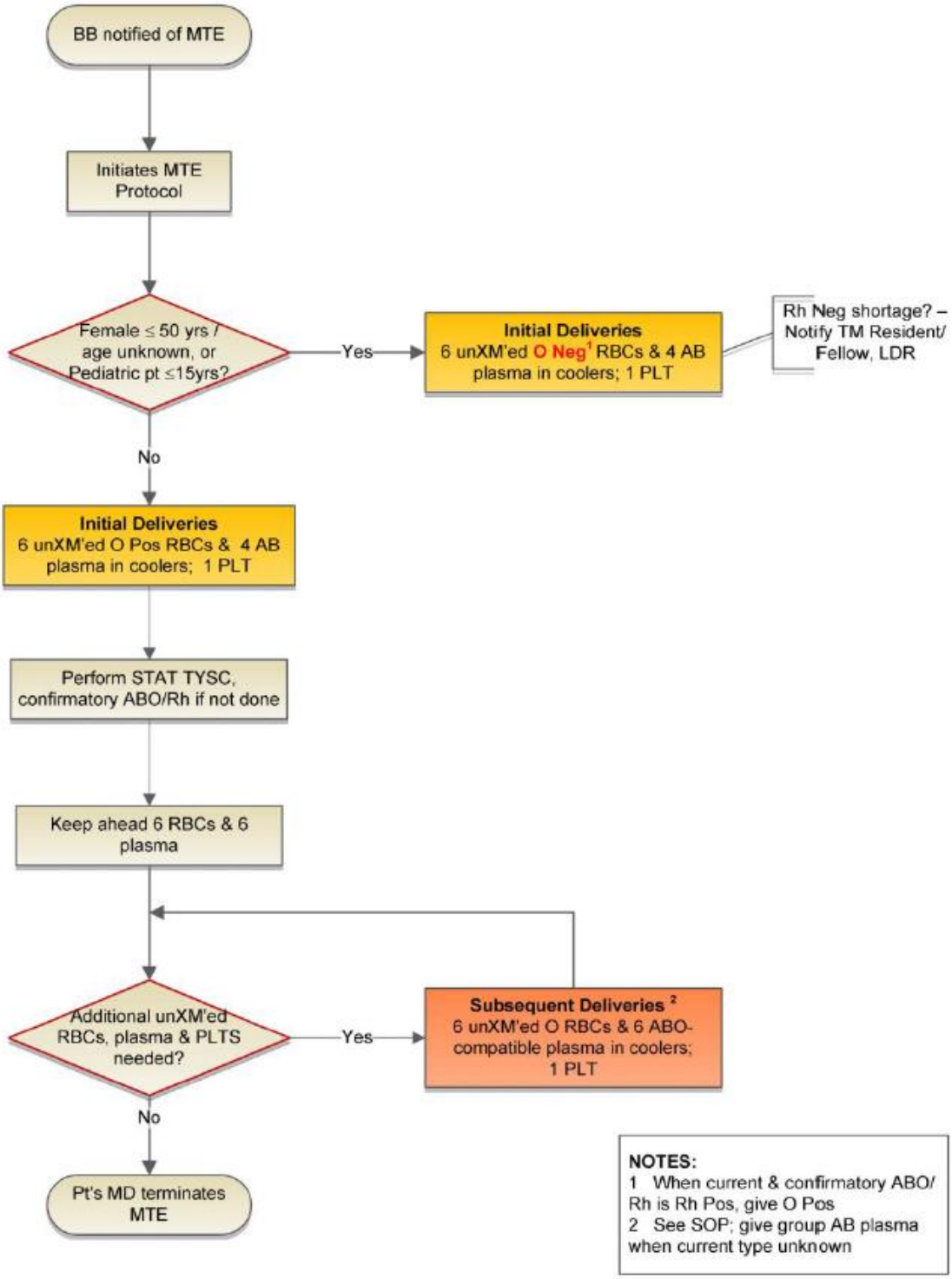
- Technical Manual, 17th Edition, AABB, Bethesda, MD, 2011.
- Standards for Blood Banks and Transfusion Services, 28th Edition, AABB, Bethesda, MD, 2012.

Original Effective Date: 5/2010



Source: Mississippi Perinatal Quality Collaborative Obstetric Hemorrhage Initiative Toolkit

Massive Transfusion Event (MTE) Protocol

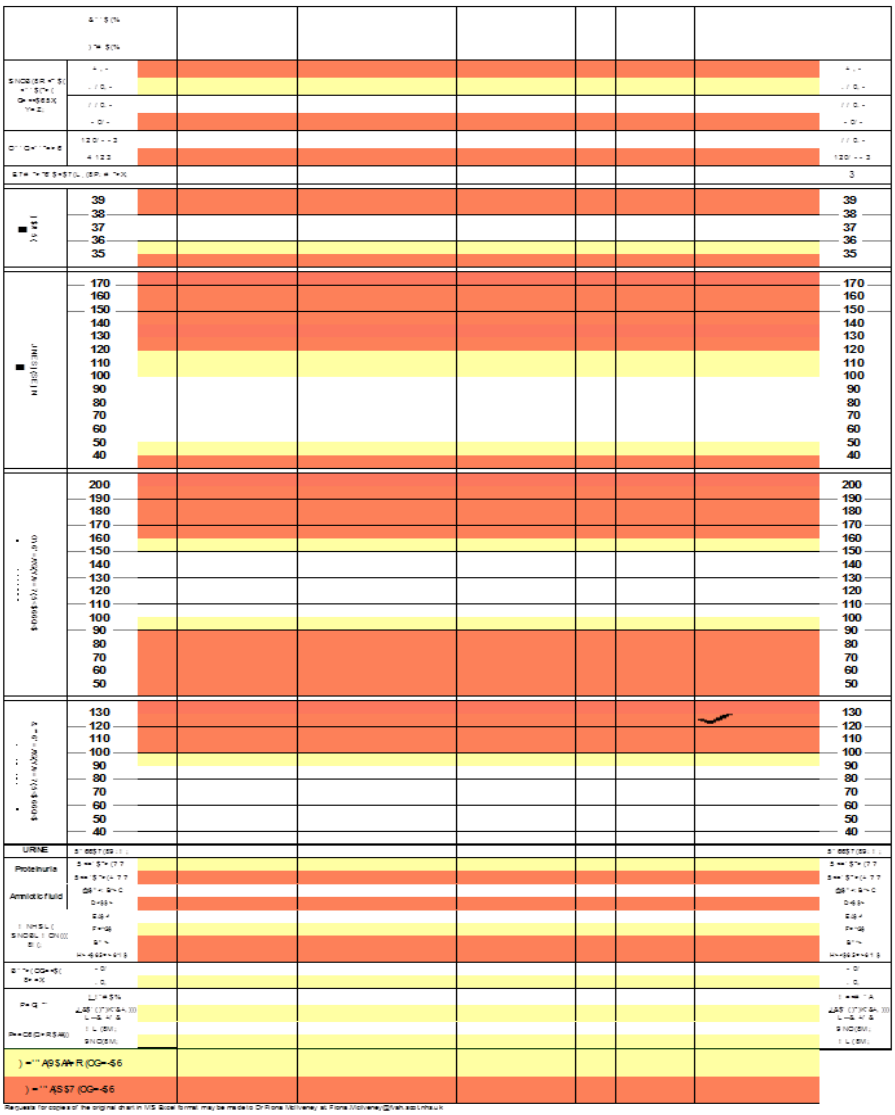


Source: Mississippi Perinatal Quality Collaborative Obstetric Hemorrhage Initiative Toolkit

E2. Example Maternal Early Warning Criteria Chart

APPENDIX E: NHS OBSTETRIC EARLY WARNING CHART

AN EXAMPLE OF AN OBSTETRIC EARLY WARNING CHART. REPRODUCED WITH THE KIND PERMISSION OF DR. FIONA MCILVENEY (1)



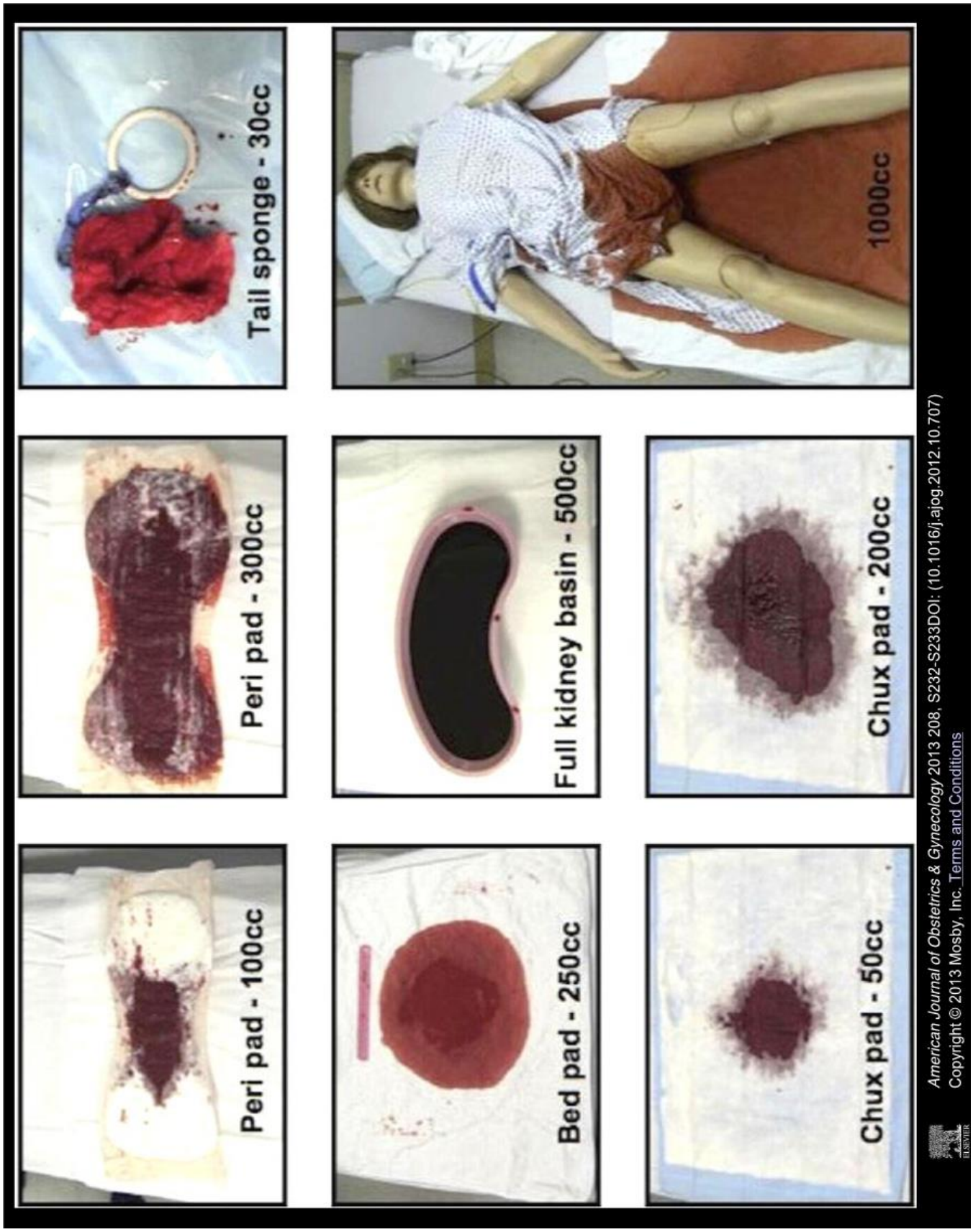
Requests for copies of the original chart in MS Excel format may be made to Dr Fiona McIlveney at Fiona.McIlveney@nhslothian.scot.nhs.uk

Reference

1. International Journal of Obstetric Anesthesia (2008) 18, S1-S42 Abstracts of free papers presented at the annual meeting of the Obstetric Anesthetists' Association, Glasgow 11-12 May 2008.
"Early-warning scoring in obstetrics". P Harrison, C Hawke, F McIlveney, Department of Anaesthesia, Stirling Royal Infirmary, Stirling, UK.

E3. Printable Hemorrhage Cart Card

E4. Printable Visual Estimation Card



III. Obstetric Hypertension Bundle

PATIENT SAFETY BUNDLE

Hypertension

READINESS

Every Unit

- Standards for early warning signs, diagnostic criteria, monitoring and treatment of severe preeclampsia/eclampsia (include order sets and algorithms)
- Unit education on protocols, unit-based drills (with post-drill debriefs)
- Process for timely triage and evaluation of pregnant and postpartum women with hypertension including ED and outpatient areas
- Rapid access to medications used for severe hypertension/eclampsia: Medications should be stocked and immediately available on L&D and in other areas where patients may be treated. Include brief guide for administration and dosage.
- System plan for escalation, obtaining appropriate consultation, and maternal transport, as needed

RECOGNITION & PREVENTION

Every Patient

- Standard protocol for measurement and assessment of BP and urine protein for all pregnant and postpartum women
- Standard response to maternal early warning signs including listening to and investigating patient symptoms and assessment of labs (e.g. CBC with platelets, AST and ALT)
- Facility-wide standards for educating prenatal and postpartum women on signs and symptoms of hypertension and preeclampsia

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

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

May 2015

For more information visit the Council's website at www.safehealthcareforeverywoman.org

READINESS

There are 5 domains of Readiness to be addressed by every facility to prevent delays and prepare for the optimal management of Severe Obstetric Hypertension.

Recommendations for **Every Unit**:

- ✓ Standards for early warning signs, diagnostic criteria, monitoring and treatment of severe preeclampsia/eclampsia (include order sets and algorithms)
- ✓ Unit education on protocols, unit-based drills (with post-drill debriefs)
- ✓ Process for timely triage and evaluation of pregnant and postpartum women with hypertension including ED and outpatient areas
- ✓ Rapid access to medications used for severe hypertension/eclampsia: Medications should be stocked and immediately available on L&D and in other areas where patients may be treated. Include brief guide for administration and dosage.
- ✓ System plan for escalation, obtaining appropriate consultation, and maternal transport, as needed

Recommended Education:

- **Hypertensive Disorders During Pregnancy Checklist: Eclampsia (ACOG District II)** https://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Readiness-1-ACOG-District-II-Checklist-Eclampsia.pdf
- **Hypertensive Disorders During Pregnancy Checklist: Postpartum Preeclampsia in the ED (ACOG District II)** https://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Readiness-2-ACOG-District-II-Checklist-Postpartum-Preeclampsia-in-the-ED.pdf
- **Hypertensive Disorders During Pregnancy Checklist: Severe Hypertension in Pregnancy (ACOG District II)** https://safehealthcareforeverywoman.org/wp-content/uploads/2016/09/Readiness-3-ACOG-District-II-Checklist-Severe-Hypertension-in-Pregnancy.pdf
- **Hypertension in Pregnancy Task Force Report (ACOG)** – Coming Soon
- **AIM eModule 3** – Hypertension Maternal Safety Bundle: Introduction https://safehealthcareforeverywoman.org/eModules/eModule-3-Intro/presentation_html5.html
- **AIM eModule 3** – Hypertension Maternal Safety Bundle: Readiness https://safehealthcareforeverywoman.org/eModules/eModule-3-Readiness/presentation_html5.html

A1. Severe Hypertension in Pregnancy Checklist

Severe Hypertension in Pregnancy Checklist

TRIGGER FOR INITIATING THIS CHECKLIST IS A SBP ≥160 OR DBP ≥110

- ☐ Initiate magnesium sulfate for seizure prophylaxis (if not already initiated)
- ☐ Load 4-6 grams 10% magnesium sulfate in 100 ml solution IV over 20 minutes
- ☐ Magnesium sulfate on infusion pump
- ☐ Magnesium sulfate and pump labeled
- ☐ Magnesium sulfate 10 grams of 50% solution IM (5 grams in each buttock) if no IV access
- ☐ Magnesium sulfate maintenance 1-2 grams/hour continuous infusion

Contraindications: pulmonary edema, renal failure, myasthenia gravis

ANTIHYPERTENSIVE MEDICATIONS

- **Labetalol** (20, 40, 80, 80 mg IV* over 2 minutes, escalating doses, repeat every 10 minutes or 200 mg orally if no IV access); avoid in asthma or heart failure, can cause neonatal bradycardia
- **Hydralazine** (5-10 mg IV* over 2 minutes, repeat in 20 minutes until target blood pressure is reached)
- Repeat blood pressure every 10 minutes during administration

*** Maximum cumulative IV administered doses should not exceed 25 mg hydralazine; 220 mg labetalol in 24 hours.**

If first line agents are unsuccessful, recommend emergency consultation with a specialist (e.g., MFM, internal medicine, OB anesthesiology, critical care) for second line management decisions

ANTICONVULSANT MEDICATIONS

(for recurrent seizures or when magnesium is contraindicated):

- **Lorazepam** (2-4 mg IV x 1, may repeat x 1 after 10-15 minutes)
- **Diazepam** (5-10 mg IV every 5-10 minutes to maximum dose of 30 mg)
- **Phenytoin** (15-20 mg/kg IV x 1, may repeat 10 mg/kg IV after 20 minutes if no response); avoid with hypotension, may cause cardiac arrhythmias
- **Keppra** (500 mg IV or orally, may repeat in 12 hours); dose adjustment needed if renal impairment

- ☐ Antenatal corticosteroids (if <34 weeks of gestation)
- ☐ Re-address VTE prophylaxis requirement
- ☐ Plan brain imaging studies if:
  - unremitting headache
  - focal signs and symptoms
  - uncontrolled high blood pressure
  - lethargy
  - confusion
  - seizures
  - abnormal neurologic examination

POSTPARTUM

- **Antihypertensive therapy** is suggested for women with persistent postpartum hypertension, SBP of 150 mm Hg or DBP of 100 mm or higher on at least two occasions that are at least 4 hours apart. Persistent SBP of 160 mm Hg or DBP of 110 mm Hg or higher should be treated within 1 hour.
- **Blood pressure monitoring** is recommended 72 hours after delivery and/or outpatient surveillance (e.g., visiting nurse evaluation) within 3 days and again 7-10 days after delivery or earlier if persistent symptoms.

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A2. Eclampsia Checklist

Eclampsia Checklist

- ☐ Call for assistance **(Hospital should identify a Rapid Response Team)** to location of the event
- ☐ Check in:
  - ○ OB Attendings/ Fellows/Residents
  - ○ Three RNs
  - ○ Anesthesia
  - ○ Neonatology (if indicated)
- ☐ Appoint a leader
- ☐ Appoint a recorder
- ☐ Appoint a primary RN and secondary personnel
- ☐ Protect airway
- ☐ Secure patient in bed, rails up on bed, padding
- ☐ Lateral decubitus position
- ☐ Maternal pulse oximetry
- ☐ IV access/PEC labs
- ☐ Supplement oxygen (100% non-rebreather)
- ☐ Bag-mask ventilation on the unit
- ☐ Suction available
- ☐ Continuous fetal monitoring (if appropriate)

Initial Medications

- ☐ Load 4-6 grams 10% magnesium sulfate in 100 ml solution IV over 20 minutes
- ☐ Magnesium sulfate on infusion pump
- ☐ Magnesium sulfate and pump labeled
- ☐ Magnesium sulfate 10 grams of 50% solution IM (5 grams in each buttock) if no IV access
- ☐ Magnesium sulfate maintenance 1-2 grams/hour continuous infusion

Contraindications: pulmonary edema, renal failure, myasthenia gravis

Anticonvulsant Medications

(for recurrent seizures or when magnesium sulfate is contraindicated):

- **Lorazepam** (2-4 mg IV x 1, may repeat x 1 after 10-15 minutes)
- **Diazepam** (5-10 mg IV every 5-10 minutes to maximum dose 30 mg)
- **Phenytoin** (15-20 mg/kg IV x 1, may repeat 10 mg/kg IV after 20 minutes if no response); avoid with hypotension, may cause cardiac arrhythmias
- **Keppra** (500 mg IV or orally, may repeat in 12 hours); dose adjustment needed if renal impairment

Persistent Seizure

- ☐ Neuromuscular block and intubate
- ☐ Obtain radiographic imaging
- ☐ ICU admission

Antihypertensive medications **SBP ≥ 160** or **DBP ≥ 110**

- **Labetalol** (20, 40, 80, 80 mg IV* over 2 minutes, escalating doses, repeat every 10 minutes or 200 mg orally if no IV access); avoid in asthma or heart failure, can cause neonatal bradycardia
- **Hydralazine** (5-10 mg IV* over 2 minutes, repeat in 20 minutes until target blood pressure is reached)
- Repeat BP every 10 minutes during administration

*** Maximum cumulative IV administered doses should not exceed 25 mg hydralazine; 220 mg labetalol in 24 hours.**

After Seizure

- ☐ Assess neurologic status every 15 minutes
- ☐ PEC labs: CBC, Chem 7, LFT, Uric Acid, LDH, T&S, PT/PTT, Fibrinogen, Magnesium
- ☐ Foley catheter (Hourly I&O. Report output < 30 ml/hour)

Strict I&O (no less than every 2 hours). Report urine output to the clinician if < 30 ml/hr. Foley catheter should be placed if urine output is borderline or strict I&O cannot be maintained. Urometer should be utilized if the urine output is borderline or < 30 ml/hr.

Delivery Plan

- ☐ Ensure that there is an appropriate plan for delivery

Magnesium Toxicity

- ☐ Stop magnesium maintenance
- ☐ Calcium gluconate 1 gram (10 ml of 10% solution) IV over 1-2 minutes

Postpartum

- ☐ Oral antihypertensive medication postpartum if > 150/100.
- ☐ Blood pressure monitoring is recommended 72 hours after delivery and/or outpatient surveillance (e.g., visiting nurse evaluation) within 3 days and again 7-10 days after delivery or earlier if persistent symptoms.

Debrief

- ☐ Debrief with the whole obstetric care team and document following the debrief

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A3. Postpartum Preeclampsia Checklist for the ED

Postpartum Preeclampsia Checklist

EMERGENCY DEPARTMENT

TRIAGE PATIENTS LESS THAN 6 WEEKS POSTPARTUM AS FOLLOWS:

- ☐ Core evaluation and assessment
- ☐ If BP ≥ 160/110 or 140/90 with:
  - Unremitting headaches
  - Visual disturbance
  - Epigastric pain
- ☐ Begin stabilization
- ☐ Call for Obstetric consult immediately
- ☐ OBS contact documented
- ☐ Call MFM/MICU consult immediately for refractory blood pressure
- ☐ Labs should include:
  - CBC
  - PT
  - PTT
  - Fibrinogen
  - CMP
  - Uric Acid
  - Hepatic function panel
  - Type and Screen
- ☐ Initiate Intravenous Access
- ☐ Assess neurologic status
  - LOC/arousal/orientation/behavior
  - Deep tendon reflexes
  - Speech
- ☐ Assess vital signs including oxygen saturation
- ☐ Assess complaints and report; unremitting headaches, epigastric pain, visual disturbances, speech difficulties, lateralizing neuro signs
- ☐ Place Foley catheter
- ☐ Strict I&O report output less than 30 ml/hr for 2 hours
- ☐ Plan brain imaging studies if:
  - Unremitting headache
  - Focal signs and symptoms
  - Uncontrolled high blood pressure
  - Lethargy
  - Confusion
  - Seizures
  - Abnormal neurologic examination

INITIAL MEDICATIONS

- ☐ Load 4-6 grams 10% magnesium sulfate in 100 ml solution IV over 20 minutes
- ☐ Magnesium sulfate on infusion pump
- ☐ Magnesium sulfate and pump labeled
- ☐ Magnesium sulfate 10 grams of 50% solution IM (5 grams in each buttock) if no IV access
- ☐ Magnesium sulfate maintenance 1-2 grams/hour continuous infusion

Contraindications: pulmonary edema, renal failure, myasthenia gravis

If magnesium sulfate is contraindicated: Keppra 500 mg PO or IV every 12 hours

ANTIHYPERTENSIVE MEDICATIONS

- **Labetalol** (20, 40, 80, 80 mg IV* over 2 minutes, escalating doses, repeat every 10 minutes or 200 mg orally if no IV access); avoid in asthma or heart failure, can cause neonatal bradycardia
- **Hydralazine** (5-10 mg IV* over 2 minutes, repeat in 20 minutes until target blood pressure is reached)
- Repeat blood pressure every 10 minutes during administration

*** Maximum cumulative IV administered doses should not exceed 25 mg hydralazine; 220 mg labetalol in 24 hours.**

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A4. Classification of Hypertension in Pregnancy

Table 1: Classification of hypertension in pregnancy

Chronic hypertension	• BP of ≥ 140 mm Hg systolic or 90 mm Hg diastolic predating conception • Identified prior to 20 weeks gestation • Persists > 12 weeks postpartum • Use of antihypertensive medications before pregnancy
Superimposed preeclampsia or eclampsia on chronic hypertension	• New onset in a woman with hypertension prior to 20 weeks • Sudden increase in proteinuria if already present in early gestation • Sudden increase in BP • Development of HELLP syndrome • Development of headache, scotomata, or epigastric pain
Gestational hypertension	• 140 mm Hg systolic or ≥ 90 mm Hg without proteinuria occurring after 20 weeks gestation • Transient diagnosis with normalization of BP by 12 weeks postpartum • May represent pre-proteinuric phase of preeclampsia or recurrence of chronic hypertension abated in mid-pregnancy • May evolve to preeclampsia • Retrospective diagnosis
Preeclampsia	• Occurring after 20 weeks of pregnancy • BP ≥ 140 mm Hg systolic or ≥ 90 mm Hg diastolic or higher • Proteinuria 0.3 grams protein or higher in a 24-hour urine specimen OR ≥+1 per dipstick OR P/C ratio > 0.3 mg/dL
Eclampsia	• Presence of new onset grand mal seizures in a pregnant woman with preeclampsia (rule out idiopathic seizure disorder or other central nervous system pathology such as intracranial hemorrhage, bleeding arteriovenous malformation, ruptured aneurysm) • New onset seizures 48-72 hours postpartum (other central nervous system pathology is the likely reason for the seizure after 7 days)
Severe preeclampsia	If one or more of the following criteria are present: 1. Blood pressure of 160 mm Hg systolic or higher or 110 mm Hg diastolic or higher on two occasions at least 6 hours apart while the patient is on bed rest 2. Oliguria of less than 500 ml in 24 hours 3. Cerebral or visual disturbances 4. Pulmonary edema or cyanosis 5. Epigastric or right upper-quadrant pain 6. Impaired liver function as indicated by abnormally elevated blood concentrations of liver enzymes (to twice normal concentration), severe persistent right upper quadrant or epigastric pain unresponsive to medication and not accounted for by alternative diagnoses, or both 7. Thrombocytopenia 8. Renal insufficiency
HELLP Syndrome (subset of severe preeclampsia)	Hemolysis_Elevated Liver enzymes_Low Platelets

Adapted from ACOG Practice Bulletin #33, Reaffirmed 2013[1] and Hypertension in Pregnancy: Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy, November 2013.[2]

Source: California Maternal Quality Care Collaborative (CMQCC) Preeclampsia Toolkit. Retrieved from: https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit

A5. Sample Preeclampsia Medication Box

SAMPLE PREECLAMPSIA/ECLAMPSIA MEDICATION BOX

Each institution should prepare its own medication box specific to its protocols.

L&D Severe Preeclampsia & Eclampsia Box – Content and Dose Guideline	
Magnesium 20 grams/500 ml bag	**IV (Use Magnesium Sulfate Continuous Infusion under L&D protocol in Alaris Pump Library):** *Initial (Loading Dose):* 4-6 g (100 ml – 150 ml) over 20 minutes *Maintenance Dose:* 1-2 g/hour (25 ml/hr – 50 ml/hr) continuous infusion
Labetalol 100 mg/20 ml vial	***Initial: Draw 4 ml from the vial.*** **20 mg (4 ml)** IV bolus followed by **40 mg (8 ml)** if not effective within 10 minutes; then **80 mg (16 ml)** every 10 minutes (maximum total dose of 300 mg/60 ml)
Hydralazine 20 mg/ml vial	***Initial: Draw 0.25 ml from the vial.*** **5-10 mg (0.25-0.5 ml)** doses IV every 15-20 minutes
Esmolol 100 mg/10 ml vial **(By Anesthesiologists ONLY)**	**1-2 mg/kg (0.1-0.2 ml/kg)** IV over 1 minute
Propofol 10 mg/ml, 20 ml vial **(By Anesthesiologists ONLY)**	**30-40 mg (3-4 ml)** IV bolus
Calcium gluconate 1000 mg/10 ml vial	1000 mg/10 ml IV over 2-5 minutes
Labetalol 200 mg tablets	200 mg PO and repeated in 30 minutes if needed
Nifedipine 10 mg PO	10 mg PO in 30 minutes if needed
Supply contents	3 ml, 10 ml, and 20 ml syringes, appropriate needles and appropriate tubing sets

Kindly used with permission of Stanford University Medical Center and Gillian Hilton, MD, 2013.

EVIDENCE GRADING
Level of Evidence: III-C

Source: California Maternal Quality Care Collaborative (CMQCC) Preeclampsia Toolkit. Retrieved from: https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit

RECOGNITION & PREVENTION

There are three domains of Recognition and Prevention that should be implemented for every patient to reduce delays in care and maximize appropriate clinical planning and response.

Recommendations for **Every Patient**:

- ✓ Standard protocol for measurement and assessment of BP and urine protein for all pregnant and postpartum women
- ✓ Standard response to maternal early warning signs including listening to and investigating patient symptoms and assessment of labs (e.g. CBC with platelets, AST and ALT)
- ✓ Facility-wide standards for educating prenatal and postpartum women on signs and symptoms of hypertension and preeclampsia

Recommended Resources:

- **Optimizing Protocols in Obstetrics (Series 4, 2013) Key Elements for the Management of Hypertensive Crisis in Pregnancy (In-patient)**
  https://access.acog.org/eweb/ACOGResponsivePage.aspx?WebCode=LoginRequired&Site=congress&urlReq=https://www.acog.org/-/media/Districts/District-II/MembersOnly/PDFs/Optimizing-Protocols-In-OB-HTN-Series-3--Version-1.pdf?dmc=1
- **Preeclampsia Foundation Patient Educational Materials**
  http://www.preeclampsia.org/
- **Preeclampsia Toolkit: Improving Health Care Response to Preeclampsia (California Maternal Quality Care Collaborative Toolkit to Transform Maternity Care), 2013**
  https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit
- **AIM eModule 3: Hypertension Maternal Safety Bundle – Recognition**
  https://safehealthcareforeverywoman.org/eModules/eModule-3-Recognition/presentation_html5.html

B1. Preeclampsia Patient Handout

Ask Your Doctor or Midwife

Preeclampsia

What Is It?

Preeclampsia is a serious disease related to high blood pressure. It can happen to any pregnant woman during the second half of her pregnancy.

Risks to You

- Seizures
- Stroke
- Organ damage
- Death

Risks to Your Baby

- Premature birth
- Death

Signs of Preeclampsia


Stomach pain


Headaches


Feeling nauseous; throwing up


Seeing spots


Swelling in your hands and face


Gaining more than 5 pounds (2,3 kg) in a week

What Should You Do?

Call your doctor or midwife right away. Finding preeclampsia early is important for you and your baby.

For more information go to www.preeclampsia.org

B2. Accurate Blood Pressure Measurement

CMQCC CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE | California Department of PublicHealth

CMQCC PREECLAMPSIA TOOLKIT
PREECLAMPSIA CARE GUIDELINES
CDPH-MCAH Approved: 12/20/13

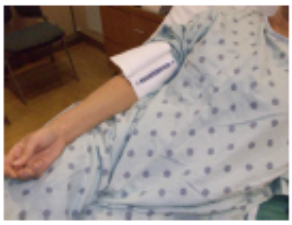
PATIENT CARE AND TREATMENT RECOMMENDATIONS
ACCURATE BLOOD PRESSURE MEASUREMENT

Kristi Gabel, RNC-OB, C-EFM, MSN, CNS, Sutter Roseville Medical Center

BACKGROUND

The current method used most often in the hospital setting for accurate measurement of blood pressure is the oscillatory method, or automated blood pressure machine, which tends to underestimate both systolic and diastolic readings by as much as 10 mm Hg[1,2] In the clinic setting and physician offices, blood pressure measurement is often used with the aneroid (mechanical type with a dial) sphygmomanometer. Refer to Table 1 for steps in obtaining accurate blood pressure measurement and Figure 1 for recommended cuff sizes.

Table 1: Steps for Obtaining Accurate Blood Pressure Measurements[3]

Step 1: Prepare equipment	a. Mercury sphygmomanometer is gold standard, can use validated equivalent automated equipment b. Check cuff for any defaults c. Obtain correct size cuff: width of bladder 40% of circumference and encircle 80% of arm (See Figure 1)
Step 2: Prepare the patient: 	a. Use a sitting or semi-reclining position with back supported and arm at heart level b. Patient to sit quietly for 5 minutes prior to measurement c. Bare upper arm of any restrictive clothing d. Patients feet should be flat, not dangling from examination table or bed, and her legs uncrossed e. Assess any recent (within previous 30 minutes) consumption of caffeine or nicotine. If blood pressures are at the level that requires treatment, consumption of nicotine or caffeine should not lead to delays in instituting appropriate anti-hypertensive therapies
Step 3: Take measurement	a. Support patients arm at heart level, seated in semi-fowlers position b. For ausculatory measurement: use first audible sound (Kortokoff I) as systolic pressure and use disappearance of sound (Kortokoff V) as diastolic pressure c. Read to the nearest 2 mm Hg d. Instruct the patient not to talk e. At least one additional readings should be taken within 15 minutes f. Use the highest reading g. If greater than or equal to 140/90, repeat within 15 minutes and if still elevated, further evaluation for preeclampsia is warranted. **Do not reposition patient to either side to obtain a lower BP. This will give you a false reading.**
Step 4: Record Measurement	Document BP, patient position, and arm in which taken

Adapted from Peters RM (2008) High blood pressure in pregnancy. Nursing for Women's Health, Oct/Nov, pp. 410-422. Photo courtesy of and printed with permission by Kristi Gabel, RNC-OB, C-EFM, MSN, CNS, Sutter Roseville Medical Center 2013.

Figure 1: Recommended cuff sizes

Arm Circumference (cm)	Cuff Size
22-26	"Small Adult": 12x22cm
27-34	"Adult": 16x30cm
35-44	"Large Adult": 16x36cm
45-52	"Adult Thigh": 16x42cm

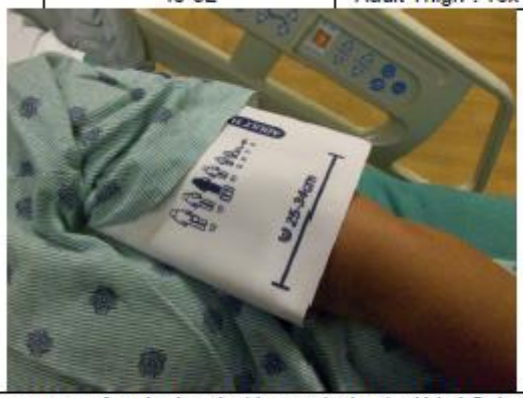


Photo courtesy of and printed with permission by Kristi Gabel, RNC-OB, C-EFM, MSN, CNS, Sutter Roseville Medical Center 2013.

Accurate blood pressure measurements in obese women can be quite challenging and it is extremely important to use an appropriate sized cuff. In women with an upper-arm circumference of more than 34cm, large adult cuffs or thigh cuffs can be used to improve blood pressure accuracy. For upper-arm measurements greater than 50cm, the American Heart Association recommends using a cuff on the forearm and feeling for the appearance of the radial pulse at the wrist to estimate systolic blood pressure. However, the accuracy of forearm measurement is not reliable.[4]

EVIDENCE GRADING
Level of Evidence: II and III

REFERENCES

1. Natarajan P, Shennan A, Penny J, Halligan A, de Swiet M, Anthony J. Comparison of auscultatory and oscillometric automated blood pressure monitors in the setting of preeclampsia. *American Journal of Obstetrics and Gynecology*. 1999;181 (5 Pt 1):1203-1210.
2. Ogedegbe G, Pickering T. Principles and techniques of blood pressure measurement. *Cardiology Clinics*. 2010;28(4):571-586.
3. Peters R. High blood pressure in pregnancy. *Nursing for Womens Health*. 2008;12(5410-421; quiz 422).
4. Pickering T, Hall J, Appel L, et al. Recommendations for blood pressure measurement in humans and experimental animals: part 1: blood pressure

Source: California Maternal Quality Care Collaborative (CMQCC) Preeclampsia Toolkit. Retrieved from: https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit

B3. Preeclampsia Early Recognition Tool (PERT)

CMQCC CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

California Department of PublicHealth

CMQCC PREECLAMPSIA TOOLKIT
PREECLAMPSIA CARE GUIDELINES
CDPH-MCAH Approved: 12/20/13

PREECLAMPSIA EARLY RECOGNITION TOOL (PERT)

Preeclampsia Early Recognition Tool (PERT)

ASSESS	NORMAL (GREEN)	WORRISOME (YELLOW)	SEVERE (RED)
Awareness	Alert/oriented	•Agitated/confused •Drowsy •Difficulty speaking	•Unresponsive
Headache	None	•Mild headache •Nausea, vomiting	•Unrelieved headache
Vision	None	•Blurred or impaired	•Temporary blindness
Systolic BP (mm HG)	100-139	140-159	≥160
Diastolic BP (mm HG)	50-89	90-105	≥105
HR	61-110	111-129	≥130
Respiration	11-24	25-30	<10 or >30
SOB	Absent	Present	Present
O2 Sat (%)	≥95	91-94	≤90
Pain: Abdomen or Chest	None	•Nausea, vomiting •Chest pain •Abdominal pain	•Nausea, vomiting •Chest pain •Abdominal pain
Fetal Signs	•Category I •Reactive NST	•Category II •IUGR •Non-reactive NST	•Category III
Urine Output (ml/hr)	≥50	30-49	≤30 (in 2 hrs)
Proteinuria (Level of proteinuria is not an accurate predictor of pregnancy outcome)	Trace	•≥ +1** •≥300mg/24 hours	
Platelets	>100	50-100	<50
AST/ALT	<70	>70	>70
Creatinine	<0.8	0.9-1.1	>1.2
Magnesium Sulfate Toxicity	•DTR +1 •Respiration 16-20	•Depression of patellar reflexes	•Respiration <12

GREEN = NORMAL
Proceed with protocol

YELLOW = WORRISOME
Increase assessment frequency

# Triggers	TO DO
1	•Notify provider
≥2	•Notify charge RN •In-person evaluation •Order labs/tests •Anesthesia consult •Consider magnesium sulfate •Supplemental oxygen

**Physician should be made aware of worsening or new-onset proteinuria

RED = SEVERE

Trigger: 1 of any type listed below	TO DO
1 of any type	• Immediate evaluation • Transfer to higher acuity level • 1:1 staff ratio
Awareness Headache Visual	• Consider Neurology consult • CT Scan • R/O SAH/intracranial hemorrhage
BP	• Labetalol/hydralazine in 30 min • In-person evaluation • Magnesium sulfate loading or maintenance infusion
Chest Pain	• Consider CT angiogram
Respiration SOB O2 SAT	• O2 at 10 L per rebreather mask • R/O pulmonary edema • Chest x-ray

11.8.13.v1

Adapted from the Modified Obstetric Early Warning System (MEOWS) in "Saving Mothers Lives: Reviewing maternal deaths to make motherhood safer (2003-2005). The Seventh Report of the Confidential Enquiries into Maternal Deaths in the United Kingdom 2007

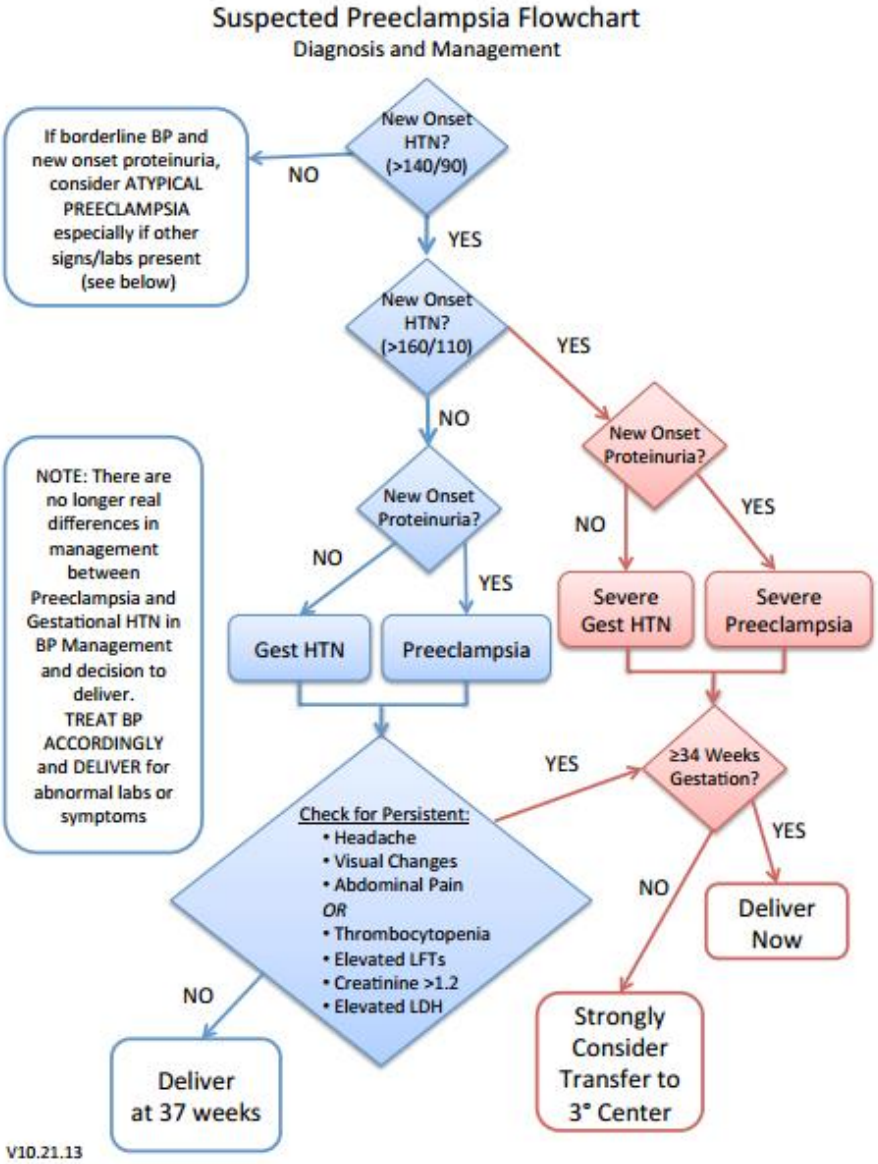
B4. Suspected Preeclampsia Algorithm

CMQCC CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

California Department of PublicHealth

CMQCC PREECLAMPSIA TOOLKIT
PREECLAMPSIA CARE GUIDELINES
CDPH-MCAH Approved: 12/20/13

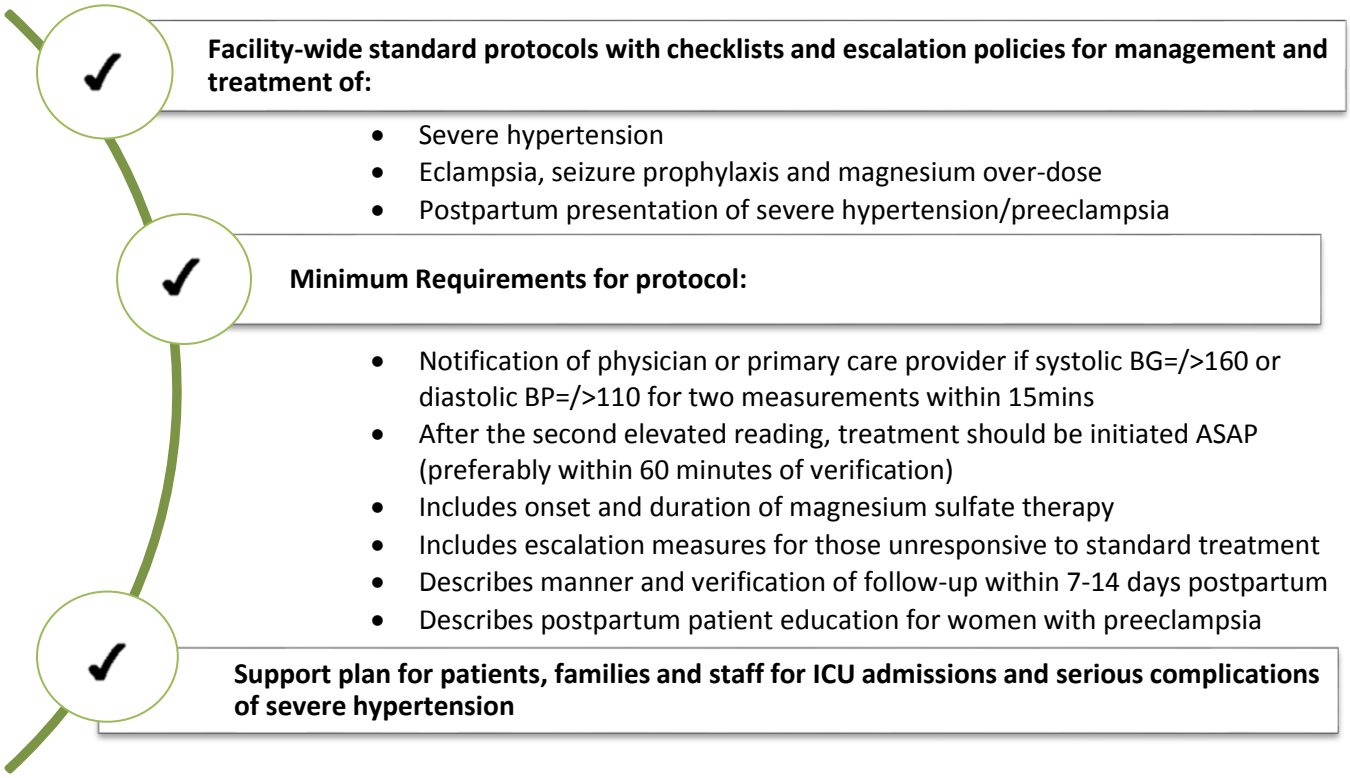
SUSPECTED PREECLAMPSIA ALGORITHM



RESPONSE

These are the key response interventions that should be utilized with every case of severe hypertension/preeclampsia:

Recommendations for every case:



Recommended Education:

- **Committee Opinion No. 623: Emergent Therapy for Acute-Onset, Severe Hypertension During Pregnancy and the Postpartum Period**
  http://journals.lww.com/greenjournal/Fulltext/2015/02000/Committee_Opinion_No__623___Emergent_Therapy_for.48.aspx
- **Improving Health Care Response to Preeclampsia: A California Quality Improvement Toolkit**
  https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit
- **AIM eModule 3: Hypertension Maternal Safety Bundle – Response**
  https://safehealthcareforeverywoman.org/eModules/eModule-3-Response/presentation_html5.html

C1. Optimizing Protocols in Obstetrics: Key Elements for the Management of Hypertensive Crisis in Pregnancy

Optimizing Protocols in Obstetrics

SERIES 4

2013

Key Elements for the Management of Hypertensive Crisis In Pregnancy (In-Patient)

Purpose

This document reflects emerging clinical, scientific and patient safety advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed. While the components of a particular protocol and/or checklist may be adapted to local resources, standardization of protocols and checklists within an institution is strongly encouraged.

ACOG Definition

Clearly explain the purpose of the protocol. The protocol should reflect current criteria used to define and diagnose hypertensive disorders in pregnancy.

References:

- The American College of Obstetricians and Gynecologists. "Chronic Hypertension in Pregnancy." ACOG Practice Bulletin 125. Reaffirmed 2012, replaces Practice Bulletin 29.
- The American College of Obstetricians and Gynecologists. "Diagnosis and Management of Preeclampsia and Eclampsia." ACOG Practice Bulletin 33. Reaffirmed 2010.

Criteria for Diagnosis of Chronic Hypertension in Pregnancy

Mild:	Systolic blood pressure 140-159 mm Hg *or* Diastolic blood pressure 90-109 mmHg	Use of antihypertensive medications before pregnancy Onset of hypertension before 20th week of gestation
Severe:	Systolic blood pressure ≥ 160 mmHg Diastolic blood pressure > 110 mmHg	Persistence of hypertension > 12 weeks postpartum period

Criteria for Diagnosis of Preeclampsia

The National Institute of Health (NIH) working group on hypertension in pregnancy has classified hypertensive disorders of pregnancy in four main categories:

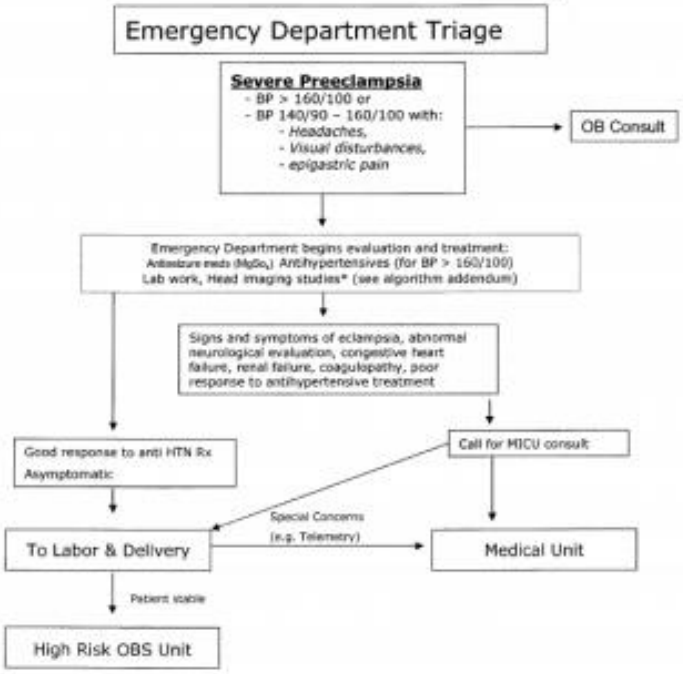
1. **chronic hypertension**
   Systolic blood pressure > 140 mmHg
   Diastolic blood pressure > 90 mmHg
   occurs prior to pregnancy or prior to the 20th week of gestation
2. **preeclampsia and eclampsia**
   Systolic blood pressure > 140 mmHg
   Diastolic blood pressure > 90 mmHg
   with proteinuria
3. **preeclampsia superimposed on chronic hypertension**
   recognized to impart a more severe course and higher incidence of maternal and fetal complications than preeclampsia alone.
4. **Severe preeclampsia** is confirmed when any of the following criteria are present:
   - Systolic blood pressure > 160 mmHg
   - Diastolic blood pressure > 110 mmHg (on two occasions at least 6 hours apart while the patient is on bed rest)
   - Proteinuria of 5000mg (5g) or higher on a 24-hour urine collection or at least 3+ on two random urine samples collected at least 4 hours apart
   - Oliguria < 500 mL urine output in 24 hours
   - Cerebral or visual functional disturbances (cns irritability)
   - Pulmonary edema or cyanosis (not due to excessive intravenous volume replacement)
   - Epigastric or right-upper quadrant abdominal pain
   - Impaired liver function on laboratory analysis (elevated AST/SGOT, ALT/SGPT, or LDH)
   - Thrombocytopenia (platelet count < 150,000/uL)
   - Fetal growth restriction
5. **gestational hypertension**
   occurs when blood pressure is elevated in the third trimester with no prior history of hypertension and proteinuria is absent.

Monitoring ***Permission to utilize sample protocol language obtained from:*** **University of Rochester Medical Center**: Protocol for Antihypertensive Therapy (2009) **Montefiore Medical Center; The University Hospital for the Albert Einstein College of Medicine**: Preeclamptic Woman, Nursing Care Standard for the Antepartal (2008)	The following list is an example of protocol language for monitoring patients. It is to serve as recommendations, not rigid criteria. ***Protocol language may include (but is not limited to):*** ➢ It is highly recommended that proteinuria testing be considered as a priority area for identification and management of hypertensive disorders in pregnancy. ➢ Continuous fetal monitoring should be initiated immediately upon admission. o Monitor vital signs including Fetal Heart Rate (FHR) every 4 hours, however if diastolic BP is > 100, then monitor vital signs including FHR at least every 2 hours. ➢ Automated blood pressure monitoring, using the appropriate cuff size, should be performed. Blood pressures should be evaluated at least every 5-10 minutes during the first 30 minutes following administration of the antihypertensive agent and then at least every hour or as ordered thereafter. ➢ The patient should continue to be monitored for vital signs, comfort status, edema, visual disturbances, headache, epigastric pain, proteinuria, fetal assessment if appropriate, and metal status. ➢ The patient should be monitored for any side effects from medication and the care provider notified immediately. ➢ Monitor intake and output at least every 8 hours.
Criteria to Treat ***Permission to utilize sample protocol language obtained from:*** **Winthrop University Hospital**: Maternal Child Nursing Procedure Manual; Obstetrical Crisis Team (2009)	Refer to the American College of Obstetricians and Gynecologists, *"Emergent Therapy for Acute-Onset, Severe Hypertension with Preeclampsia or Eclampsia"* ACOG Committee Opinion 514 (December 2011). Hypertensive Emergency defined as: ➢ BP ≥ 160 systolic or 110 diastolic ➢ Seizures ➢ Cardiac Compromise ➢ Abnormal maternal rhythm ➢ Change in Patient Status ➢ Respiratory Arrest ➢ Unresponsive Patient ➢ Staff concerned or worried
Medications ***Awaiting permission to utilize sample protocol language obtained from:*** **Crouse Hospital**: Pregnancy-Related Hypertension (2010) **NY Methodist Hospital**: Hypertensive Disorders of Pregnancy (interdisciplinary Guidelines) (2007)	There are different antihypertensive drug regimens used for treating the obstetrical patient with severe hypertension. The protocol should include medication descriptions, dosage, adverse effects, contraindications and precautions. ***Commonly used antihypertensives are the following:*** ➢ Labetalol (Normodyne ®; Trandate ®) ➢ Hydralazine (Apresoline ®) ➢ Nifedepine (Adalat ®; Procardia ®) Refer to the American College of Obstetricians and Gynecologists, *"Emergent Therapy for Acute-Onset, Severe Hypertension with Preeclampsia or Eclampsia"* ACOG Committee Opinion 514 (December 2011).
Eclampsia ***Permission to utilize sample protocol language obtained from:***	A rare, life threatening obstetrical emergency (1/2000 deliveries) characterized by the onset of convulsions or seizure activity that cannot be attributed to other causes in women with clinical presentation consistent with preeclampsia. Eclampsia may develop antepartum (38-53%), Intrapartum (18-36%) or post-partum (11-44%).

Winthrop University Hospital: Maternal Child Nursing Procedure Manual; Obstetrical Crisis Team (2009)	Atypical cases of eclampsia are those that develop either before 20 weeks, while the patient receives adequate doses of magnesium sulfate, or beyond 48 hours postpartum. **Management of Eclampsia:** ➢ Control seizures and provide patient safety ➢ Correction of hypoxia and acidosis ➢ Control severe hypertension ➢ Assess neurologic status ➢ If antepartum, delivery after maternal stabilization **Anticonvulsant Therapy:** Initiate and maintain magnesium sulfate ($MgSO_4$) infusion for seizure prevention when severe preeclampsia or eclampsia is suspected. **Magnesium Sulfate:** a) Dosage: 4 to 6 grams IV loading dose over 20 minutes, followed by 2gm/hour as a continuous intravenous infusion via pump. b) 10% of eclamptic women will have a second convulsion after receiving magnesium sulfates. Give another IV bolus of 2 g magnesium sulfate. c) For recurrent seizures (occurrence) - may give Lorazepam 0.02 to 0.03 mg/kg IV. If seizures continue, additional doses of Lorazepam may be given (up to a cumulative dose of 0.1 mg/kg) IV at a maximum rate of 2 mg/minute for acute treatment. d) If seizures continue, paralyze and intubate. Obtain radiographic imaging. Eclamptic patients may require admission to the ICU. e) Consider an alternative method for preventing seizures in women who have preeclampsia when Magnesium is contraindicated.
Warning Signs of Deterioration in Patient Status ***Permission to utilize sample protocol language obtained from:*** **University of Rochester Medical Center**: Protocol for Antihypertensive Therapy (2009) & Standard of Care for the Patient with Gestational Hypertension (2009)	The care provider should be notified if the patient: ➢ Exhibits any side effects from the antihypertensive. ➢ Shows a sudden drop in blood pressure. ➢ Complains of shortness of breath, a drop in her 0_2 saturation or adventitious breath sounds. ➢ Complains of chest discomfort, tachycardia, bradycardia, or cardiac arrhythmia. ➢ Sudden onset of abdominal/back pain, vaginal bleeding, leaking of fluid or contractile activity. ➢ Complains of severe headache, visual changes or a generalized feeling of disorientation or confusion. ➢ Decrease in urinary output (<25 cc/hr.). Fetal signs: ➢ Tachy- or bradycardia ➢ Late decelerations ➢ Decreased long term variability
Defined Care Team Escalation ***Permission to utilize sample protocol language obtained from:*** **Winthrop University Hospital**: Maternal Child Nursing Procedure Manual; Obstetrical Crisis Team (2009)	An obstetrical emergency response team should be formed and activated based on established criteria to enhance quality of care and patient outcomes. The care team can be activated by any member of the health team to bring multiple obstetrical and medical health care providers to the bedside at once. A specific plan of care should be developed based upon patient assessment; team members who are not essential may be dismissed by the physician in charge. The patient should be co-managed by members of the obstetrical team and hospital rapid response team.

	Members of an ***Obstetrical Crisis Team*** may include: ➢ Obstetric chief resident ➢ Ob in-house obstetrical attending physician ➢ Labor & Delivery charge nurse
Postpartum Surveillance ***References:*** Sibai, Bahah M. MD. "Etiology and Management of postpartum hypertension-preeclampsia," *American Journal of Gynecology* (AJOG), 2011. Berks, Durk. "Resolution of hypertension and proteinuria after preeclampsia," *Obstetrics and Gynecology*, 2009.	After delivery, the patient's vital signs, fluid intake and output, and symptoms should be closely monitored for at least 24- 48 hours. Close monitoring of blood pressure is essential during the immediate postpartum period and closely after discharge from the hospital. Many preeclamptics or women with PIH will exhibit an initial decrease in blood pressure within 48 hours of delivery, but the blood pressure will rise in most between 3 and 6 days postpartum. A well designed Dutch study reported on ~200 preeclamptic patients at several intervals postpartum and found that 78 % still had elevated blood pressures at the time of discharge. At 6 weeks, 54 % and at 3 months 39 % manifested high blood pressure. Resolution time was directly related to maximal systolic and diastolic B/P values at the time of initial diagnosis. Resolution time also increased directly with the interval between diagnosis and delivery. Most studies have shown that maternal prognosis worsens with delayed diagnosis of persistent or de novo postpartum preeclampsia, especially so with inadequate control of persistent severe hypertension. The following approach is suggested .**Immediate postpartum in hospital** ➢ Expect initial drop in B/P followed by a rise beyond 24 hours postpartum ➢ Keep magnesium sulfate 24 hours postpartum ➢ Initiate antihypertensive therapy if greater than 150 mmHg and /or diastolic greater than 100. Consider Labetolol (alpha /beta blocker) or Nifedipine (calcium channel blocker) orally .[see prior guideline on dosage] ➢ IV therapy with Labetolol or Hydralazine if systolic B/P >/ 160 and /or diastolic >/ 110. The goal is to keep B/P < 150/100 .Transition to oral therapy Discharge planning: ➢ Patients with persistent hypertension requiring meds should be on home B/P monitoring. Include visiting nurse if possible. ➢ Follow up visit to be scheduled no later than 1 week later and serially thereafter based on B/P response to antihypertensives. May need several visits and internal medicine co-management. ➢ Many suggest discontinuing antihypertensives if blood pressure is below normal for > 48 hours.
Emergency Department Postpartum Preeclampsia ***Awaiting permission to utilize sample protocol language obtained from:*** **North Shore University Hospital:** Management of Postpartum Preeclampsia Guidelines (2010)	Effective interdepartmental collaboration and communication of healthcare delivery among care team members for complex conditions, such as hypertension in pregnancy is essential for successful management of patient care. Postpartum hypertension can be related to persistent gestational hypertension or preeclampsia or chronic hypertension. If the patient's blood pressure is elevated, assess for the following symptoms of preeclampsia in the pregnant or postpartum patient and report findings to the physician. ➢ Headache, abdominal pain, right upper quadrant tenderness, visual disturbances, elevated BP, nausea, vomiting, edema, neck pain, malaise, speech difficulties, lateralizing (only one side of the body) neurological signs ➢ If any of the above symptoms are offered or observed, a bedside evaluation is warranted. Telephone orders are not appropriate. Follow the chain of command as necessary.

MANAGEMENT OF POSTPARTUM PREECLAMPSIA (<6wks PP)



Staff Education Regarding:
Management of Postpartum Pre-eclampsia Algorithm

- When contacting an OBS resident, a 2nd or 3rd year must be notified.
- Consider alternative seizure prophylaxis medication to magnesium sulfate when there are signs or symptoms of congestive heart failure (shortness of breath, tachypnea or abnormal physical exam), Keppra (see Medication Management). Call for MICU consult
- With signs and symptoms of altered mental status/seizure, lateralizing neurologic signs, call for MICU consult
- *Consider CT scan with Severe headache, focal signs and symptoms, lethargy, confusion, seizures, abnormal neurological evaluation, coagulopathy
- Labs to be drawn include: CBC, PT, APPT, Fibrinogen, CMP, Uric Acid, Hepatic function panel, type and screen.
- If there are no beds available in the MICU, MICU will arrange for patient assessment and monitoring at the bedside.
- If there is no response to treatment of hypertension within 60 minutes, IV antihypertensive drip may be required. See Medication Management Guidelines.
- The patient must be signed out to the admitting service attending, in the medical record.
- Prior to transfer to Labor and Delivery, the ED attending and OBS attending must discuss disposition and decide together.
- Regardless of the unit to which the patient is admitted, the patient must be seen at the bedside by the supervising attending and findings documented in the patient record.
- MICU Admission Criteria may include: Eclampsia, altered mental status, unable to stabilize within 60 minutes of first dose of antihypertensive agent, co-morbidities (renal failure, CHF, CAD) invasive monitoring, lateralizing neurological signs, or the need for continuous IV antihypertensive therapy.

Patient Education ***Permission to utilize sample protocol language obtained from:*** **University of Rochester Medical Center:** Standard of Care for the Patient with Gestational Hypertension (2009)	Encourage patients to verbalize concerns and questions and provide appropriate support and reassurance. Offer appropriate patient information (handouts) regarding high blood pressure or preeclampsia (see enclosed). ***Patient education may include (but is not limited to):*** ➢ The medication and possible side effects of the drug to be administered ➢ Any effects on the fetus ➢ The necessity of consistent administration of the medication ➢ Explanation of the disease process of pregnancy induced hypertension/chronic hypertension

Montefiore Medical Center; The University Hospital for the Albert Einstein College of Medicine: Preeclamptic Woman, Nursing Care Standard for the Antepartal (2008)	➢ The impact of pregnancy induced hypertension/chronic hypertension on the fetus ➢ The need for continued compliance throughout the remainder of her pregnancy and postpartum period ➢ Arrange for home nursing and/or a dietary consultant follow-up as needed
Checklist	Checklists identify items that should be confirmed before or during the scheduling or the performance of a procedure, or facilitate documentation of what was accomplished or used during a procedure. A checklist is highly recommended for the management of hypertensive disorders in pregnancy. Refer to the enclosed ***Hypertension Disorders During Pregnancy Checklist.***

C2. Hypertensive Disorders During Pregnancy Checklist

Optimizing Protocols in Obstetrics

SERIES 4

2013

Hypertensive Disorders During Pregnancy Checklist

[For reference only, consult your institutional policy for preferred management]

- ☐ Document complete history and complete physical examination including any symptoms associated with pre-eclampsia (e.g. headache, visual changes, epigastric pain).
  - Key elements include any symptoms of headaches, vision changes, abdominal pain, fetal activity, contractions, loss of fluid, vaginal bleeding
  - Baseline blood pressures over the course of the pregnancy
  - Any medications/drugs taken during the pregnancy (including illicit and OTC ones)
  - Current vital signs, including oxygen saturation
  - Current physical examination
  - Current fetal assessment (including FHR monitoring results, estimated fetal weight, and BPP, as appropriate)
- ☐ In documentation of Assessment and Plan be sure to include:
  - Whether a diagnosis of preeclampsia has been made and if not what steps are being taken to exclude the diagnosis
  - Whether antihypertensive medications are required to control blood pressure and if so, medication, dose, route and frequency
  - Current fetal status
  - Whether magnesium sulfate is being initiated for seizure prophylaxis and if so, dosing, route, and duration of therapy
  - Whether delivery is indicated and if so, timing, method and route. If delivery not indicated, under what circumstances it would be indicated.
  - Consideration of antenatal corticosteroids if preterm.
- ☐ Obtain intravenous access
- ☐ Notify Anesthesia staff
- ☐ Notify Pediatric staff
- ☐ Labs to send: ☐ CBC ☐ PT/aPTT ☐ Fibrinogen ☐ Chem 7 ☐ Uric Acid ☐ LFTs ☐ LDH ☐ Type and screen
- ☐ Foley catheter with hourly I&O (Report output < 30 cc/hr), as appropriate (e.g., For patients on magnesium sulfate, severe preeclampsia)
- ☐ Magnesium sulfate, if ordered
  - If given intravenously, must use IV infusion pump
  - Magnesium sulfate dosing intravenously: 4-6 g IV loading dose over 20 min, followed by 2 g per hour via pump. For recurrent seizures consider another IV bolus of 2 g Magnesium sulfate (relative **contraindications**: pulmonary edema, renal or congestive heart failure, myasthenia gravis). Continue for 24 hours after delivery or last seizure episode.
  -
  - Be certain that the pump and the magnesium are marked to distinguish them from other fluids running intravenously.
  - Relative contraindications
    - Evidence of pulmonary edema or congestive heart failure
    - Evidence of renal failure or poor urinary output
    - Myasthenia gravis
  - If magnesium is contraindicated consider another anticonvulsant
- ☐ Seizure precautions
  - Oxygen (100% non-rebreather at the bedside)

Page **1** of **2**

- Bag-mask ventilation on the unit
- Appropriate benzodiazepine readily available on the unit

☐ Monitoring
- Vital signs, Oxygen saturation, level of consciousness and DTRs during loading of magnesium
- If undelivered, continuous fetal heart rate monitoring while on magnesium. If magnesium not indicated, monitor regularly as indicated.
- Consider continued checks every 15 minutes depending on patient's status
- Neuro checks every hour
- Assess for pulmonary edema (SOB, decreased oxygen saturation, etc.) and toxicity (DTRs, neuro checks, respiratory rate, etc.)
- If clinically indicated, check magnesium level at regular intervals as ordered.

☐ Calcium gluconate for magnesium toxicity readily available on the unit (10 ml of 10% solution). If indicated can be given IV push slowly over 1-2 minutes.

☐ Consider antihypertensive medications (see antihypertensive medication guidelines).
- Antihypertensive medications (repeat BP every 10 minutes during administration):
  - **Labetalol--** (20, 40, 80 mg IV over 2 minutes, escalating doses, repeat every 10 minutes to maximum dose 220 mg, or 200 mg orally if no IV access) avoid in asthma or heart failure, can cause neonatal bradycardia
  - **Hydralazine--**(5-10 mg IV over 2 minutes, repeat in 20 minutes until target BP reached)

☐ Consider anticonvulsant medications (for recurrent seizures or when Magnesium is contraindicated):
- **Lorazepam** (2-4 mg IV x 1, may repeat x 1 after 10-15 min)
- **Diazepam** (5-10 mg IV every 5-10 min to max dose 30 mg)
- **Phenytoin** (15-20 mg/kg IV x 1, may repeat 10 mg/kg IV after 20 minutes if no response) avoid with hypotension, may cause cardiac arrhythmias

☐ Postpartum:
- Continue antihypertensive medications postpartum to maintain BP < 150/100
- Consider early follow up of blood pressure after discharge (either early office visit or home nurse visit)

References

1. ACOG District II Hypertensive Crisis Guidelines 2012
2. Diagnosis and Management of Preeclampsia and Eclampsia. ACOG Practice Bulletin No. 33. American College of Obstetricians and Gynecologists; 2012.
3. Emergent Therapy for Acute-Onset, Severe Hypertension with Preeclampsia or Eclampsia. ACOG Committee Opinion No. 514. American College of Obstetricians and Gynecologists; 2011.

C3. Treatment for Acute-Onset Severe Hypertension During Pregnancy and the Postpartum Period

v8-30-2016

ALLIANCE FOR INNOVATION ON MATERNAL HEALTH AIM

AIM FAQ TOPIC
Treatment for Acute-onset Severe Hypertension during Pregnancy and the Postpartum period
By: Dr. Elliott Main, AIM Implementation Director

Source Document
ACOG Committee Opinion 623 (Feb 2015) is the source for the guidelines

Acute onset, severe hypertension that is persistent for 15minutes or more is considered a hypertensive emergency

- Can occur during pregnancy or postpartum
- Either Systolic ≥160 or Diastolic ≥110
- Can be either new onset (typically Preeclampsia) or in women with chronic hypertension who are developing superimposed preeclampsia with acutely worsening, difficult to control, severe hypertension

If severe BP elevations persist for 15 minutes or more, administer labetalol…

- The 15 minutes is the definition of a hypertensive emergency that needs immediate treatment NOT the definition of preeclampsia which in other guidelines calls for elevated BPs measured 4 hours apart
- It is fair to repeat the BP measurement to ensure that it was not in error (but this is not an invitation to place the women in a non-standard position for BP measurement such as supine on the left side and measuring BP using the upper arm!)

Two thirds of the preeclampsia deaths in the most recent UK Confidential Enquiries resulted from stroke. Identical findings were noted in the recent California review of maternal deaths. It should be noted that very few women die from seizures.

- Strokes can occur in women with acute-onset hypertension with systolic pressures in the 160's and diastolic pressures in the 110's
- Treatment of acute-onset severe hypertension is an emergency and demands immediate response. We should aim for "as soon as possible", ideally by 30 minutes and not more than 60 minutes. Hospitals that address the systems issues around immediate treatment have been able to achieve this goal.
- Treatment of acute-onset severe hypertension is an emergency and should take precedence over starting Magnesium Sulfate.
- The emergency began with the first measurement of severe hypertension and that should be used as the starting point for the timeline. Calls to the physician and preparation of the medication can be started while waiting for the confirmatory BP measurement.

Is there worry about fetal effects of treating a severe range BP?

- Fetal responses to sudden hypotension are documented but occur more commonly in mothers receiving epidural anesthesia.
- In the recent CMQCC California Preeclampsia Collaborative, among mothers being treated for acute-onset sever hypertension, <1% were associated with significant changes in the fetal heart rate pattern in the hour after treatment (and may have been related to other factors such as the preeclampsia)
- Severe Hypertension is an emergency and the mother needs emergent treatment.

Are manual BP measurements required/ recommended with blood pressures ≥140/90 or ≥160/110?

- Manual BP measurement is the "gold standard" and is encouraged with BP > 140/90 and recommended with severe range pressures to improve accuracy.

1

v8-30-2016

- At the very least, if a hospital chooses to use the automated BP route, they should check it against a manual BP device to make sure that it is within +- 5 mmHg. If it is not, a manual BP device is recommended.
- The most important factor is being consistent: same position, same arm and right sized cuff.

What about BP measurements that vacillate between severe and nearly severe?
This is a case of parsing the words versus understanding the reasoning behind the guideline. Women with acute-onset severe hypertension can have strokes. Serial measurements of: 162/105; 158/104; 165/100; 159/109 shows persistence and risk and we recommend treatment.

What about a severe range BP followed in 15minutes by less concerning BP (145/95)?
This scenario does not require treatment BUT does indicate the need for frequent monitoring of BP.

What if in another hour, the BP rises again to severe range?
Here there may be choices: begin treatment or await another BP measurement to document persistent severe range (while preparing the medication). This judgment depends, among other factors, on how low the blood pressures were between the two severe range measurements.

What if the nurse does not take a confirmatory BP for 30-40 minutes and it is still severe?
Even if the second BP is not taken "within 15 minutes" and it remains in the severe range it is persistent, so treatment should commence immediately. A key educational point is that one severe range BP requires the initiation of frequent BP measurements.

2

Source: http://opqic.org/wp-content/uploads/2016/02/AIM-FAQ-Topic-for-Treatment-for-Acute-Onset-Severe-HTN-v8-30-2016.docx

Labetalol Algorithm

EXAMPLE

Trigger: If severe elevations (SBP ≥160 or DBP ≥ 110) persist for 15 min or more **OR** If two severe elevations are obtained within 15 min and tx is clinically indicated

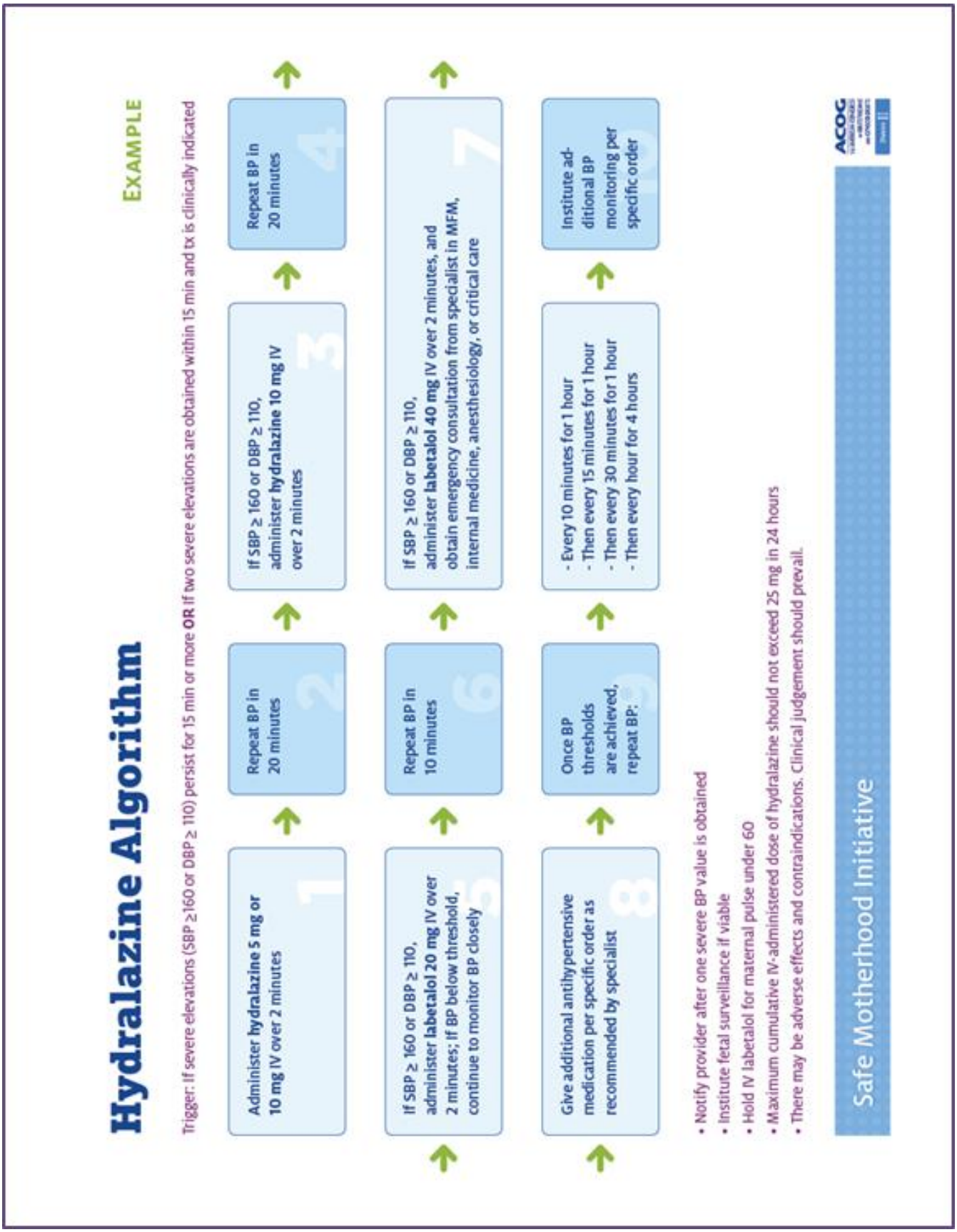
1. **Labetalol 20 mg** IV over 2 minutes
2. Repeat BP in 10 minutes
3. If SBP ≥ 160 or DBP ≥ 110, administer **labetalol 40 mg** IV over 2 minutes; If BP below threshold, continue to monitor BP closely
4. Repeat BP in 10 minutes
5. If SBP ≥ 160 or DBP ≥ 110, administer **labetalol 80 mg** IV over 2 minutes; If BP below threshold, continue to monitor BP closely
6. Repeat BP in 10 minutes
7. If SBP ≥ 160 or DBP ≥ 110, administer **labetalol 80 mg** IV over 2 minutes; If BP below threshold, continue to monitor BP closely
8. Repeat BP in 10 minutes
9. If SBP ≥ 160 or DBP ≥ 110, administer **hydralazine 10 mg** IV over 2 minutes; If below threshold, continue to monitor BP closely
10. Repeat BP in 20 minutes
11. If SBP ≥ 160 or DBP ≥ 110 at 20 minutes, obtain emergency consultation from specialist in MFM, internal medicine, anesthesiology, or critical care
12. Give additional antihypertensive medication per specific order as recommended by specialist
13. Once BP thresholds are achieved, repeat BP:
14. - Every 10 minutes for 1 hour
    - Then every 15 minutes for 1 hour
    - Then every 30 minutes for 1 hour
    - Then every hour for 4 hours

Institute additional BP monitoring per specific order

- Notify provider after one severe BP value is obtained
- Institute fetal surveillance if viable
- Hold IV labetalol for maternal pulse under 60
- Maximum cumulative IV-administered dose of labetalol should not exceed 220 mg in 24 hours
- There may be adverse effects and contraindications. Clinical judgement should prevail.

ACOG District II

C5. Hydralazine Algorithm



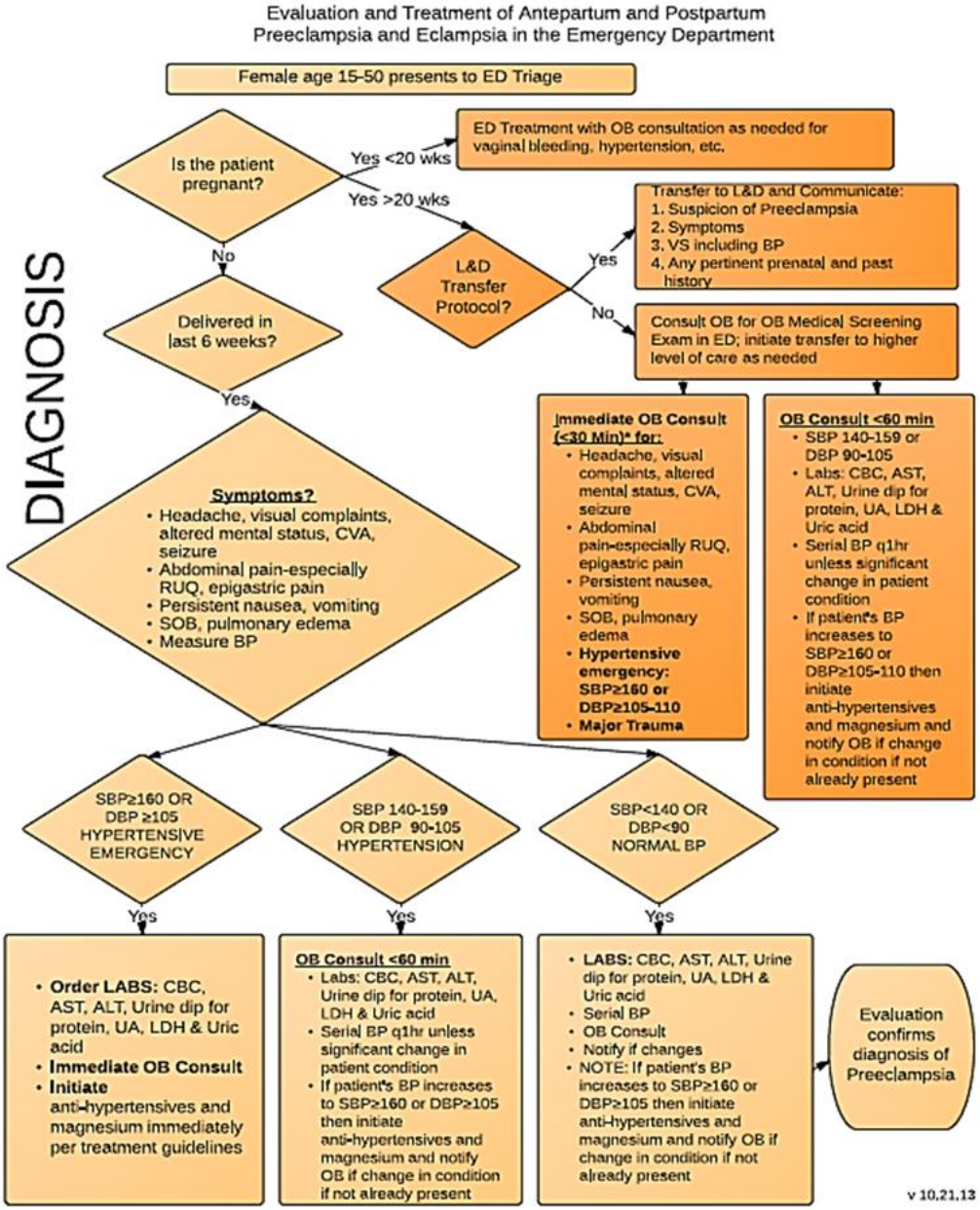
C6. Evaluation and Treatment of Antepartum & Postpartum Preeclampsia and Eclampsia in the Emergency Department

CMQCC CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

California Department of PublicHealth

CMQCC PREECLAMPSIA TOOLKIT
PREECLAMPSIA CARE GUIDELINES
CDPH-MCAH Approved: 12/20/13

PART 1 of 2: Diagnosis: Evaluation and Treatment of Antepartum and Postpartum Preeclampsia and Eclampsia in the Emergency Department



CMQCC CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

California Department of PublicHealth

CMQCC PREECLAMPSIA TOOLKIT
PREECLAMPSIA CARE GUIDELINES
CDPH-MCAH Approved: 12/20/13

Part 2 of 2: Treatment: Evaluation and Treatment of Antepartum and Postpartum Preeclampsia and Eclampsia in the Emergency Department

Evaluation and Treatment of Antepartum and Postpartum Preeclampsia and Eclampsia in the Emergency Department

TREATMENT

1st Line Anti-Hypertensive Treatment: Labetalol & Hydralazine*
Target BP: 140-160/90-100 (BP<140/90 = decreased fetal perfusion)
See CMQCC Preeclampsia Toolkit for "Antihypertensives in Preeclampsia" for 2nd line therapy

LABETALOL as Primary Anti-Hypertensive

1. Administer Labetolol 20 mg IV
2. Repeat BP in 10 min
   - If BP threshold is still exceeded, administer labetalol
   - If SBP<160 and DBP<100, continue to monitor closely
3. Repeat BP in 10 min
   - If BP threshold is still exceeded, administer labetalol 80 mg IV
   - If SBP<160 and DBP<100, continue to monitor BP closely
4. Repeat BP in 10 min
   - If BP threshold is still exceeded, administer hydralazine 10 mg IV
   - If SBP<160 and DBP<100, continue to monitor closely
5. Repeat BP in 20 min; if BP threshold is still exceeded, obtain emergent consultation from maternal-fetal medicine, internal medicine, anesthesiology, or critical care
6. Once target BP achieved, monitor BP q10 min for 1 hour, q 15 min for 2nd hour

HYDRALAZINE as Primary Anti-Hypertensive

1. Administer hydralazine 5 or 10 mg IV
2. Repeat BP in 20 min
   - If BP threshold is still exceeded, administer hydralazine 10 mg IV
   - If SBP<160 and DBP<100, continue to monitor closely
3. Repeat BP in 20 min
   - If BP threshold is still exceeded, administer labetalol 20 mg IV
   - If SBP<160 and DBP<100, continue to monitor BP closely
4. Repeat BP in 10 min
   - If BP threshold is still exceeded, administer labetalol 40 mg IV and obtain emergent consultation from maternal-fetal medicine, internal medicine, anesthesiology, or critical care
   - If SBP<160 and DBP<100, continue to monitor closely
5. Once target BP achieved, monitor BP q10 min for 1 hour, q 15 min for 2nd hour

Magnesium

Initial Treatment

1. Loading Dose: 4-6 gm over 15-20 min
2. Maintenance 1-2 gm/hr
3. Close observation for signs of toxicity
   - Disappearance of deep tendon reflexes
   - Decreased RR, shallow respirations, shortness of breath
   - Heart block, chest pain
   - Pulmonary edema

If Patient Seizes While on Magnesium:

1. Secure airway and maintain oxygenation
2. Give 2nd loading dose of 2 gm Magnesium over 5 min
3. If patient seizes after 2nd magnesium bolus, consider the following:
   - Midazolam 1-2 mg IV; may repeat in 5-10 min **OR**
   - Lorazepam 2 mg IV-may repeat **OR**
   - Diazepam 5-10 mg IV. May repeat q15 min to max of 30 mg
   - Phenytoin 1 g IV over 20 min

Seizures Resolve

1. Maintain airway and oxygenation
2. Monitor VS, cardiac rhythm/ECG for signs of medication toxicity
3. Consider brain imaging for:
   - Head trauma
   - Focal seizure
   - Focal neurologic findings
   - Other neurologic diagnosis is suspected

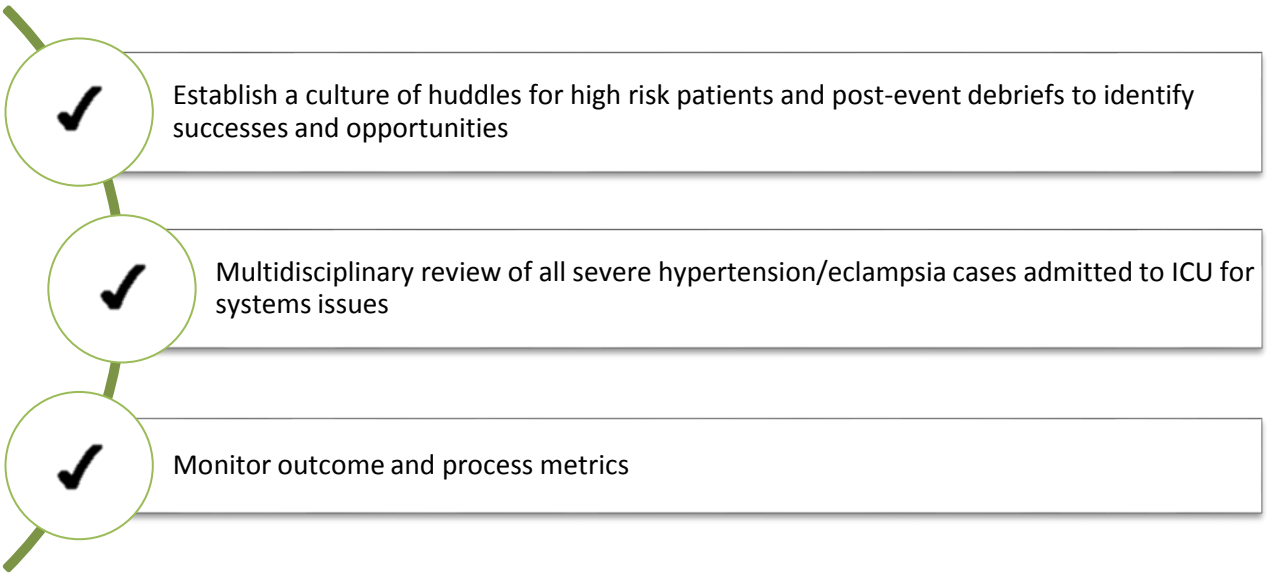
*Labetalol and Hydralazine recommendations based on 2011 ACOG Committee Opinion #514 and Practice Bulletin #33, Reaffirmed 2012

v 10.21.13

REPORTING/SYSTEMS LEARNING

There are three key domains of reporting and systems learning that every facility providing obstetric care should establish. These domains are focused upon learning from severe hypertensive events in order to generate system-wide improvements.

Recommendation for every unit:



Recommended Education:

- **Hypertension in Pregnancy: Executive Summary AOG November 2013-Volumne 122 Issue 5 –p 1122-1131** http://journals.lww.com/greenjournal/Fulltext/2013/11000/Hypertension_in_Pregnancy___Executive_Summary.36.aspx
- **Severe Maternal Morbidity Reporting Form (Long and Short form available)** https://safehealthcareforeverywoman.org/patient-safety-tools/severe-maternal-morbidity-review/
- **AIM eModule 3: Hypertension Maternal Safety Bundle – Reporting** https://safehealthcareforeverywoman.org/eModules/eModule-3-Reporting/presentation_html5.html

D1. Communication Strategy Examples

Table 1. Communication Strategies to Foster Mutual Respect and Shared Decision-making (30)

Briefings	• Set tone for team interaction • Can be a routine part of board rounds, huddles, handouts and bedside rounds
Debriefings	• Used to identify what happened, what was learned, and what can be done better next time • Can be team-building in real patient situations as well as simulation learning
Assertive Language	• Effective assertion is persistent, polite, timely, clear and solution focused • Using "CUS" as a guideline: "I'm **C**oncerned," "I'm **U**ncomfortable," "this is a **S**afety Issue"
Critical Language	• Ensures that specific, relevant, critical information is communicated; example: SBAR (Situation, Background, Assessment, Recommendation)
Closed Communication Loop	• Receiver of information restates what was said to the sender to ensure correct understanding. • Reinforces the importance of effective listening
Call Outs	• Used to confirm the phase of a process

Adapted from: Teamwork and Communication Working Group. Improving patient safety with effective teamwork and communication: Literature review needs assessment, evaluation of training tools and expert consultations, 2011. Edmonton (AB): Canadian Patient Safety Institute; TeamSTEPPS®: Strategies and Tools to Enhance Performance and Patient Safety, Agency for Healthcare Research and Quality, and Quality Patient Care in Labor and Delivery: A Call to Action. *J Midwifery Women's Health.* 2012; 57(2):112-113 and *J Obstet, Gynecol Neonatal Nurs.* 2012;41(1):151-3.

Example dialogue—Closed Communication Loop

Nurse: Hi CNM Jones, this is Nurse Smith, calling about Ms. Green in room 27 at XYZ birth center. She is 39-3/7 weeks G1P0 admitted for nausea and vomiting this morning. Her blood pressure is 150/92, no proteinuria on dip UA, but she has a sudden severe headache. I am concerned and would like you to come over now to evaluate her.

CNM: Thanks Nurse Smith, I'm going to be over later to rupture her membranes and get this labor going. She must be miserable from all that vomiting and probably has the flu.

Nurse: Hmm. I understand the vomiting could be a GI bug. But I'm concerned that the signs and symptoms Ms. Green is demonstrating could also be atypical preeclampsia, and if so, the headache would make it severe preeclampsia. I really think she needs a workup now and you should come over to evaluate her. When can I expect to see you?

CNM: Oh, I see. Please draw xyz labs right away. I'll be right over, and I'm calling the OB back-up now. Thanks for clarifying your concerns.

Nurse: Ok great. I'll draw x, y, and z labs right away. I'll let Ms. Green know you'll be in to see her in about 15 minutes.

CNM: Agreed, thank you.

Table 2. Approaches for improving communication and resolving clinical disagreements

Sources of Potential Conflict	Approach – May Need to have:
Differing expectations for information needs, communication content and style	• Team Training • Structured communication tools (e.g., SBAR-R-R structured handoffs) [a]; • Board rounds • Huddles • Attentive listening
Failure to communicate rationale Inattention to concern Concerns remain unresolved	• Routinely ask for plan and reasoning • Persistently restate concerns until resolved • Develop clear lines for problem resolution that can be activated quickly with high risk patients: e.g. laborist in house; MFM consultation available 24 hours a day; back-up list for who to call including anesthesiologists, MFM, intensivists, and administrators • Ratify plan before concluding conversation
Differing "world views," e.g., use of magnesium in women with preeclampsia without severe features (mild); meaning of signs and symptoms such as nausea, lethargy, or headache; interpretation, and management of complex tracings	• Standardize protocol for magnesium sulfate, including criteria for administration • Standardize ongoing clinical assessments and notification parameters for signs of potential disease progression or magnesium toxicity • Standardize fetal monitoring language and application • Provide regular interprofessional case reviews to discuss management; role model expression of concern and positive resolution of differences • Standardize expectations for notification of complications • Articulate and plan for potential problems early in care • Individuals take responsibility for collaboratively discussing differing views • Avoid professional stereotyping as an explanation for behavior
Disruptive behavior	• "Good Citizen" policy consistently enforced • Individuals and peers stand up to unprofessional behaviors • Administrative commitment to addressing any chronic issues • Availability of anonymous incident reporting system

Adapted from Lyndon, Zlatnik & Wachter Effective physician-nurse communication: a patient safety essential for labor and delivery. *Am J Obstet Gynecol.* 2011; Aug;205(2):91-6.
[a]SBAR-R-R = Situation, Background, Assessment, Recommendation, Reasoning, Ratification

Table 4: Sample SBAR-R-R Scenarios

	Ambulatory Care or Emergency Department	Inpatient Antepartum or Intrapartum	Postpartum
Situation	I am calling about Ms. ___, who □ is pregnant □ recently had a baby and is here in the ED with stomach pain. I am concerned about • High blood pressure • Headache • Visual disturbances • Decreased fetal movement • Nausea and vomiting	I am calling about Ms. ___, who is an antepartum patient being monitored for preeclampsia. I am concerned about: • New onset headache • Increasing blood pressures • Headache that has not resolved • Visual disturbances • Stomach pain • Abnormal or indeterminate fetal status • Altered/worsening lab values	I'm calling about Ms. ___ who had her second baby yesterday at 3 pm. I am concerned about: • New onset headache • Increasing blood pressures • Headache that has not resolved • Visual disturbances • Stomach pain • Altered/worsening lab values
Background	• GPTAL @__weeks or G_P_ #days post birth • Significant OB and medical history • Current problems • Patient complaints • Vital Signs • Interventions and response	• GPTAL @__weeks • Significant OB and medical history • Current problems • Patient complaints • Vital Signs • FHR tracing baseline, variability, accelerations, decelerations • Uterine activity • Interventions already completed	• G__P__ • Mode of birth (vaginal/cesarean) • Significant OB and medical history • Current problems • Patient complaints • Vital Signs • Interventions already completed
Assessment	• I'm thinking she may have preeclampsia and need an OB evaluation before we can clear her. • I'm concerned she may have severe preeclampsia and needs medication to control her blood	• Her preeclampsia seems to be progressing and her blood pressures indicate severe hypertension and severe preeclampsia. • The FHR tracing is indeterminate and the	• I'm thinking that her increasing BPs and new onset headache may represent preeclampsia and that she would benefit from an initial preeclampsia workup.

	pressure now.	decelerations do not resolve with position change.	

Recommendation	• Could you please come and evaluate her within___?
	  ○ Now
	  ○ Within 30 min
	  ○ Before___, etc.
	• Could I have orders for:___
	  ○ CBC, liver function, kidney function
	  ○ Antihypertensive
	• Magnesium sulfate
		• I need you to come and evaluate her now.
		• May I please have an order for antihypertensive medication?
		• Are there any labs we need to repeat?
		• When can I expect you?
			• May I have an order for a preeclampsia lab panel?
			• When can I expect you in to evaluate Ms. ___?

Reasoning	• I don't think it is safe to send her home without evaluating the possibility of preeclampsia • If we don't lower her blood pressure to a safer range she could have a stroke	• It is really important to control her blood pressure while we make preparations to proceed to birth. • If we don't lower her blood pressure to a safer range she could have a stroke.	• It's important for us to get baseline data before considering discharge in the morning.
Ratification	• Ok, I'll do___, and You'll evaluate her in ___ or call ___ for ___.	• Ok, I'll do___, and you'll be here to evaluate her in ___.	• OK, I'll do ___ and you'll be in to evaluate her in ___.

Adapted from Kaiser Permanente SBAR Guidelines and SBAR Report to Physician about a Critical Situation, and Ascension Health Perinatal SBAR Report Template.

Source: California Maternal Quality Care Collaborative (CMQCC) Preeclampsia Toolkit. Retrieved from: https://www.cmqcc.org/resources-tool-kits/toolkits/preeclampsia-toolkit

D2. Severe Maternal Morbidity Reporting Form – Short Version

COUNCIL ON PATIENT SAFETY IN WOMEN'S HEALTH CARE
safe health care for every woman

Abstraction

SMM (recorded cause) _____ SMM Date _____
MR # or PATIENT ID _____ Zip code of patient residence _____
Abstraction Date ____/____/____ Abstractor _____
Birth Facility _____
Hospital Level ☐1 ☐ 2 ☐3 ☐4 ☐ Birth center ☐ Other (Specify) _____

Patient Characteristics	
Age __ *Weight/Height* / *Body mass index (BMI) at first prenatal visit* *Most recent BMI* ____	
Race (Indicate race patient identifies) Choose an item. **Hispanic or Latina** No ☐ Yes ☐ Unknown ☐	**Obstetric History** Gravida _____ Para ___ Term ___ Premature __ Aborted __ Living ___ # Previous fetal deaths ____ # Previous infant deaths ____
Prenatal Care (PNC)	
Yes ☐ Week PNC began _____ Week unknown Yes ☐ No ☐ Number of PNC visits _____ Visit # unknown Yes ☐ No ☐ **No** ☐ **Unknown PNC status** ☐	
Discipline of Primary PNC Provider (choose one) Choose an item.	**Prenatal care source/location** Choose an item.
Planned/intended place of delivery Choose an item.	**Timing of maternal morbidity** Choose an item.
Maternal Transport (during peripartum period) No Choose an item. **Yes** ☐ From facility _____ to facility _____ **Unknown** ☐	**Perinatologist consultation** (during peripartum period) **No** Choose an item. **Yes** ☐ Provider type: _____ **Unknown** ☐
Delivery Information Gestational age at time of morbidity _____ Singleton ☐ Multiple ☐ (If multiple fill out additional delivery information per fetus)	
Birth status Choose an item.	**Labor** Yes ☐ No ☐ / **Delivery type** Choose an item.
If C-Section Type of C-section Choose an item.	**If C-Section** Primary reason for C-Section Choose an item.
Type of anesthesia Choose an item.	**Primary payer source** Choose an item.

Case Narrative

Should include brief synopsis focused on the specific severe maternal morbidity that occurred that allow you to address the disease specific questions. It should be concise and pertinent to the particular SMM and include appropriate time line, evaluation, and be in chronologic format. Try to identify key moments that impacted care

Case Analysis

COUNCIL ON PATIENT SAFETY IN WOMEN'S HEALTH CARE
safe health care for every woman

Assessment

MR# or PATIENT ID_____
Date of event: _____
Date of review: _____
Reviewers: _____

1. Morbidity Category ☐ ICU Admission ☐Transfused 4 or more units ☐ Other _____	
2. Sequence of Morbidity Indicate the course of events: *Clinical Cause of Morbidity: 1& 2 reflect what initiated the final cause resulting in the severe morbidity. 3 is the final cause* *For example: 1. Preeclampsia 2. uncontrolled hypertension 3 intracranial bleed,* *So that 1, caused 2, that resulted in 3 – the severe morbidity*	1. 2. 3.
3. Primary Cause of Morbidity Choose an item. If trauma indicated as primary cause of morbidity: Choose an item. Other cause _____	

COUNCIL ON PATIENT SAFETY IN WOMEN'S HEALTH CARE
safe health care for every woman

Resolution

Refer to the SMM Outcome Factors Guide (pg. 7) of the SMM Review Long Form to determine contributing factors and opportunities

Opportunity to Alter Outcome	☐ Strong ☐ Possible ☐ None
If opportunity to alter outcome present were opportunities largely: Circle all that apply Provider System Patient	
List up to 3 things that could be done to alter outcome:	
Identify practices that were done well and should be reinforced:	
Recommendations for system, practice, provider improvements:	

This form was originally developed by the California Pregnancy-Associated Mortality Review (CA-PAMR) using Title V MCH funding and is adapted with permission from the California Department of Public Health, Maternal, Child and Adolescent Health Division. Sacramento, CA

Geller SE, Adams MG, Kominiarek MA, Hibbard JU, Endres LK, Cox SM, Kilpatrick SJ. Reliability of a preventability model in maternal death and morbidity. AJOG 2007;196:57.e1

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D3. Sample Nursing Management Policy and Procedure

Appendix U: Sample Nursing Management Policy and Procedure
Nursing Management of Preeclampsia
Sample Policy and Procedure

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PURPOSE:
To outline the nursing management of inpatients who have preeclampsia including special considerations for management of patients on magnesium sulfate, patients on antihypertensive medications and management of eclampsia.

BACKGROUND:
Preeclampsia is a hypertensive disorder of pregnancy characterized by vasospasm and endothelial damage, which may impact the cardiovascular, renal, hematological, neurologic, and hepatic systems as well as the uteroplacental unit. It is of unknown etiology. Preeclampsia is characterized by new onset of hypertension and proteinuria after 20 weeks gestation in a previously normotensive woman.

- Hypertension: two blood pressure reading of > 140 systolic OR > 90 diastolic taken at least six hours apart
- Proteinuria: 0.3 gm of protein in a 24 hour urine collection

REPORTABLE CONDITIONS:
Notify provider for:

1. Repeated blood pressure greater than 160 systolic OR greater than 105-110 diastolic (taken at least 15 minutes apart).
2. New or worsening complaint of any of the following:
   a. Headache
   b. Visual changes
   c. Right Upper Quadrant (RUQ) or epigastric pain
3. Abnormal lab values

ADMISSION:

1. Assess for absence or presence of:
   a. Headache
   b. Visual changes
   c. Right upper quadrant or epigastric pain
   d. Nausea/vomiting
   e. General malaise.
2. Assess upper or lower deep tendon reflexes.
3. Auscultate for lung sounds, noting any presence of rales, rhonchi, wheezing, etc.
4. Assess for generalized edema and significant, rapid weight gain.

5. Assess blood pressure using an appropriately sized blood pressure cuff with patient sitting or in the upright position with the patient's arm at the level of the heart. Do not reposition the patient to her left side and retake blood pressure. It will give a false lower reading.
6. Apply external fetal monitor (if viable fetus).
7. Prepare to obtain IV access as ordered by provider.
8. Prepare to administer medications to lower blood pressure and prevent seizure activity.
9. Prepare to monitor intake and output.
10. Maintain activity as ordered by provider. If on bedrest, maintain side-lying position as much as possible, avoiding supine position, and change position every two hours or more often as needed.
11. Provide emotional support and opportunity for patient family to verbalize questions, concerns and/or fears.
12. Assess maternal vital signs including: blood pressure as described above, respiratory rate, heart rate, temperature, and oxygen saturation.
13. Prepare to assess lab values as ordered.
14. Ensure oxygen and suction equipment are present and functioning.
15. Implement measures to decrease stress level, such as provision of a quiet environment and low lighting.
16. Monitor temperature per department protocol.
17. Assess intake and output (I&O) every 1 hour.

ANTEPARTUM ONGOING ASSESSMENT:

Goals of patient management are:

1. Early recognition of severe or worsening preeclampsia or development of eclampsia.
2. Prolongation of pregnancy to optimize fetal maturation must be weighed against risks of pregnancy continuation.

Preeclampsia without severe features (mild):

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 4 hours.
2. Assess lung sounds every 4 hours.
3. Assess deep tendon reflexes (DTRs), Clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 8 hours.
4. Obtain Non Stress Test (NST) or monitor Fetal Heart Rate (FHR) with uterine activity for 30 minutes every shift or as condition warrants.
5. Assess fetal movement every shift.

Severe Preeclampsia:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation hourly.
2. Assess lung sounds every 2 hours.
3. Assess deep tendon reflexes (DTR's), Clonus, edema, level of consciousness (LOC), Headache (HA) visual disturbances, epigastric pain every 4 hours.

4. Monitor FHR and uterine activity continuously.

INTRAPARTUM ONGOING ASSESSMENT:

Preeclampsia without severe features (mild):

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 60 minutes.
2. Assess lung sounds every 4 hours.
3. Assess deep tendon reflexes (DTRs), clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 8 hours.
4. Monitor FHR and uterine activity continuously.

Severe Preeclampsia:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 30 minutes.
2. Assess lung sounds every 2 hours.
3. Assess Deep Tendon Reflexes (DTRs), clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 4 hours.
4. Monitor FHR and uterine activity continuously.

POSTPARTUM TO DISCHARGE ONGOING ASSESSMENT:

Preeclampsia without severe features (mild):

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 4 hours.
2. Assess lung sounds every 4 hours.
3. Assess deep tendon reflexes (DTRs), Clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 8 hours.

Severe Preeclampsia:

1. Obtain blood pressure, pulse, respirations, and oxygen saturation every 60 minutes for first 24 hours after delivery then every 4 hours.
2. Assess lung sounds every 2 hours for first 24 hours after delivery then every 4 hours.
3. Assess deep tendon reflexes (DTRs), clonus, edema, level of consciousness (LOC), headache (HA) visual disturbances, epigastric pain every 4 hours.

MAGNESIUM SULFATE:

Magnesium sulfate is administered as a first line drug to prevent maternal eclamptic seizures. (See Magnesium Sulfate chapter, pg. 50)

ANTIHYPERTENSIVES:

Background:

1. A sustained systolic blood pressure greater than 160 mm Hg OR greater than 105-110 mm Hg diastolic is treated with IV antihypertensive medication to protect the patient from cerebral vascular accident.
2. The goal is a diastolic pressure of 90-100 mm Hg to maintain perfusion.
3. Labetalol is a combined alpha and beta-blocker, resulting in decreased peripheral vascular resistance without altering heart rate or cardiac output. Its use is contraindicated in patients with bronchial asthma, heart block and severe bradycardia.
4. Hydralazine is a vasodilator and results in vasodilation of vascular smooth muscle.

Administration:

1. Ensure presence of mainline IV infusion.
2. Monitor the fetal heart rate continuously if a viable fetus is present.
3. Maintain bedrest during and for 3 hours following medication administration. Assess for postural hypotension prior to ambulation.
4. If unable to control blood pressure, contact physician regarding consideration of other medications and/or transfer to a higher level of care.
5. Hydralazine (Apresoline):
   a. Administer initial dose IV push over 1-2 minutes. (Usual dose range is 5-10 mg.)
   b. May repeat dose at 20-minute intervals until desired blood pressure is achieved or a cumulative dose of 30-40 mg is reached.
6. Labetalol:
   a. *IV Push:*
      i. Administer initial dose IV push over 2 minutes. (Usual dose is 10-20 mg.)
      ii. Repeat doses may be given at 10-minute intervals.
   b. *Continuous IV:*
      i. Consider collaborative care with intensive care unit.
      ii. Initiation of continuous cardiac monitoring.
      iii Infuse a continuous labetalol infusion pump until diastolic pressure is 90-100 mm Hg.
   c. Maximum dose is 300 mg/24 hours.

Reportable Conditions:

1. Notify provider for:
   a. Diastolic blood pressure less than 80 or greater than 105-110 following medication administration.
   b. Category II or III fetal heart rate tracing following antihypertensive administration.
   c. Sustained maternal heart rate less than 50 bpm or greater than 120 bpm during or within 30 minutes following medication administration.

ECLAMPSIA MANAGEMENT:

Background:

- Eclampsia is characterized by convulsions and loss of consciousness, which can occur without warning during the antepartum, intrapartum or postpartum period.
- The eclamptic patient is at risk for aspiration and cerebral hemorrhage.
- Fetal bradycardia frequently occurs during and following an eclamptic seizure.
- Best treatment for baby is maternal stabilization.

MANAGEMENT:

1. Notify charge nurse, attending provider, and anesthesiologist/CRNA immediately. Initiate emergency pager (if institution has instituted).
2. Position patient on side.
3. Protect from injury.
4. Prepare to administer magnesium sulfate.
5. Anticipate obtaining lab tests (magnesium level, blood for liver enzymes, kidney function, etc.).
6. Following seizure:
   a. Suction mouth.
   b. Give oxygen by non-rebreather mask at 10 liters per minute.
   c. Provide ventilatory support as needed.
   d. Assess blood pressure, pulse, and respirations every 5 minutes.
   e. Assess oxygen saturation and level of consciousness every 15 minutes until stable for a minimum of one hour.
   f. Monitor fetal heart rate and uterine activity continuously if viable fetus is present.
   g. Observe for signs and symptoms of placental abruption or impending delivery.
   h. Obtain order for indwelling catheter.