Postpartum Hemorrhage
Part I: Prevention Strategies
Nursing Considerations

A CNE activity by Kenneth E. Brown, MD, MBA, FACOG
and Carol Curran, RNC, MS, OGNP
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This material is presented as risk management education, not legal advice.

Introduction

This monograph will present risk management strategies related to postpartum hemorrhage (PPH). These strategies are formulated by drawing upon peer reviewed literature, clinical practice guidelines and Committee Opinions from the American College of Obstetricians and Gynecologists (ACOG), Association of Women’s Health, Obstetric, and Neonatal Nurses (AWHONN), national patient safety initiatives, and professional liability claims data. PPH Part I will focus on PPH prevention while Part II will address management.

Postpartum Hemorrhage (PPH)
An Overview

Hemorrhage is the number one obstetric related cause of maternal mortality worldwide (Fialkow et al., 2014; WHO, 2011). Developing countries account for the vast majority of pregnancy-related hemorrhagic deaths (Haeri & Dildy, 2012). The World Health Organization (WHO) estimates that more than half a million women and over 5.7 million infants die before, during, or after childbirth annually worldwide. Approximately one quarter of these deaths are caused by complications in the first 24 hours following birth.

PPH Facts & Figures

Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO, 2005).

Decline in maternal mortality (Knight et al., 2009):

1900’s: 700 per 100,000 births
2011: 17.8 per 100,000 births

Professional Liability data on PPH:

Indemnity is the amount of money paid to plaintiffs for harm from medical treatment.

- Over 15% of total indemnity paid on behalf of OB/GYN physicians was for claims of maternal death (PIAA, 2012).
- PPH accounts for 4% of professional liability indemnity costs (CRICO, 2010).

Figure 1: International Trends in Maternal Mortality (*Source: WHO, 2005)
ACOG estimates that over 50% of all maternal deaths occur within 24 hours of delivery, typically due to severe bleeding (2013b). Clark and others reviewed over 1.4 million births and found that obstetric hemorrhage accounted for 12% of the 95 maternal deaths noted over a 7 year period (Clark et al., 2008). These researchers concluded that most maternal deaths in the United States are not preventable and occur in women who begin pregnancy without significant risk factors for death.
New CDC data reveals a shift in maternal mortality causes. An increase in advanced maternal age has led to a rise in medical conditions complicating pregnancy. Today, medical conditions now surpass hemorrhage as leading causes of maternal mortality (Figure 4). As national maternal mortality statistics may vary from resource to resource, all sources agree that the prevention and management of hemorrhage is a primary concern to all providers caring for pregnant patients.

PPH management errors may include (Anthony & Dildy, 2013):

- Lack of preparation to manage hemorrhage
- Prolonged expectant management of the third stage labor
- Underestimating blood loss leading to delay in recognition
- Diagnostic error in failing to identify root cause

**Nursing Tip:**

PPH statistics vary according to clinical factors, reporting techniques and the practice habits of primary practitioners. Nursing care can also influence statistics positively or negatively. Being prepared with an evidence-based multidisciplinary PPH protocol improves patient safety. Nurses who work with high-risk patients must have a heightened state of readiness.
Physiologic Adaptations of Pregnancy

Coagulation Factors

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>*Pregnancy(Term)</th>
<th>Function &amp; Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Fibrinogen</td>
<td>↑</td>
<td>Fibrin precursor: Cleaved by thrombin to form fibrin clot</td>
</tr>
<tr>
<td>II</td>
<td>Prothrombin</td>
<td>↑/→</td>
<td>Activated on Surface of Activated Platelets; Thrombin precursor (Vitamin K)</td>
</tr>
<tr>
<td>III</td>
<td>Tissue Factor Thromboplastin</td>
<td></td>
<td>Tissue Factor formed in Plasma or Tissues that Reacts with VII &amp; Calcium to Activate X</td>
</tr>
<tr>
<td>IV</td>
<td>Calcium Ions</td>
<td></td>
<td>Activator of Enzyme Activity in all Stages of Coagulation</td>
</tr>
<tr>
<td>V</td>
<td>Plasma Accelerator Globulin</td>
<td>↑/→</td>
<td>Activated by Thrombin; Accelerates Conversion of Prothrombin to Thrombin</td>
</tr>
<tr>
<td>VII</td>
<td>Proconvertin</td>
<td>↑</td>
<td>Activated by Thrombin; Reacts with III &amp; Calcium to Activate X (Vitamin K)</td>
</tr>
<tr>
<td>VIII</td>
<td>Antihemophilic Globulin</td>
<td>↑</td>
<td>Activated by Thrombin; Reacts with IX; Calcium, &amp; Phospholipid to Activate X</td>
</tr>
<tr>
<td>IX</td>
<td>Plasma Thromboplastin Component</td>
<td></td>
<td>Activated by Xla; Reacts with VIII, Calcium, &amp; Phospholipid to Activate X (Vitamin K)</td>
</tr>
<tr>
<td>X</td>
<td>Stuart-Prower Factor</td>
<td>↑</td>
<td>Activated on Surface of Activated Platelets; Accelerates Conversion of Prothrombin to Thrombin</td>
</tr>
<tr>
<td>XI</td>
<td>Plasma Thromboplastin</td>
<td>↓</td>
<td>Activated by Xla; Contact Factor for Tissue Factor Thromboplastin</td>
</tr>
<tr>
<td>XII</td>
<td>Hageman Factor</td>
<td>↑</td>
<td>Activated by high-MW Kininogen &amp; Kallikrein; Contact Factor for Initiation of Clotting Cascade-Binds to Exposed Collagen at Site of Vessel Wall Injury</td>
</tr>
<tr>
<td>XIII</td>
<td>Fibrin Stabilizing Factor</td>
<td>↓</td>
<td>Activated by Thrombin in Presence of Calcium; Maintains Firm Fibrin Clot</td>
</tr>
<tr>
<td></td>
<td>von Willebrand Factor</td>
<td>↑</td>
<td>Associated with Subendothelial Connective Tissue; Serves as a Bridge between Platelet Glycoprotein GPIbIX &amp; Collagen</td>
</tr>
<tr>
<td></td>
<td>Protein C &amp; Protein S              (S only)</td>
<td>↓</td>
<td>Coagulation Inhibitors of V &amp; VIII</td>
</tr>
<tr>
<td></td>
<td>Antithrombin</td>
<td>↑</td>
<td>Coagulation Inhibitor of Thrombin, II, and other Factors</td>
</tr>
</tbody>
</table>

Table 2: Hematologic Adaptations of Pregnancy (Sources: Blackburn, 2012; Sisson, 1991)

Physiologic adaptations to pregnancy protect against the normal blood loss that occurs at delivery. Pregnancy is an acquired hypervolemic and hypercoagulable state associated with a 40% increase in plasma volume and a 25% increase in red cell mass. Fibrinogen levels double and other coagulation factors increase, while coagulation inhibitors decrease. These adaptations increase the risk of thrombosis and consumptive coagulopathies such as disseminated intravascular coagulation (DIC).

The positive effects of these changes are the enhancement of maternal tolerance to blood loss at delivery. The negative effects are a delayed maternal response to hypotension which may disguise impending hemorrhage.

Nursing Tip:

Blood loss is a normal result after birth and may desensitize obstetric practitioners to hemorrhage. Labor and delivery RNs, as well as postpartum RNs, can become immune to slow and insidious bleeding. This may lead to a delay in PPH diagnosis. Bleeding after delivery typically equals 1 cup (240cc); anything more may than 2 cups may be cause for concern.
PPH: Definition
Volume Loss: PPH is defined as excessive blood loss immediately after expulsion of the infant until 12 weeks postpartum. ACOG defines excessive blood loss as more than 500 milliliters (mL) for a vaginal delivery, or more than 1000 mL for a cesarean section (2013b). PPH etiology may be defined by four primary classifications: Tone, Tissue, Trauma, and Thrombin (Table 1).

<table>
<thead>
<tr>
<th>Etiology Process</th>
<th>Clinical Risk Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tone</strong></td>
<td></td>
</tr>
<tr>
<td>Overdistended Uterus</td>
<td>Polytympanicis, Multiple Gestation, Macrosomia</td>
</tr>
<tr>
<td>Uterine Atony</td>
<td>Rapid Labor, Prolonged Labor, Grand Multiparous, Medications: Magnesium Sulfate, Oxytocin, Halothane</td>
</tr>
<tr>
<td>Intra Amniotic Infection</td>
<td>Fever, Prolonged Rupture of Membranes</td>
</tr>
<tr>
<td>Abnormal Uterine Development</td>
<td>Fibroids, Uterine Anomalies: Septum</td>
</tr>
<tr>
<td><strong>Tissue</strong></td>
<td></td>
</tr>
<tr>
<td>Retained Products of Conception</td>
<td>High Parity, Precipitous Delivery</td>
</tr>
<tr>
<td>Abnormal Placenta</td>
<td>Placenta Previa; Accreta, Increta, Percreta; History of Cesarean Section</td>
</tr>
<tr>
<td>Retained Blood Clots</td>
<td>Atonic Uterus</td>
</tr>
<tr>
<td><strong>Trauma</strong></td>
<td></td>
</tr>
<tr>
<td>Lacerations</td>
<td>Precipitous or Operative Delivery; Macrosomia</td>
</tr>
<tr>
<td>Surgical: Cesarean Delivery</td>
<td>Malpresentation, Deep Engagement; Emergent Delivery</td>
</tr>
<tr>
<td>Uterine Rupture</td>
<td>Previous Uterine Surgery</td>
</tr>
<tr>
<td>Uterine Inversion</td>
<td>Fundal Placenta, Excessive Traction</td>
</tr>
<tr>
<td><strong>Thrombin</strong></td>
<td></td>
</tr>
<tr>
<td>Pre-Existing Condition</td>
<td>Liver Disease, Von Willebrand Disease, Hemophilia</td>
</tr>
<tr>
<td>Abnormality Acquired during Gestation</td>
<td>Idiopathic Thrombocytopenia Purpura (ITP), Disseminated Intravascular Coagulation (DIC)</td>
</tr>
<tr>
<td>Anti-Coagulant Therapy</td>
<td>Cool Therapy; Heparin, Lovonox</td>
</tr>
</tbody>
</table>

*Table 1: Etiology of PPH (Sources: SOGC 1998 & 2000)*

Laboratory Analysis: Estimated blood loss (EBL) at delivery is subjective, unreliable and frequently underestimated. More objective definitions may include a 10% decline in hematocrit or a need for a blood transfusion (ACOG, 2013b; Haeri & Dildy, 2012). During active hemorrhage, hemoglobin and hematocrit values are frequently inaccurate.

*Physical examination* findings may be the most clinically relevant and accurate determination of excessive blood loss. Due to patient variation, a loss of 1000 mL may or may not manifest as clinical instability. Clinical triggers signaling hemorrhage may not occur until blood loss exceeds 15%. These symptoms may include:

- Tachycardia
- Hypotension
- Pallor
- Dizziness
- Oliguria
Timing: Hemorrhage may occur early or late during the postpartum period. Primary PPH occurs within the first 24 hours of delivery in 4-6% of pregnancies (ACOG, 2013b). Primary PPH is more common and severe, with 80% of cases resulting from uterine atony. Secondary PPH occurs between 24 hours and 6-12 weeks following delivery. The most frequent causes of PPH are listed in Figure 6.

Nursing Tip: Any physiologic situation which disturbs normal involution either by intervention (MgSO4 or Oxytocin) or by natural causes (uterine overdistension secondary to macrosomia or multiple gestations) will alter the uterus’s ability to contract and tamponade the placental implantation site at delivery….increasing risk of hemorrhage.

Nurses must maintain a heightened state of awareness when administering MgSO4 or Oxytocin simultaneously. This happens frequently in Level III facilities that care for high-risk patients.

ACOG identifies several clinical risk factors that may contribute to the threat of hemorrhage (2013b) including length of labor, preeclampsia, chorioamnionitis, operative delivery, and certain medication administration. Maternal age, multiple gestation, and cesarean section also contribute to PPH risk.
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Case Study:

- Patient Gravida2 Para2, 1 week postpartum following operative vaginal delivery arrives in the ED with complaints of dizziness, nausea, and fainted approximately 2 hours ago.
- Medical History: Mild preeclampsia during each pregnancy, mitral valve prolapse, allergy to penicillin. Liver function tests (LFT) & coagulation studies/DIC screen were within normal limits.

What is the most likely cause of this patient’s bleeding?

1. HELLP Syndrome
2. Retained products of conception
3. Undiagnosed cervical laceration

Correct Answer: 2-Retained products of conception.

1. Incorrect: Patient did not show signs of HELLP Syndrome antepartum, intrapartum, or at this admission. 
   ER physician performed a bedside ultrasound of the liver which was negative; LFT & DIC screen negative.
2. Correct: Patient received a dilation & curettage procedure, was stabilized, and discharged after 12 hours.
3. Incorrect: Cervical lacerations of significant size would typically be symptomatic prior to discharge.
   OB MD performed a cervical exam which revealed several clots in the posterior fornix but negative for lacerations.

Nursing Tip:

Nurses play a key role in the diagnosis of PPH. Think of these questions when evaluating a patient for excessive blood loss:

- Is the source uterine or other?
  * A non-uterine cause typically requires evaluation and treatment by the primary practitioner.
- Are there any visible lacerations?
  *Perform a visual exam of the introitus, perineum, and the vaginal opening.
- Does the lochia contain clots, membranes, or both?
  *Solids found in blood may be the source; report these findings.
- Is the patient symptomatic (↓BP, ↑pulse, ↑ respirations)?
  *Healthy pregnant women have a high tolerance for blood loss; once symptoms develop intervene quickly.
PPH Prevention

Researchers examining pregnancy-related deaths in the US found that 72-93% of deaths due to PPH were preventable (Berg et al., 2005; Clark et al., 2008). Simulation preparation and early diagnosis of PPH have been shown to be associated with reduction in morbidity and mortality (ECRI, 2011). Obstetric providers may improve patient outcomes by initiation of four major objectives:

1. **Preparation**
   - PPH Cart & Simulation Drills

2. **Identification**
   - Risk Factors

3. **AMTSL**
   - Active Management of Third Stage of Labor

4. **Assess**
   - PPH Assessments & Actual Blood Loss

PPH Prevention - Preparation

Prevention of PPH requires skilled personnel, equipment, and specific resources to manage a hemorrhagic emergency. **Rapid Response Teams** comprise a diverse range of clinicians who bring critical care expertise to the bedside of unstable patients. ACOG Committee Opinion #590 found that early activation of a rapid response team has been associated with a decrease in cardiac arrest, improved survival of hospitalized patients, and decreased admissions to an intensive care unit (2014). These teams are activated once clinical triggers (signs or symptoms of impending decompensation) of maternal instability have been identified by the bedside practitioner; typically the nurse. A **Modified Early Obstetric Warning System** (MEOWS) of high-risk trigger thresholds are outlined in Table 3.

<table>
<thead>
<tr>
<th>Assessment Parameter</th>
<th>Red Trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature: °C</td>
<td>&lt; 35 or &gt; 38</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>&lt; 90 or &gt; 160</td>
</tr>
<tr>
<td>Diastolic BP (mmHg)</td>
<td>&gt; 100</td>
</tr>
<tr>
<td>Heart Rate (beats per minute)</td>
<td>&lt; 40 or &gt; 120</td>
</tr>
<tr>
<td>Respiratory Rate (per minute)</td>
<td>&lt; 10 or &gt; 30</td>
</tr>
<tr>
<td>Oxygen Saturation (%)</td>
<td>&lt; 95%</td>
</tr>
<tr>
<td>Neurologic Response</td>
<td>Unresponsive or Pain-Induced only</td>
</tr>
</tbody>
</table>

*Table 3 (Source data: ACOG, 2014)*
**Nursing Tip:**

LD and PP nurses should have a low threshold for PPH clinical triggers. As first responders, early recognition and management of mild hemorrhage by a nurse often negates severe hemorrhage treatment by the physician. Be alert to early warning signs of obstetric hemorrhage:

- SBP <90 or DBP < 60
- Pulse < 60 or > 110
- Respirations > 20
- MAP < 30
- Oxygen Saturation < 95%
- Urinary Output < 25cc/hour

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**OB Hemorrhage Cart:** Designation of a central location of all supplies for treating acute postpartum hemorrhage is essential for patient safety. Antony and Dildy have identified essential components of an obstetrical hemorrhage cart listed here (2013):

- **Paperwork:** Laminated copy of OB department approved hemorrhage protocol, cart item checklist (items in each drawer), surgical consent forms, key telephone numbers, and non-sterile gloves
- **IV Supplies, blood filters, blood gas/pH kits**
- **Blood tubing, blood collection tubes, IV fluids (NS and LR), and hetastarch**
- **Hemorrhage timeline record, uterotonic chart, B-Lynch/O’Leary Suture diagrams & associated supplies**
- **Obstetric procedure/laceration tray, standard and weighted speculums, large curette, and vaginal packing supplies**
- **Arterial line supplies, large-bore triple lumen kit, stopcocks, IV pressure bag and supplies, and sterile gloves**
- **Balloon Tamponade device of choice, rapid infusion and fluid warmer supplies, Foley catheter, surgical drains, warming blanket**
- **Postpartum hysterectomy tray**
**PPH Protocol & Tools:** In 2010, The Joint Commission (TJC) recommended the adoption of protocols in the management of PPH. National Patient Safety Goal 16 (recognize and respond to changes in a patient’s condition) is most applicable to the care of women during labor and birth (TJC #44, 2010). To prevent maternal morbidity and mortality, current TJC standards for hospitals and critical access facilities recommend the following (2010):

- Have a process for recognizing & responding to patient deterioration
- Develop written criteria for clinical triggers and when to seek assistance
- Inform the patient & family how to seek assistance when they have concerns about the patient’s safety

After implementing a protocol, researchers have found that most PPH patients were successfully treated at an earlier stage. Nurses are a key component of this success. This resulted in a decrease of hemorrhages progressing past stage 1 from 65% down to only 18% (Antony & Dildy, 2013). A protocol or practice algorithm creates a template for the perinatal team to organize a response. Physicians may modify care as the patient’s condition warrants.

Established protocols should be modified to address the clinical needs and resources of each individual institution (ACOG, 2013a). Nurses are considered first responders. Protocols include a point at which additional responders are summoned: obstetrician or certified nurse midwife, anesthesia, and blood transfusion services. During obstetrical emergencies, it is helpful to designate a record keeper to document clinical events, interventions, and the patient’s response (Antony & Dildy, 2013). A nurse, or other care provider, may perform this task.

The AWHONN Postpartum Hemorrhage Project was started in 2014 as a multi-hospital quality improvement program to reduce associated morbidity and mortality. The pro-
The AWHONN Postpartum Hemorrhage Project was started in 2014 as a multi-hospital quality improvement program to reduce associated morbidity and mortality. The program has a multitude of downloadable resources online at: http://www.pphproject.org/resources.asp. One important PPH Project resource is the AWHONN Practice Brief number one entitled Quantification of Blood Loss. This includes a new AWHONN recommendation requiring cumulative blood loss be formally measured or quantified after every birth (2014). Three US states (NJ GA, and District of Columbia) with the highest rates of PPH mortality have adopted this and other recommendations in an effort to improve patient safety. All hospitals should consider including these new recommendations and nursing interventions into any PPH protocol.

Both ACOG and CMQCC offer protocols based on best practice principles for management of hemorrhage. Recently, ACOG developed a concise one-page patient safety checklist for management of postpartum hemorrhage from vaginal delivery (2013a). CMQCC has a full tool kit of resources for obstetricians and perinatal teams available on their website. Each protocol offers a systematic approach based on clinical triggers. Most patients hemorrhage slowly, particularly patients experiencing secondary PPH, and they are under the care of several healthcare providers. Structured protocols offer organized management and communication pathways for a swift and collaborative response.

Risk of medical or nursing error intensifies when life threatening conditions arise. Severe hemorrhage is often a primary cause of cardiac dysrhythmia and dysfunction. Therefore, hospitals and practitioners may integrate recommendations for PPH management from advanced cardiac life support treatment algorithms such as tachycardia, bradycardia, and pulseless electrical activity.
Simulation Drill Training: Simulation drills provide a platform for interdisciplinary team practice while maintaining the environmental and system factors present during actual patient care events (Fialkow et al., 2014).

TJC, AWHONN, ACOG, and the Institute of Healthcare Improvement (IHI) all support performance of multidisciplinary simulation drills to improve patient safety during PPH. Simulation drills provide a platform for interdisciplinary team practice. The Society for Simulation in Healthcare recently completed an evaluation of the effectiveness of in situ simulation training during PPH. The use of real patients creates realistic conditions. Researchers developed an event-based approach utilizing triggers to encourage team interactions in a realistic manner.

Following simulation, a debriefing process allows for identification of gaps in knowledge and teamwork and detection of environmental and system deficiencies. Participants are able to evaluate themselves and others increasing opportunities for improvement. Collaborative communication and management during PPH are required to reduce risk and improve patient safety.

Lastly, IHI offers a Perinatal Trigger Tool for retrospective chart analysis. The use of triggers to identify adverse events during a manual chart review has been used extensively to measure adverse events. Recent publications describe the process for the review and the history of triggers to identify events. This tool counts only adverse events, whether or not the result of an error. IHI recommends each hospital perform monthly reviews of 20 charts. Both physicians and nurses are involved in the process. IHI perinatal innovation strategies have been shown to reduce adverse events by 75%.

Nursing Tip: The clinical nurse specialist or unit educator has a strategic role in simulation training. Nurses should provide input into simulation preparation, organization, performance, evaluation and quality improvement measures. All nurses are required to complete a clinical orientation program and periodic competency assessment. Multidisciplinary simulation offers a platform to assess individual, as well as, team-focused behaviors and responsibilities. A ratio of 4-6 perinatal healthcare providers per 1 simulation instructor is recommended.
PPH Prevention-Identification

Early recognition of known PPH risk factors and initiation of active management of the third stage of labor have been shown to significantly lower the incidence and severity of PPH (Fialkow et al., 2014; Westoff et al., 2013). Antepartum and intrapartum risk factors may be assessed by reviewing aspects of the patient’s medical history, obstetric history, labor characteristics, medication administration, exposure to anesthesia, and third stage labor management. Each obstetric provider should discuss risks of hemorrhage with the patient before labor initiation and as labor progresses. At admission, nurses should re-evaluate a patient’s risk for PPH and communicate any change in risk status to other perinatal team members. Written documentation of patient education should be evident in the patient’s chart.

Antepartum & Intrapartum Medical Record Documentation Examples:

**ROUTINE MD note:** Patient in for routine visit. VSS. FHR 130. Anticipate vaginal delivery. -Dr. Jones

**RECOMMENDED MD note:** Patient in for routine visit, exam negative, see flowsheet. Discussed delivery options and PPH risk factors (obesity, multiparity, twins, hx PPH). She is aware of her risk factors and the implications for LD and PP, which may include: multiple medications, procedures, or surgery (balloon tx, D&C, blood transfusion or hysterectomy) if bleeding is excessive and unresponsive to routine therapy. Pt and husband questions asked and answered. Patient agrees to current plan of care.

-Dr. Jones

**RECOMMENDED RN note:** Patient admitted to LD for induction of labor due to twins @ 36.5 weeks. OB hx positive for PPH at last delivery, requiring blood products. Med Hx positive for obesity. Discussed PPH risks with patient and reported to obstetrician. MD discussed PPH risks, potential interventions, and management options with patient and significant other. Patient asks questions, repeated back understanding of plan of care and agreed to plan. Additional PIV placed in left arm with heplock. PPH protocol checklist in patient chart, risks identified and documented. Continue to assess PPH risk status throughout labor and birth.

-Nurse Smith

PPH Prevention-Active Management of the Third Stage of Labor [AMTSL]

In the past, administering an uterotonic medication prior to delivery of the placenta was thought to increase the incidence of a trapped placenta requiring manual removal and uterine inversion. This concern remains unfounded and is not supported by research, only opinion. ACOG and other opinion leaders support a more “active” approach to management in the third stage of labor. Nurses should support and encourage primary
practitioner’s use of the active management of the third stage of labor or AMTSL for the purposes of PPH reduction.

In 2003, the International Federation of Obstetrics and Gynecology (FIGO) and the International Confederation of Midwives (ICM) launched a joint statement on management of the third stage of labor to prevent postpartum hemorrhage. This statement was part of the Safe Motherhood effort to reduce maternal death and disability around the world. Upon review of current evidence, FIGO and ICM agreed that active management of the third stage of labor has been effective in reducing the incidence of hemorrhage, quantity of blood loss, and blood transfusions. Physicians and midwives are encouraged to utilize the AMTSL interventions listed here, as they have been shown to decrease PPH (WHO, 2006; Cochrane Database Review, 2003):

1. Prophylactic administration of uterotonic agents
2. Controlled cord traction
3. Uterine massage after delivery of the placenta, as appropriate.

Active management of the third stage of labor consists of interventions designed to facilitate delivery of the placenta while averting uterine atony. Interventions include mild but steady traction of the umbilical cord and uterine massage. Controlled cord traction consists of both stabilization of the uterus and maintaining tension on the cord. This is the recommended method of removal of the placenta during cesarean section in the new World Health Organization guidelines (2005, 2006).

In 2010, several Cochrane Database System Reviews were published on the efficacy of various uterotonic agents. There is overwhelming evidence and widespread acceptance that compared to placebo alone, prophylactic oxytocin at any dose:

- decreases PPH
- decreases the need for therapeutic uterotonics, and
- is superior to ergot alkaloids.

A dose of 10 IU concentrated in 500cc or more intravenous solution given immediately after delivery is the primary intervention in the active management of third stage.

In 2014, ACOG recently endorsed the routine use of AMTSL as best practice and referenced the Cochrane systematic review of five randomized controlled trials of 6,400 women as evidence (2014b). Conclusions from the Cochrane review include: 1) AMTSL
is superior to “expectant management”, and 2) “active management” should be the routine management choice for women expecting to deliver a baby by vaginal birth in a maternity hospital (2010). Labor and delivery nurses must anticipate and incorporate AMTSL into nursing practice. Administering uterotonics medications after delivery of the anterior shoulder and assisting with uterine massage at the request of the physician after birth are nurse-specific interventions.

A recent Cochrane systematic review found that AMTSL reduces severe PPH and anemia while negative effects included: reduced infant birth weight and increased the mother’s blood pressure, after-pains, vomiting and the number of women returning to the hospital with bleeding (Begley et al, 2015). New evidence evaluates single components of the AMTSL management “package”. For example, controlled cord traction (CCT) as an independent factor has not been found to clearly reduce blood loss at delivery in the absence of uterotonics administration (Hofmeyr et al, 2015). Each element of AMTSL requires further research and routine use may not be required in all cases. Nurses should educate labor patients on the AMTSL prior to birth.

**PPH Prevention-Immediate Postpartum Assessments**

Guidelines from the World Health Organization (2006) recommend assessing for postpartum abdominal uterine tonus in all women following childbirth to improve early identification of uterine atony. Immediate postpartum assessments are typically performed at 15 minute intervals for a minimum of 60 minutes after delivery. Both national and international obstetrical governing bodies recommend assessments continue until 2 hours postpartum (FIGO & ICM, 2004; AWHONN, AAP & ACOG, 2007). Routine assessments include vital signs accompanied by evaluations of the bladder, uterine fundus, perineum, and lochia. Abnormal findings warrant more frequent assessments.

**Nursing Tip:**

The immediate postpartum period involves a lot of nursing intervention. Stabilization of the mother and newborn, as well as, initiation of breastfeeding are clinical goals. Although not required, consider more frequent (Q 10 minutes) assessments for early identification and treatment of PPH.

A Cochrane Database Review found that uterine massage given every 10 minutes for 60 minutes after birth reduced blood loss and the need for uterotonics by 80% (Hofmeyr et al., 2008). After initiation of these interventions, the number of women who lost more than 500 mL was decreased by half. Hospital PPH Protocols should include more frequent assessments (every 10 minutes) of patients at high risk for PPH during the immediate postpartum period.

**PPH Assessments Q 10 min X 1 hr = 50% ↓ in PPH**
Identification of obstetrical hemorrhage includes both blood loss estimates and vital sign analysis. Visual estimates of blood loss are frequently imprecise and inaccurate, often leading to delay in diagnosis and treatment (Haeri & Dildy, 2012). Dildy and others found that accuracy of estimates does not improve with clinical experience and age (2004). However, as noted earlier, accuracy has been shown to improve with simulation.

AWHONN recommends that blood loss be formally measured or quantified after every birth (2014). Ideally, every labor and operating room should contain resources and equipment to improve blood loss analysis. Suggested equipment includes: laminated dry weight cards for quick reference, scales to weigh blood-soaked items, calibrated under-buttocks drapes, and electronic charting systems equipped with preset formulas for automated dry and wet weight measurements of standard supplies such as chux and peri-pads. Blood soaked items are measured using a 1:1 calculation.

1cc of blood = 1 mL

<table>
<thead>
<tr>
<th>PPH Prevention Strategies</th>
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<tr>
<td>PPH Protocol</td>
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<tr>
<td>PPH OB Hemorrhage Cart</td>
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<tr>
<td>PPH Simulation Drill Training</td>
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<tr>
<td>Early Identification of Risk Factors</td>
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<td>Active Management of Third Stage of Labor</td>
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<tr>
<td>PPH Assessments Q 10 min X 1hr</td>
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<tr>
<td>Utilization of Patient Safety Checklists</td>
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<tr>
<td>Measure actual blood loss by weight machines</td>
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Table 4: PPH Prevention Strategies
1. PPH is a symptom, not a diagnosis. It’s essential to identify the underlying cause early.

2. Appreciate the many barriers to early recognition of PPH. Barriers may be cognitive (denial), subjective (underestimation of EBL), negligence (failing to perform a PP assessment) and systems-related (lab results reflect patient’s earlier status, not current clinical conditions).

3. Give strong consideration to increasing your PP assessments from Q 15 to Q 10 minutes, even in the absence of a standard of care and particularly in patients at risk for PPH.

4. Guidelines, tools and protocols for preparation and prevention of PPH have been shown to reduce morbidity and mortality. Be familiar with the guidelines of your professional society and take advantage of available tools and resources.

Please proceed to Part II which will address clinical management of active postpartum hemorrhage.
Postpartum Hemorrhage Part I: Prevention Strategies

Nursing Considerations

KEY RESOURCES AND LINKS (Accessed Links: May 1, 2015)

3. **Top #3 Selection**: AWHONN. (2014). Quantification of Blood Loss (Video). https://www.youtube.com/watch?v=F_ac-aCbEn0&list=UUPrOhL3Od7ZeFDq27ycS00g

CITATIONS

14. Center for Disease Control and prevention. Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion.