Executive Summary Checklist

Obstetric hemorrhage is the most common complication in pregnancy leading to severe maternal morbidity and preventable mortality.

Prevention of PPH-related maternal mortality

☐ Commitment from hospital governance and senior administrative leadership to support maternal safety initiatives like PPH in their healthcare system.

Readiness in Every Unit

☐ Create a hemorrhage cart with supplies, checklist, and instruction cards for intrauterine balloons and compressions stitches based on the recommendations referenced (ACOG, 2016; Lyndon et al., 2010; ACOG, 2014; FPQC, 2014; AWHONN, 2014; Bingham et al., 2010).
☐ Ensure teams have 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 in Every Patient

☐ Assessment of hemorrhage risk (prenatal, on admission, and at other appropriate times)
☐ Assessment of:
  ● Retained placenta
  ● Failure to progress during the second stage
  ● Lacerations
  ● Morbidly adherent placenta
  ● Instrumental delivery
  ● Large for gestational age newborn (>4000 gm)
  ● Hypertensive disorders
  ● Induction of labor
  ● Prolonged 1st or second stage of labor
☐ Measurement of cumulative blood loss (formal, as quantitative as possible)
  ● Weigh the pads for quantitative measurement
☐ Active management of the 3rd stage of labor (department-wide protocol)

Response

☐ Unit-standard, stage-based, obstetric hemorrhage emergency management plan with checklists
  ● Obstetric rapid response teams, TeamStepps.
☐ Support program for patients, families, and staff for all significant hemorrhages

Reporting

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

Global maternal deaths have fallen 44% since 1990 but still over 303,000 women die each year from complications related to pregnancy, delivery, or within the first six weeks after delivery (WHO, 2015). A majority of deaths (64%) occur from the day of delivery through 41 days postpartum (Creanga et al., 2015). That equates to about 830 women dying every day, 550 occurring in sub-Saharan Africa, 180 in Southern Asia, and 5 in developed countries (WHO, 2015).

Within the United States it is estimated that approximately 600 women die each year; 14.0 per 100,000 live births (CDC, 2015; WHO and UNICEF, 2015). While that number seems to pale in comparison on the global scale the US ranks 46th in the world for maternal mortality (Agrawal, 2015). Of all industrialized countries, the US lags behind Kazakhstan, Libya and Qatar and is one of only 13 countries whose rates have continued to decline instead of improving over the last 25 years (Kempner, 2015).

A 2015 report by the United Nations (UN) agencies and World Bank Group, Trends in Maternal Mortality: 1990 to 2015, was generated to gauge whether the UN’s Millennium Development Goals would be reached (FPQC, 2014). The 2015 target was to reduce maternal mortality by three-quarters. Only 9 of the 100 countries participating reached the 2015 goal so the new target is to reduce global average maternal death rates below 70 per 100,000 live births by the year 2030, with no country above 140 per 100,000 live births (ACOG, 2006).

The reasons for the overall increase in maternal mortality within the US are unclear. Delaying childbearing and assisted reproductive technology (ie: in-vitro fertilization) have given rise to older mothers with an increased risk of complications than younger women (Joy et al., 2000; Bewley et al., 2005). Additionally, the obesity epidemic gives rise to chronic conditions such as hypertension, diabetes, and chronic heart disease increase the risk of complications during pregnancy (CDC, 2015; Kuklina et al., 2009; Albrecht et al., 2010; Kuklina et al., 2012).

Over a third of maternal deaths in the US are preventable, 40% could be avoided if women had access to quality care (Berg et al, 2005). Most notably, black women have a 3 to 4-fold increased risk of death due to pregnancy compared to any other race or ethnicity (Creanga et a., 2014; Callaghan et al., 2008). The reasons are extremely complex and not well documented. Moreover, severe maternal morbidity is much more prevalent and preventable, affecting tens of thousands of women each year (Callaghan et al., 2012; Callaghan et al., 2008).

Postpartum Hemorrhage (PPH)

Obstetric hemorrhage remains among the leading global causes of severe maternal morbidity and mortality (Callaghan et al., 2010; Calvert et al., 2012; Ross and Mullin, 2012). In some developing countries, the maternal mortality rate is as high as 1 percent of live births with nearly one-fourth of those deaths being attributable to postpartum hemorrhage (PPH) (AbouZahr, 1998). According to the most recent mortality data reported to the CDC in 2011-2012, 11% of pregnancy-related deaths in the U.S. are caused by PP (Berg et al., 1996). Between 1994-2006, the number of PPH cases has increased more than 25 percent, potentially driven by a 50 percent increase in uterine atony.

PPH is a "low-volume, high-risk" event for birth facilities, which has led to the down-prioritization for developing standardized intervention protocols (Lyndon et al., 2015). Limited consideration for the implementation of coordinated approaches persists despite a consistent global recognition that the lack of communication, patient engagement, and clinical intervention strategies for managing acute hemorrhage in the postpartum period lead to an increase in maternal morbidity and mortality (Lewis et al., 2007; CAPH, 2011).

There are many potential causes for PPH, but chief among them is uterine atony or the inability of the uterus to contract and retract following childbirth. PPH in a previous pregnancy also can increase the risk of hemorrhage during a subsequent delivery. A contributing factor to the lack of standard coordinated approaches to PPH is the issue that there is no precise definition for the condition. Literature defines PPH as blood loss of more than 500 mL following a vaginal delivery or more than 1000 mL following a cesarean section delivery (Baskett, 1999). PPH is also classified by time frame with Primary PPH occurring in the first twenty-four hours and secondary or late-term PPH occurring in the subsequent period.

Further, blood loss during delivery can be difficult to measure, which is attributable to lack of standardization on how to manage blood collected during childbirth as well as improvements in medical products that can absorb a deceivingly high amount of fluid. The lack of clear guidelines for measuring blood loss during childbirth often leads to underestimation and a clinician may not diagnose Primary PPH.
Population-based studies have identified some significant risk factors that may result in PPH:

- Retained Placenta
- Failure to Progress During the Second Stage Of Labor
- Placenta Accreta, Increta, and Percreta
- Lacerations
- Instrumental Delivery
- Large Gestational Age (LGA) Newborns
- Hypertensive Disorders
- Induced Labor
- Augmentation of Labor With Oxytocin (Scheiner et al., 2005)

Another issue that leads to the missed diagnosis of PPH is the physiological difference between expectant mothers. On average, mothers of single pregnancies have between 30-50 percent higher blood volume than a non-pregnant woman. Within the pregnant population, other blood-related physiological traits such as anemia, underlying cardiac conditions, or preeclampsia will also impact a mother's ability to tolerate blood loss.

Lack of timely and medically appropriate response to PPH is what results in poor outcomes. Early recognition of PPH and a timely, coordinated intervention are essential to reducing associated morbidity and mortality.

Leadership Plan

- Individual practices, hospitals, and hospital systems should develop systems of care that deliver risk-appropriate care to women pre- and post-delivery.
- Managing PPH requires a comprehensive and interdisciplinary commitment from administrative and medical leaders.
- While there are prescriptive clinical interventions, highlighted in the practice plan, engaging expectant mothers and those supporting them is critical to the holistic improvement of an institution's obstetric safety including PPH.
- Women with risk factors for PPH should be identified and counseled as appropriate for their level of risk and gestational age.
- It is important that leaders ensure availability of resources such as personnel, equipment, blood products and trained personnel.
- Establishing PPH protocols, creation of PPH kits, and appropriate training and simulation drills reduces the risk of PPH.

Practice Plan

The Council on Patient Safety in Women’s Health Care developed comprehensive bundles and list of resources that applies to the prevention of harm from PPH and other maternal safety issues. The bundles are a roadmap for hospitals to use in the prevention of harm for these two pregnancy-related conditions.

It is important to remember that approach to management of PPH depends on the etiology in a patient who has had a vaginal delivery or a cesarean section. Treatment of atony depends on the route of delivery. Coagulopathies are managed medically whilst trauma related PPH is managed surgically.
Technology Plan
Suggested practices and technologies are limited to those proven to show benefit or are the only known technologies with a particular capability. As other options may exist, please send information on any additional technologies, along with appropriate evidence, to info@patientsafetymovement.org.

- Electronic Health Record (EHR)
  - Web-based/EHR predictive algorithms that elicit specific data such as but not limited to vital signs (BP, Temp, HR, RR, and SpO2) lab values, nurses notes, and event reports.
- Close monitoring of hemodynamics such as heart rate and blood pressure
- Ultrasound technology for assessment of retained products, retained placenta or abruption.

Metrics

Topic:
Severe Maternal Morbidity among Hemorrhage Cases

Outcome Measure Formula:

**Numerator:** Among the denominator, all cases with any SMM code  
**Denominator:** All mothers during their birth admission, excluding ectopics and miscarriages, meeting one of the following criteria:
- Presence of an Abruption, Previa or Antepartum hemorrhage diagnosis code
- Presence of transfusion procedure code without a sickle cell crisis diagnosis code
- Presence of a Postpartum hemorrhage diagnosis code

*Rate is typically displayed as: All cases w/ any SMM code/All mothers meeting denominator criteria*

Metric Recommendations:

**Direct Impact:**
All pregnant patients

**Lives Spared Harm:**

\[ \text{Live Spared Harm} = (SMM Rate}_{baseline} - SMM Rate}_{measurement} \times \text{Denominator Procedures}_{measurement} \]

**Notes:**
Since this is a morbidity measure, the lives saved calculation is not applicable.

**Data Collection:**
HDD File (ICD9/ICD10)
Workgroup

Chair:
David Lagrew (Providence St. Joseph Health)

Members:
S. Abbas Shobeiri (Virginia Commonwealth University School of Medicine Inova Fairfax Medical Campus)
Gillian Abir (Stanford University)
Jill Arnold (National Accreta Foundation)
Ari Babaknia (Patient Safety Movement Foundation)
Lilly Filler (Patient Safety Movement Foundation)
Steven J. Barker (Patient Safety Movement Foundation; Masimo)
Ariana Longley (Patient Safety Movement Foundation)
Jacob Lopez (Patient Safety Movement Foundation)
Jeanne Mahoney (The American College of Obstetricians and Gynecologists)
Elliot Main (California Maternal Quality Care Collaborative)
Claire Manneh (California Hospital Association)
Ross McQuivey (Clinical Innovations, LLC)
Charles Micheli (The University of Vermont Health Network)
Kristen Terlizzi (National Accreta Foundation)
Josef Wichilewski (Clalit)

Metrics Integrity:
Nathan Barton (Intermountain Healthcare)
Robin Betts (Intermountain Healthcare)
Jan Orton (Intermountain Healthcare)

Conflicts of Interest Disclosure
The Patient Safety Movement Foundation partners with as many stakeholders as possible to focus on how to address patient safety challenges. The recommendations in the APSS are developed by workgroups that may include patient safety experts, healthcare technology professionals, hospital leaders, patient advocates, and medical technology industry volunteers. Some of the APSS recommend technologies offered by companies involved in the Patient Safety Movement Foundation that the workgroups have concluded, based on available evidence, are beneficial in addressing the patient safety issues addressed in the APSS. Workgroup members are required to disclose any potential conflicts of interest.

References
AWHONN Launches Postpartum. Hemorrhage Project. Nursing for Women’s Health 18 Wiley Online Library

IV Oxytocin Warning. Guidelines for Oxytocin Administration after Birth: AWHONN Practice Brief Number 2. Wiley Online Library


Centers for Disease Control, Prevention, others. Pregnancy mortality surveillance system. 16 (2015).


