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The AHA/HRET HEN would like to acknowledge our partner, Cynosure Health, for their work in developing the Obstetrical Harm Change Package.
WHAT’S NEW IN THIS EDITION?
• Added sections on readiness, recognition and response to Maternal Hemorrhage and Severe Preeclampsia, including measures, AIM statements, treatment recommendations and guidelines.

OVERVIEW

Background
• The maternal mortality rate in the United States has DOUBLED in the last decade. Possible causes for this increase include Early Elective Deliveries, a higher incidence of C-sections, more cases of severe pre-eclampsia, and complications from other co-morbidities.
• Additionally, severe maternal morbidity is 50 times more common than mortality, and often goes unnoticed until it is too late to prevent outcomes that include lifelong disability.
• The biggest challenge for hospitals is to identify those patients at highest risk for maternal morbidity and imminent risk for harm, and to implement strategies in a timely manner to mitigate those risks.

Recommended AIM:
• By December 8, 2014, all hospitals will observe a 40% decrease in the number of women requiring 4 or more transfusions of any blood product in the post-partum period.
• By December 8, 2014, all hospitals will show a 40% decrease in the number of days spent in the ICU by pregnant women with pre-eclampsia during their hospitalization.
• Reduce the perinatal birth-trauma rate (AHRQ PSI 17) by 40% by December 8, 2014.

Potential Measurement(s):
Outcome: The number of women who received 4 or more units of any blood product during the postpartum hospitalization. (EOM# 118)

Process: The number of women admitted to the Labor and Delivery unit whose risk of OB hemorrhage has been assessed and recorded in the medical record. (EOM# 116)
### KEY ELEMENTS | IDEAS TO TEST
--- | ---
**Standardize readiness for obstetric emergencies** | • Have emergency supplies and medications readily available through the use of standardized hemorrhage and magnesium carts or kits.  
• Keep a hemorrhage kit in the medication delivery station.  
• With the assistance of physicians, nurses, and blood bank staff, develop a hospital protocol for the response to hemorrhage using an evidence-based example such as the Maternal Hemorrhage Toolkit found at www.CMQCC.org.  
• Use policies, protocol examples, practice bundles, educational materials and data collection tools that are already created and available publicly from organizations like CMQCC and IHI.  
• Unless contraindicated, place sequential compression devices on all cesarean delivery patients.

**Standardize recognition of obstetric emergencies** | • Utilize equipment such as drapes with a calibrated collection system that can accurately measure blood loss in lieu of estimating blood loss.  
• Implement an evidence-based trigger tool for the diagnosis and treatment of hemorrhage and severe pre-eclampsia in obstetric patients.  
• Evaluate every obstetric patient for risk of VTE using a standardized assessment tool.  
• Use standardized language to describe the amount of blood loss, the severity of preeclampsia, and fetal heart tracings for communications among the treatment team and with the blood bank.

**Standardize responses to obstetric emergencies** | • Place copies of the hospital’s hemorrhage protocol in prominent places in each patient room.  
• Schedule and conduct regular simulation drills with physicians and nurses to practice the response to obstetric emergencies such as hemorrhage or shoulder dystocia. Use feedback from the post-event debriefing to revise and improve future responses.  
• Conduct a thorough debriefing after each actual and simulated emergency to identify areas needing improvement, and to obtain suggestions for future exercises.  
• Allow all team members the opportunity to speak and to offer suggestions at each debriefing.

**Make the use of oxytocin safer** | • Require all scheduled elective inductions to be at least 39 weeks gestation, unless medical necessity exists.  
• Require fetal monitoring prior to start of induction.  
• Require a pelvic exam prior to start of induction.  
• Obtain an estimated fetal weight prior to induction.

**Make vacuum-assisted deliveries safer** | • Require that alternative labor strategies be considered prior to use.  
• Educate and prepare the patient prior to use.  
• Only use on patients with a high probability of success.  
• Pre-determine a maximum number of allowable “pop-offs.”  
• Require an “exit strategy” if the vacuum assist fails.

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**Making Changes**
- Research has demonstrated that the use of a proven improvement model is necessary to be able to achieve and sustain improvement. Examples of such models include The Model for Improvement, LEAN, and Six Sigma. Additional information about these models is available at: www.IHI.org

**Resources**
- The Institute for Healthcare Improvement on Perinatal Care Improvement, Retrieved at: http://www.ihi.org/Topics/PerinatalCare/Pages/default.aspx
Background
The 20th century saw a dramatic decrease in pregnancy-related deaths, largely because of improvements in sterile techniques — reaching the lowest number in 1987 at 7.2 deaths per 100,000 live births. Unfortunately, the most recent figures available show the rate currently hovers around 15 deaths per 100,000 births — placing the U.S. near the bottom among developed nations in this regard. According to a 2012 federal study, the rate of severe complications during and after delivery has doubled in the last decade. Near-misses, where a woman nearly dies, increased by 27 percent.

As a result, each year in the U.S., about 700 women die of pregnancy-related complications, and 52,000 experience emergencies such as acute renal failure, shock, respiratory distress, aneurysms, and heart disease requiring surgery. An additional 34,000 women barely avoid death.

(Lyndon A L., 2010)

Additionally, severe maternal morbidity is 50 times more common than maternal death. In the National Hospital Discharge Survey from 1991-2003, it was estimated that the severe maternal morbidity rate in the U.S. was 5.1 per 1,000 deliveries. (Callaghan WM, 2008) There is also growing evidence that maternal morbidity may be increasing in the U.S.

Data from the 1998– 2005 Nationwide Inpatient Sample of the Healthcare Cost and Utilization Project show that the prevalence of delivery hospitalizations complicated by at least one severe obstetric complication increased from 6.4 per 1,000 deliveries (n = 48,645) in 1998– 1999, to 8.1 per 1,000 deliveries (n = 68,433) in 2004–2005. (Kuklina E, 2009) Rates of complications that increased significantly during the study period included renal failure (increased by 21%, from 0.23 to 0.28), pulmonary embolism (increased by 52%, from 0.12 to 0.18), adult respiratory distress syndrome (increased by 26%, from 0.36 to 0.45), shock (increased by 24%, from 0.15 to 0.19), blood transfusions (increased by 92%, from 2.38 to 4.58), and ventilation (increased by 21%, from 0.47 to 0.57).

The top 3 causes of maternal morbidity and mortality are postpartum hemorrhage, severe pre-eclampsia and obstetric VTE. Recognition, response and readiness to treat these conditions are the keys to decreasing obstetric mortality and morbidity. (Main EK, 2011) In addition to the “Three R’s” (Readiness, Recognition and Response), hospitals that have implemented the following safety bundles and tools are better positioned to treat and prevent maternal morbidity:

• Postpartum Hemorrhage Safety Bundle
• VTE Prevention Safety Bundle
• Severe Pre-Eclampsia Safety Bundle
• Maternal Early Warning Criteria (trigger tool)
**AIM:** Reduce Obstetric Harm by 40% by December 8, 2014

### PRIMARY DRIVERS

<table>
<thead>
<tr>
<th><strong>Standardize readiness for obstetric emergencies</strong></th>
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<tr>
<td>• Implement standardized care delivery systems</td>
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### SECONDARY DRIVERS

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<tr>
<th><strong>Standardize recognition of obstetric emergencies</strong></th>
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<tr>
<td>• Implement standardized early warning systems to identify high-risk patients</td>
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### CHANGE IDEAS

<table>
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<th><strong>Standardize responses to obstetric emergencies</strong></th>
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<td>• Implement and test standardized protocols for obstetric emergencies</td>
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<tr>
<td>Standardize readiness for obstetric emergencies</td>
<td>• Implement standardized care delivery systems</td>
<td>• Have emergency supplies and medications readily available through the use of standardized magnesium carts or kits.</td>
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<td>• Keep a severe pre-eclampsia medication toolkit at the medication-delivery station.</td>
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<td>• With the assistance of physicians and nurses, develop a protocol for the response to severe pre-eclampsia using an evidence-based example, such as the Severe Pre-eclampsia Toolkit found on <a href="http://www.CMQCC.org">www.CMQCC.org</a>.</td>
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<td>• Implement standardized care delivery systems</td>
<td>• Use policies, protocol examples, practice bundles, educational materials, and data collection tools that have already been created and are publicly available from organizations like CMQCC and other state and national agencies.</td>
</tr>
<tr>
<td>Standardize recognition of obstetric emergencies</td>
<td>• Implement standardized early warning systems to identify high-risk patients</td>
<td>• Implement a tool with evidence-based triggers for the diagnosis and treatment of severe pre-eclampsia in obstetric patients.</td>
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<td>• Use standardized language to describe the severity of pre-eclampsia and fetal heart tracings in communications among the treatment team.</td>
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<tr>
<td>Standardize responses to obstetric emergencies</td>
<td>• Implement and test standardized protocols for obstetric emergencies</td>
<td>• Schedule simulation drills on a regular basis to practice the response to obstetric emergencies such as hemorrhage, and use the feedback from a debriefing after the event to improve future exercises.</td>
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<td>• Conduct a thorough debriefing after each actual and simulated emergency to identify areas needing improvement and obtain suggestions for the future.</td>
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<td>• Allow all team members the opportunity to speak and offer suggestions at each debriefing.</td>
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| **Standardize readiness for obstetric emergencies** | • Implement standardized care delivery systems                                  | • Have medications readily available through the use of standardized VTE prophylaxis kits.  
• Keep a hemorrhage kit at the medication delivery station.  
• With the assistance of physicians and nurses, develop a hospital protocol for the assessment and treatment of patients at risk for VTE.  
• Use policies, protocol examples, practice bundles, educational materials, and data collection tools that have already been created by organizations such as IHI and are publicly available.  
• Unless contraindicated, place sequential compression devices on the lower extremities of all cesarean delivery patients. |
| **Standardize recognition of obstetric emergencies** | • Implement standardized early warning systems to identify high-risk patients     | • Evaluate each obstetric patient for risk of VTE using a standardized assessment tool.  
• Use standardized language to describe maternal condition and fetal heart tracings in communications among the treatment team.                                                                                                                                                                                                                       |
| **Standardize responses to obstetric emergencies**    | • Implement and test standardized protocols for obstetric emergencies             | • Include the VTE prophylaxis protocol as part of the risk assessment and orders.  
• Schedule simulation drills to practice responding to obstetric emergencies on a regular basis, and use feedback from debriefings after the events to improve future exercises.  
• Conduct a thorough debriefing after each actual or simulated emergency to identify areas needing improvement and obtain suggestions for revisions.  
• Allow all care team members the opportunity to speak and offer suggestions at each debriefing.                                                                                                                                                                                                                       |
REDUCTION OF OBSTETRIC HARM DRIVER DIAGRAM – OTHER OB HARM (OXYTOCIN USE AND VACUUM-ASSISTED DELIVERIES)

**Aim:** Reduce Obstetric Harm by 40% by December 8, 2014

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<tr>
<td><strong>Standardize readiness for obstetric emergencies</strong></td>
<td>• Implementation of Evidence Based Practice Bundles for Oxytocin Use and Vacuum-Assisted Deliveries</td>
<td>• Develop a policy based on successful examples of established, evidence-based protocols, which follow the guidelines in the IHI Augmentation and Induction bundles.</td>
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<td>• To ensure compliance with all the bundle elements, require documentation of each in the medical record.</td>
<td>• Establish a concrete policy requiring documentation and justification of “medical necessity” for any induction prior to 39 weeks gestation.</td>
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<td>• Establish a concrete policy requiring documentation and justification of “medical necessity” for any induction prior to 39 weeks gestation.</td>
<td>• Implement a “hard stop” policy when an attempt is made to schedule an elective delivery without meeting all four elements of the Induction or Augmentation bundle.</td>
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<td>• Decide on a standard interval of time for fetal monitoring prior to augmenting or inducing labor.</td>
<td>• Develop policies for vacuum use based on successful, established, evidence-based protocols.</td>
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<td>• To ensure compliance, require documentation of the bundle elements in the medical record.</td>
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<td>• Include guidelines for a maximum time for vacuum application and pop-offs in the policies for operative vaginal delivery.</td>
<td>• Establish a concrete policy requiring documentation and justification of “medical necessity” for any induction prior to 39 weeks gestation.</td>
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<td>• Develop a standardized method of notifying the practitioner in real-time about the elapsed time of vacuum use and the number of pop-offs during delivery.</td>
<td>• Implement a “hard stop” policy when the maximum number of pop-offs or time of administration is reached during an operative vaginal delivery that includes instructions to implement the next steps of the protocol or notify the chain of command as appropriate.</td>
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<td>• Implement a “hard stop” policy when the maximum number of pop-offs or time of administration is reached during an operative vaginal delivery that includes instructions to implement the next steps of the protocol or notify the chain of command as appropriate.</td>
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<td>• Decide on a standard interval of time for fetal monitoring prior to augmenting or inducing labor.</td>
<td>• Require that a C-section room and required staff be available and ready for use during all operative vaginal deliveries in case of an emergency.</td>
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<td>• Adopt a standardized fetal monitoring educational program for both medical and nursing staff.</td>
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<td>• Incorporate NICHD terminology in all discussions and documentation of fetal heart rate status.</td>
<td>• Develop fetal heart rate management algorithms based on the three-tiered NICHD Fetal Heart Rate Status Categories (American College of Obstetricians and Gynecologists, 2009).</td>
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<td><strong>Standardize responses to obstetric emergencies</strong></td>
<td>• Implement team training for communication during an emergency</td>
<td>• Provide teamwork education and training to all staff using a program such as TeamSTEPPS, to enhance communication during emergencies.</td>
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<td>• Conduct a thorough debriefing after each actual emergency to identify necessary improvements.</td>
<td>• Consider implementing simulated drills to practice and develop skills and identify and address concerns.</td>
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SUGGESTED AIM STATEMENT
By December 8, 2014, hospitals in the AHA/HRET Hospital Engagement Network will reduce obstetric-related mortality and/or severe morbidity by 40%.

POST-PARTUM HEMORRHAGE (PPH)
Postpartum hemorrhage (PPH) affects 1-3% of pregnancies in the first 24 hours after birth and is a leading cause of pregnancy-related mortality in both developing and developed countries. Deaths due to PPH have declined in developed countries because hospitals have easier access to blood products, but PPH-related morbidities have remained constant, and include massive transfusions, secondary surgical procedures, ICU admissions and fertility loss. The risk of hemorrhage is always present at birth, but early identification allows earlier intervention that may prevent major blood loss. Early intervention requires the following:
1) a recognition of risk factors that trigger heightened surveillance; 2) a standardized approach to estimating blood loss; and 3) the use of clinical evaluative thresholds – typically vital signs – as triggers or alerts.

Though efforts to standardize treatment abound, relatively few institutions have created a systematic PPH protocol for early recognition and rapid response. This deficit is due in part to the broad range of clinical risk factors involved in PPH, the lack of standardized methods for estimating blood loss, and the lack of a “gold standard” for defining PPH. (Lyndon A L., 2010)
The 3 “R’s” for addressing Post-Partum Hemorrhage include:

**Readiness:**
- Hemorrhage Cart / with procedural Instructions (balloons, sutures)
- Partnership with the Blood Bank
- Regular unit-based drills (with debriefings)
- Rapid availability of necessary medications
- Access to resources needed for special cases
- Unit/Staff education re protocols

**Recognition:**
- Assessment of hemorrhage risk on admission and late in labor
- Early Warning tool that identifies symptoms and vital signs as triggers
- Quantitative assessment of CUMULATIVE blood loss

**Response:**
- A standard OB Hemorrhage Protocol with checklists

Finally, a critical component:

**Prevention / Learning:**
- Universal use of ‘Active Management’ of the 3rd Stage of labor
- Establishment of a culture that embraces the post-event debriefing/huddle
- Reviews of all serious cases for systems issues (via the mini RCA format)
  (Lyndon A L. D., July 2010)

**Primary Driver:**
Standardize readiness for obstetric emergencies

**Secondary Driver**
Implement delivery systems for standardized care
Ideas to test:
• Have emergency supplies and medications readily available through the use of standardized hemorrhage carts or kits.
• Keep a hemorrhage kit at the medication delivery station.
• With the assistance of physicians, nurses, and blood bank staff, develop a hospital protocol for the response to hemorrhage using an evidence-based example such as the Maternal Hemorrhage Toolkit found on www.CMQCC.org.
• Use policies, protocol examples, practice bundles, educational materials, and data collection tools that have already been created and are publicly available from organizations like CMQCC and IHI.

Primary Driver
Standardize the recognition of obstetric emergencies

Secondary Driver
Implement standardized early warning systems to identify high risk patients

Ideas to test:
• Instead of estimating blood loss, utilize equipment that can identify and quantify blood loss, such as drapes with a calibrated collection system.
• Implement a tool that uses evidence-based triggers for the diagnosis and treatment of hemorrhage in obstetric patients.
• Use standardized language to describe the amount of blood loss and fetal heart tracings in communications among the treatment team and with the blood bank.

Primary Driver
Standardize responses to obstetric emergencies

Secondary Driver
Implement standardized protocols for obstetric emergencies

Ideas to test:
• Conduct drills regularly with physicians and nurses to simulate obstetric emergencies such as maternal hemorrhage
• Place copies of the hemorrhage protocol in prominent places in each patient room.
• Conduct drills regularly with physicians and nurses to simulate obstetric emergencies.

• Conduct a thorough debriefing after each actual and simulated emergency to identify areas needing improvement and obtain suggestions for improving future exercises.
• Allow all team members the opportunity to speak and offer suggestions at each debriefing.

SEVERE PRE-ECLAMPSIA
The biggest opportunity to prevent maternal deaths from preeclampsia is through the prevention of strokes. Unfortunately, there has been little progress in preventing maternal death in the United States from hemorrhagic cerebral vascular accidents. Controlling blood pressure is the best way to prevent deaths due to stroke in women with preeclampsia. In order to prevent stroke, it is imperative to recognize and appropriately treat systolic and diastolic hypertension in a timely manner.

Early recognition and treatment of worsening signs and symptoms of preeclampsia are critical factors in reducing maternal morbidity and mortality, as demonstrated by the 2002-2004 data from the California Pregnancy-Associated Maternal Mortality Review. Missed triggers (i.e. abnormal vital signs) occurred in 60% of preeclampsia deaths.

The critical initial intervention to decrease maternal morbidity and mortality is to administer antihypertensive medications within 15-30 minutes of documentation of persistent BP ≥160 systolic, and/or >105 diastolic. (Blood pressure should be re-tested in 10-15 minutes.) In Martin et al., strokes occurred in 95.8% of women with systolic BP greater than or equal to 160 mm Hg, and in 12.5% of women with diastolic BP greater than 110 mm Hg. (Martin JN, 2005)

An organized tool to identify “clinical signs” or triggers of concern can help clinicians recognize and respond to emergencies in a timelier manner and avoid delays in diagnosis and treatment. The California Maternal Quality Care Collaborative has developed the Severe Pre-Eclampsia Toolkit that contains an Early Recognition Tool. (www.CMQCC.org)

The Early Recognition Tool can be incorporated into the maternal chart notes and can be used, beginning in the prenatal clinic and continuing until discharge, as a guide for vital sign monitoring and documentation. The tool will accompany the patient and provide clinicians with a visual display of vital sign trends, allowing earlier recognition of deviations from the mother’s “typical” physiology.
The 3 “R’s” for Severe Pre-Eclampsia are:

**Readiness:**
- Have antihypertensive medications readily available to be administered within 15-30 minutes for a persistent blood pressure of greater than or equal to 160 systolic and/or greater than 105 diastolic. (Re-check the BP 15 minutes later – if it continues to be elevated, administer the antihypertensive medications as per physician orders.)
- Use an early warning-trigger tool to identify those patients at highest risk for morbidity related to severe hypertension.

**Recognition:**
- Patients presenting with symptoms of headache, abdominal pain, shortness of breath, generalized swelling, or complaints of “I just don’t feel right” should be evaluated for atypical presentations of pre-eclampsia or for “severe features.”
- Standardize the definition of severe pre-eclampsia.
- Use of education to increase patient awareness of signs and symptoms of pre-eclampsia and eclampsia.

**Response:**
- Algorithms for the acute treatment of severe hypertension and eclampsia should be developed and readily available.
- Early post-discharge follow-up is recommended for all patients diagnosed with pre-eclampsia/eclampsia. The Pre-eclampsia Toolkit recommends follow-up
  — within 3-7 days, if medication was used during labor and delivery OR postpartum
  — within 7-14 days, if no medication was used
- **Post-partum** patients presenting to the ED with hypertension, pre-eclampsia, or eclampsia should either be assessed by or admitted to an obstetric service
- Implementing pre-eclampsia-specific checklists, team training and communication strategies, and continuous process improvement strategies will likely reduce hypertensive-related morbidity.
- Use of patient education strategies, targeted to the educational level of the patients, is essential for increasing patient awareness of signs and symptoms of pre-eclampsia.

**Primary Driver**
Standardize readiness for obstetric emergencies

**Secondary Driver**
Implement standardized care delivery systems

**Ideas to test:**
- Have emergency supplies and medications readily available through the use of standardized carts or kits.
- Keep a severe hypertension or eclampsia kit at the medication delivery station.
- With the assistance of physicians, nurses, and blood bank staff, develop a protocol for the response to severe hypertension using an evidence-based example such as the Severe Pre-Eclampsia Toolkit from www.CMQCC.org.
- Use policies, protocol examples, practice bundles, educational materials, and data collection tools that have already been created and are publicly available from organizations such as CMQCC and IHI.

**Primary Driver**
Standardize Recognition of obstetric emergencies

**Secondary Driver**
Implement standardized early warning systems to identify high risk patients

**Ideas to test:**
- Implement a tool using evidence-based triggers for the diagnosis and treatment of hemorrhage and severe pre-eclampsia in obstetric patients.
- Using a standardized assessment tool, evaluate every obstetric patient for the risk of severe morbidity using a standardized assessment tool.
- Use standardized language to describe the amount of blood loss, the severity of pre-eclampsia, and fetal heart tracings in communications among the treatment team and with the blood bank.

**Primary Driver**
Standardize responses to obstetric emergencies

**Secondary Driver**
Implement standardized protocols for obstetric emergencies

**Ideas to test:**
- Place copies of the severe hypertension protocol in prominent places in each patient room.
- Schedule simulation drills regularly with physicians and nurses to practice the response to obstetric emergencies such as eclampsia, and use feedback from a debriefing after each exercise to improve future responses.
• Conduct a thorough debriefing after each actual and simulated emergency to identify areas needing improvement, and obtain suggestions for future exercises.
• Allow all team members the opportunity to speak and offer suggestions at each debriefing.

OBSTETRIC VTE
DVT is more common in the ante-partum period versus the postpartum period (74% vs. 26%, P<.001; mean gestational age at diagnosis of 16.8 ±2.4 weeks). But, as the puerperal period is only 6 weeks, it is associated with the greatest “risk per time interval”. Among patients with ante-partum DVT, 50% are detected by 15 weeks gestation, 38% between 16 & 30 weeks, and only 17% after 30 weeks. In contrast, most pulmonary emboli are diagnosed in the post-partum period (60%), and are strongly associated with cesarean delivery [Relative Risk (RR) of 30, p<0.001]. Thus, the risk of VTE is increased 6-fold during pregnancy, making it one of the top causes of obstetric harm. It has also been noted that pregnant women admitted to the hospital during the ante-partum period are at greatest risk for VTE. (Sultan AA, 2013)

The 3 “R’s” for Obstetric VTE are:
Readiness:
• Sequential Compression Devices (SCD) prior to delivery for all C-section deliveries
• Availability of prophylactic medication at the time of assessment

Recognition:
• Standardize assessments for all patients to determine risk for VTE

Response:
• Standard protocol for chemoprophylaxis.
  — Continue prophylaxis medications for all women who have been receiving it or have been on full anticoagulation during the ante-partum period.
  — Add chemoprophylaxis for patients with:
    • History of VTE not already on chemoprophylaxis
    • Family History of VTE plus any thrombophilia
    • Morbid obesity (BMI>40)
  Or
  • With a score of 2 or more and with additional risks.

Primary Driver
Standardize readiness for obstetric emergencies

Secondary Driver
Implement standardized care delivery systems

Ideas to test:
• Develop and use policies, protocol examples, practice bundles, educational materials, and data collection tools that have already been created and are publicly available.
• Unless contraindicated, place sequential compression devices on all cesarean delivery patients.

Primary Driver
Standardize recognition of obstetric emergencies

Secondary Driver
Implement standardized early warning systems to identify high-risk patients

Ideas to test:
• Evaluate every obstetric patient for risk of VTE using a standardized assessment tool.
• Use standardized language to describe VTE risks when communicating among the treatment team and with the blood bank.

Primary Driver
Standardize responses to obstetric emergencies

Secondary Driver
Implement standardized protocols for obstetric emergencies

Ideas to test:
• Schedule regular simulation drills with physicians and nurses to practice the response to obstetric emergencies such as hemorrhage, and use the feedback from the debriefing after the event to improve future responses.
• Conduct a thorough debriefing after each actual and simulated emergency to identify areas needing improvement and to obtain suggestions for future exercises.
• Allow all team members the opportunity to speak and offer suggestions at teach debriefing

Make the Use of Oxytocin Safer
Oxytocin is commonly used in the induction and augmentation of labor, and has been associated with adverse events and complications during the perinatal period. In response to the reports of adverse events with the use of oxytocin, the Institute for Healthcare Improvement (IHI) developed two Perinatal Safety bundles addressing the use of oxytocin for labor induction and augmentation. In 2007, the Institute for Safe Medical Practices (ISMP) added oxytocin to its list of high-alert medications. Additionally, in 2008, the Eunice Kennedy Shriver National Institute
for Child Health and Human Development (NICHD) sponsored a workshop to update the nomenclature for fetal heart pattern classifications and the definitions of uterine contraction patterns. The revised nomenclature and definitions have been adopted by the American Congress of Obstetricians and Gynecologists (ACOG) and the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) as the standard of care since 2008.

**Primary Driver**
Standardize readiness for obstetrical emergencies

**Secondary Driver**
Implementation of Evidence-Based Practice Bundles

**IHI Elective Induction Bundle (Oxytocin)**
The IHI Elective Induction Bundle (Institute for Healthcare Improvement, 2012) has four elements that must be considered when using oxytocin to induce labor:

1. Assess gestational age (ensure fetal maturity, which generally equates to gestational age greater than or equal to 39 weeks).
   - Use a standardized method, such as ACOG guidelines, to determine gestational age.
   - Fetal heart rate status must be assessed prior to the administration of oxytocin, and the status should be documented using standardized terminology (NICHD) to describe the fetal heart tracings.
3. Conduct a pelvic assessment and use the Bishop Score.
   - Perform and document pelvic examination(s) to determine dilation, effacement, station, cervical position and consistency (Bishop Score), fetal presentation, and adequacy of the maternal pelvis, to confirm the patient is a good candidate for a successful induction.
4. Recognize and manage tachysystole.
   - Tachysystole must be identified using a standard definition and a corresponding plan for a standardized response.

**IHI Augmentation Bundle (Oxytocin)**
Oxytocin augments uterine contractions for patients already in labor, and may be used when the progress of labor is slower or less effective than expected. The IHI Augmentation Bundle (Institute for Healthcare Improvement, 2012) also contains four elements:

1. Estimate fetal weight.
   - Fetal weight and size are estimated to identify the presence of cephalo-pelvic disproportion which may prevent the progress of labor.
2. Monitor and manage fetal heart rate status – as noted in the Induction Bundle.
3. Conduct pelvic assessment – as noted in the Induction Bundle.
4. Recognize and manage tachysystole – as noted in the Induction Bundle.

**Ideas to test:**
- Develop a policy based on successful examples of established, evidence-based protocols, which follow the guidelines in the IHI Augmentation and Induction bundles.
- To ensure compliance with all the bundle elements, require documentation of each in the medical record.
- Establish a concrete policy requiring documentation and justification of “medical necessity” for any induction prior to 39 weeks gestation.
- Implement a “hard stop” policy when an attempt is made to schedule an elective delivery without meeting all four elements of the Induction or Augmentation bundle.
- Decide on a standard interval of time for fetal monitoring prior to augmenting or inducing labor.
IHIVacuum Bundle

The components of the Vacuum Bundle were designed with the intent of providing guidelines regarding alternatives to vacuum delivery and for the safe and appropriate use of the vacuum device. The Vacuum bundle can be utilized by a multidisciplinary team as a reliability tool to promote safety by limiting the procedure to appropriate patients. (Institute for Healthcare Improvement, 2012)

The elements of the Vacuum Bundle include:

1. Consider alternative labor strategies
   - Alternatives may include allowing the patient to rest without pushing, and encouraging the use of effective breathing and pushing techniques. Specific strategies are developed for patients with epidural anesthesia.

2. Discuss treatment alternatives with the mother and document informed consent in advance of final decision-making.
   - Ensure the patient is aware of the potential interventions and possible outcomes of each intervention.

3. Recognize and identify the probability of delivery success based on EFW, fetal position and station.
   - ACOG Practice Bulletin No. 17 reports that the highest risk of fetal injury occurs when delivery attempts with both the vacuum and forceps are followed by a cesarean delivery. Identifying EFW, fetal position and station increases the probability of a successful delivery.

4. Determine in advance the maximum application time for vacuum devices and for maximum number of pop-offs.
   - The organization should develop parameters for the maximum application time for vacuum devices and the maximum number of allowed pop-offs based on the type of equipment (and its corresponding manufacturer recommendations) used at the facility for that equipment.
   - Healthcare staff should be coached to communicate civilly and effectively with each other regarding these parameters when the equipment is used.

5. Develop a contingency strategy, which includes the designation of a stand-by C-section and resuscitation team, to be implemented the event of an emergency.
   - A pre-procedure briefing should be instituted to ensure that operating room and nursery staff remain immediately available so as to avoid delays in care should a vacuum extraction fail.

**BIRTH TRAUMA RELATED TO VACUUM DELIVERY**

<table>
<thead>
<tr>
<th>METHOD</th>
<th>DEATH</th>
<th>ICH</th>
<th>OTHER*</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVD</td>
<td>1/5,000</td>
<td>1/1,900</td>
<td>1/216</td>
</tr>
<tr>
<td>C/S labor</td>
<td>1/1,250</td>
<td>1/952</td>
<td>1/71</td>
</tr>
<tr>
<td>C/S after OVD</td>
<td>1/333</td>
<td></td>
<td>1/38</td>
</tr>
<tr>
<td>C/S no labor</td>
<td>1/1,250</td>
<td>1/2,040</td>
<td>1/105</td>
</tr>
<tr>
<td>VD alone</td>
<td>1/3,333</td>
<td>1/860</td>
<td>1/122</td>
</tr>
<tr>
<td>Forceps alone</td>
<td>1/2,000</td>
<td>1/664</td>
<td>1/76</td>
</tr>
<tr>
<td>Vacuum and forceps</td>
<td>1/1,666</td>
<td>1/280</td>
<td>1/58</td>
</tr>
</tbody>
</table>


**Primary Driver**

Standardize readiness for obstetrical emergencies

**Secondary Driver**

Implementation of an Evidence-Based Practice Bundle
Ideas to test:
• Develop policies for vacuum use based on successful, established, evidence-based protocols.
• To ensure compliance, require documentation of the bundle elements in the medical record.
• Include guidelines for a maximum time for vacuum application and pop-offs in the policies for operative vaginal delivery.
• Develop a standardized method of notifying the practitioner in real-time about the elapsed time of vacuum use and the number of pop-offs during delivery.
• Implement a “hard stop” policy when the maximum number of pop-offs or time of administration is reached during an operative vaginal delivery that includes instructions to implement the next steps of the protocol or notify the chain of command as appropriate.
• Require documentation of patient education and informed consent in the medical record prior to any procedure.
• Require that a C-section room and required staff be available and ready for use during all operative vaginal deliveries in case of an emergency.

Improve outcomes for obstetrical emergencies
The presence of fetal heart rate accelerations provides reassurance of healthy fetal status (American College of Obstetricians and Gynecologists, 2009). To ensure effective communication of fetal status, practitioners should use a common language and nomenclature. Both ACOG and AWHONN have adopted standardized fetal heart rate terminology developed by the National Institute for Child Health and Human Development (NICHD).

Primary Driver
Improve recognition of obstetrical emergencies

Secondary Driver
Implement standardized language for all documentation and discussion of fetal heart tracings

Ideas to test:
• Adopt a standardized fetal monitoring educational program for both medical and nursing staff.
• Incorporate NICHD terminology in all discussions and documentation of fetal heart rate status.
• Develop fetal heart rate management algorithms based on the three-tiered NICHD Fetal Heart Rate Status Categories (American College of Obstetricians and Gynecologists, 2009).

Primary Driver
Improve readiness for obstetrical emergencies

Secondary Driver
Implement team training for communication during an emergency

Teamwork training attempts to minimize the potential for errors by coaching each team member to respond appropriately in acute situations to promote adherence to safety processes and procedures. Team members are trained to cross-check each other’s actions, offer assistance when needed, and identify and address errors in a nonjudgmental fashion. Teamwork training develops effective communication skills and promotes a collaborative environment among team members, creating an atmosphere in which all personnel feel comfortable speaking up or intervening when they suspect a problem. Team members are mentored in how to debrief and provide feedback, especially after an incident or error occurs.

Teamwork training also emphasizes the contribution of human factors such as fatigue and perceptual errors to safety mishaps, as well as the impact of organizational cultures and management and communication styles on team function. (D, 2001)

In addition to teamwork, effective communication is essential for the delivery of high quality, safe patient care. Communication failures are an extremely common cause of inadvertent patient harm. The complexity of modern medical care, coupled with the inherent limitations of human performance, make it critically important that clinicians maintain effective standardized communication skills, and share a common “critical language” which can alert team members to unsafe situations. Other high reliability industries, such as aviation, have demonstrated that the adoption of standardized tools and behaviors is a very effective strategy to enhance teamwork and reduce risk.

Ideas to test:
• Provide education and training to all staff in TeamSTEPPS, the teamwork program from AHRQ, to enhance communication during emergencies.
• Conduct a thorough debriefing after each actual emergency to identify necessary improvements.
• Consider implementing simulated drills to practice and develop skills and identify and address concerns.
• Allow all team members, regardless of position classification, the opportunity to speak and offer suggestions at debriefings.
## Appendix I: OB Harm Top Ten Checklist

### OB Harm Top Ten Checklist

<table>
<thead>
<tr>
<th>TOP TEN EVIDENCE BASED INTERVENTIONS</th>
<th>IN PLACE</th>
<th>NOT DONE</th>
<th>WILL ADOPT</th>
<th>NOTES (RESPONSIBLE AND BY WHEN?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put together a hemorrhage cart with sutures, balloons, medications and a copy of the hospital’s hemorrhage protocol to be kept in a secure, easily accessible area for nursing staff.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Develop a hospital protocol for the response to hemorrhage using an evidence based example, such as the Maternal Hemorrhage Toolkit found on <a href="http://www.CMQCC.org">www.CMQCC.org</a> with the involvement of blood bank, nursing and physicians.</td>
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<tr>
<td>Schedule simulation drills to practice the response to obstetrical emergencies such as hemorrhage on a regular basis, and use the feedback in the debrief after the event to improve future responses.</td>
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<tr>
<td>Place copies of the hospital’s hemorrhage protocol in prominent places in each patient room.</td>
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<tr>
<td>Document cumulative blood loss during delivery instead of estimated blood loss by using graduated drapes, weighing sponges, or by visual count.</td>
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<td>☐</td>
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</tr>
<tr>
<td>Use policies, protocol examples, educational materials and data collection tools that are already created and available publicly from CMQCC.</td>
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<td>☐</td>
<td></td>
</tr>
<tr>
<td>Evaluate every obstetrical patient for risk of VTE using a standardized assessment tool.</td>
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<td></td>
</tr>
<tr>
<td>Unless contraindicated, place sequential compression devices on all cesarean delivery patients.</td>
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<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Use a standardized language to describe amount of blood loss, severity of pre-eclampsia, and fetal heart tracings in communication among the treatment team, including blood bank.</td>
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</tr>
<tr>
<td>Review all obstetrical HTN cases with severe morbidity for systems issues in a root cause analysis (RCA) format.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>
REFERENCES


Lyndon A, L. D. (July 2010). Improving Health Care Response to Obstetric Hemorrhage: the California Maternal Quality Care Collaborative Toolkit to Transform Maternity Care. Developed under contract #08-85012 with the California Department of Public Health; Maternal, Child and Adolescent Health Division: California Maternal Quality Care Collaborative.

