Birthing Hospital Peripartum Hemorrhage Prevention Practices as a Component of the NYS Hemorrhage Project

Adriann Combs, DNP, NNP-BC
Clinical Director
Obstetrics and Gynecology
Northwell Health
I have No Conflicts of Interest to Disclose
OBJECTIVES

• Describe the Goal and Objectives of the NYSPQC Hemorrhage Project
• Review NYSPQC Hemorrhage Project data
• Discuss the consequences of Peripartum Hemorrhage
• Review the risk of peripartum hemorrhage
  • Provider/facility
  • Patient
• Describe the vital sign changes that occur with the onset of severe hemorrhage and shock
• Discuss evidence based tools to maximize early intervention with hemorrhage (MEWS and Shock Index)
NYS Obstetric Hemorrhage Project Goal

The goal of the NYS Obstetric Hemorrhage Project is to reduce maternal morbidity and mortality statewide by translating evidence-based guidelines into clinical practice to improve the assessment and management of obstetric hemorrhage.

• By June 2019, increase hemorrhage risk assessment on admission and postpartum to 85% of maternity patients.
NYS Obstetric Hemorrhage Project Objectives

• Improve **readiness** to respond to an obstetric hemorrhage by implementing standardized policies and procedures and developing rapid response teams;

• Improve **recognition** of obstetric hemorrhage by performing ongoing objective quantification of actual blood loss and triggers of maternal deterioration during and after all births;

• Improve **response** to hemorrhage by performing regular on-site, multidisciplinary hemorrhage drills;

• Improve **reporting** of obstetric hemorrhage using standardized definitions resulting in consistent coding.
Project Participation

70% (86/123) of NYS birthing hospital are participating in the project:

• 100% (17/17) RPCs
• 74% (25/34) Level III hospitals
• 76% (19/25) Level II hospitals
• 53% (25/47) Level I hospitals
### New York State Obstetric Hemorrhage Project

#### Obstetric Hemorrhage

#### Vaginal Delivery

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>≥500</td>
<td>639</td>
<td>625</td>
<td>678</td>
<td>688</td>
<td>720</td>
<td>746</td>
<td>723</td>
<td>728</td>
<td>770</td>
<td>760</td>
<td>7077</td>
</tr>
<tr>
<td>≥1500</td>
<td>48</td>
<td>55</td>
<td>60</td>
<td>50</td>
<td>53</td>
<td>76</td>
<td>62</td>
<td>51</td>
<td>49</td>
<td>68</td>
<td>572</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar</td>
<td>9,682</td>
<td>9,184</td>
<td>9,975</td>
<td>9,978</td>
<td>10,581</td>
<td>10,813</td>
<td>10,328</td>
<td>10,256</td>
<td>9,746</td>
<td>9,740</td>
<td></td>
</tr>
<tr>
<td>Apr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jun</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jul</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aug</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Total n=100,283*
New York State Obstetric Hemorrhage Project
Obstetric Hemorrhage
Cesarean Section

<table>
<thead>
<tr>
<th>Volume</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥500</td>
<td>605</td>
<td>635</td>
<td>643</td>
<td>679</td>
<td>734</td>
<td>692</td>
<td>704</td>
<td>763</td>
<td>684</td>
<td>675</td>
<td>6814</td>
</tr>
<tr>
<td>≥1500</td>
<td>123</td>
<td>124</td>
<td>114</td>
<td>144</td>
<td>158</td>
<td>138</td>
<td>149</td>
<td>145</td>
<td>148</td>
<td>160</td>
<td>1403</td>
</tr>
</tbody>
</table>

n=49,797
New York State Obstetric Hemorrhage Project
Method of Calculating Blood Loss (n=396)

(For patients with hemorrhage-related morbidity or mortality)
New York State Obstetric Hemorrhage Project
Massive Transfusion (4+ units of blood)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>n=13,994</td>
<td>n=13,503</td>
<td>n=14,369</td>
<td>n=14,904</td>
<td>n=14,900</td>
<td>n=16,106</td>
<td>n=15,063</td>
<td>n=15,330</td>
<td>n=14,335</td>
<td>n=14,227</td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>0.5</td>
<td>0.4</td>
<td>0.4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>≥4 units</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>42</td>
<td>41</td>
<td>43</td>
<td>45</td>
<td>45</td>
<td>48</td>
<td>30</td>
<td>77</td>
<td>57</td>
<td>57</td>
<td>485</td>
</tr>
</tbody>
</table>
New York State Obstetric Hemorrhage Project

Hemorrhage-Related* Comorbidities and Mortality

*Hemorrhage is defined as a blood loss of 500mL or greater for a vaginal delivery and 1,000mL or greater for a cesarean section.

<table>
<thead>
<tr>
<th>Month</th>
<th>Transfer to higher care</th>
<th>Hysterectomy</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 2018</td>
<td>2.3</td>
<td>1.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Apr 2018</td>
<td>1.9</td>
<td>1.0</td>
<td>0.1</td>
</tr>
<tr>
<td>May 2018</td>
<td>2.4</td>
<td>2.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Jun 2018</td>
<td>2.1</td>
<td>0.9</td>
<td>0.0</td>
</tr>
<tr>
<td>Jul 2018</td>
<td>2.1</td>
<td>1.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Aug 2018</td>
<td>2.1</td>
<td>1.6</td>
<td>0.0</td>
</tr>
<tr>
<td>Sep 2018</td>
<td>1.9</td>
<td>1.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Oct 2018</td>
<td>1.9</td>
<td>1.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Nov 2018</td>
<td>3.1</td>
<td>3.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Dec 2018</td>
<td>1.6</td>
<td>1.5</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Hysterectomy=208
New York State Obstetric Hemorrhage Project

Percent of Patients Receiving a Hemorrhage Risk Assessment on Admission/Postpartum

Percent %

Mar 2018 (n=10,060) 40.9 32.0
Apr 2018 (n=9,207) 41.1 35.7
May 2018 (n=10,150) 40.2 40.9
Jun 2018 (n=10,438) 42.5 41.1
Jul 2018 (n=10,897) 70.7 69.4
Aug 2018 (n=11,550) 71.3 71.6
Sep 2018 (n=10,797) 74.2 74.2
Oct 2018 (n=11,073) 78.2 78.2
Nov 2018 (n=10,356) 71.6 71.6
Dec 2018 (n=10,167) 74.2 74.2

On admission
Post-partum
New York State Obstetric Hemorrhage Project
Cumulative Hospital Completion of Hemorrhage Drills and Drill Debriefs (n=81)

89% (72/81) of hospitals have completed at least one hemorrhage drill during the project period.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># Drills</td>
<td>37</td>
<td>46</td>
<td>59</td>
<td>60</td>
<td>62</td>
<td>64</td>
<td>67</td>
<td>69</td>
<td>71</td>
<td>72</td>
</tr>
<tr>
<td># Drill Debriefs</td>
<td>35</td>
<td>44</td>
<td>54</td>
<td>56</td>
<td>59</td>
<td>61</td>
<td>65</td>
<td>67</td>
<td>69</td>
<td>70</td>
</tr>
</tbody>
</table>
Why the focus on Hemorrhage?

## Cause of Death by Maternal Mortality Review Cohort

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>2006-2008 n (%) (N=125)</th>
<th>2012-2014* n (%) (N=92)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage</td>
<td>29 (23%)</td>
<td>15 (16%)</td>
</tr>
<tr>
<td>Hypertensive disorders</td>
<td>29 (23%)</td>
<td>6 (7%)</td>
</tr>
<tr>
<td>Embolism (not cerebral)</td>
<td>21 (17%)</td>
<td>22 (24%)</td>
</tr>
<tr>
<td>Cardiovascular conditions</td>
<td>12 (10%)</td>
<td>6 (7%)</td>
</tr>
<tr>
<td>Other</td>
<td>10 (8%)</td>
<td>4 (4%)</td>
</tr>
<tr>
<td>Intracerebral hemorrhage (not associated with PIH)</td>
<td>5 (4%)</td>
<td>4 (4%)</td>
</tr>
<tr>
<td>Infection</td>
<td>4 (3%)</td>
<td>15 (16%)</td>
</tr>
<tr>
<td>Cardiac arrest/failure</td>
<td>4 (3%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Hematopoietic (sickle cell, thalassemia, ITP)</td>
<td>3 (2%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Pulmonary problems</td>
<td>3 (2%)</td>
<td>3 (3%)</td>
</tr>
<tr>
<td>Neurologic/neurovascular problems</td>
<td>3 (2%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>2 (2%)</td>
<td>11 (12%)</td>
</tr>
</tbody>
</table>

Data source: NYS Maternal Mortality Review
*2014 not complete
Why the focus on Hemorrhage?

<table>
<thead>
<tr>
<th>Clinical Cause of Death</th>
<th>Chance to Alter Outcome (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strong/Good</td>
</tr>
<tr>
<td>Obstetric hemorrhage</td>
<td>69</td>
</tr>
<tr>
<td>Deep vein thrombosis/ pulmonary embolism</td>
<td>53</td>
</tr>
<tr>
<td>Sepsis/infection</td>
<td>50</td>
</tr>
<tr>
<td>Preeclampsia/eclampsia*</td>
<td>50</td>
</tr>
<tr>
<td>Cardiomyopathy and other cardiovascular causes*</td>
<td>25</td>
</tr>
<tr>
<td>Cerebral vascular accident</td>
<td>22</td>
</tr>
<tr>
<td>Amniotic fluid embolism</td>
<td>0</td>
</tr>
<tr>
<td>All other causes of death</td>
<td>46</td>
</tr>
<tr>
<td><strong>Total (%)</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

Two deaths lacked sufficient records to make determination (one from each cause of death).

**INTERPRETATION:** The CA-PAMR Committee judged that there was a strong-to-good chance to have altered the fatal outcome in 40% of the pregnancy-related deaths in California in 2002 to 2004. Some pregnancy-related deaths may have had a better chance of being prevented, for example deaths from obstetric hemorrhage, compared to others, such as amniotic fluid embolism.


CA-PAMR Pregnancy-Related Deaths, Chance to Alter Outcome by Grouped Cause of Death; 2002-2004 (N=143)
Peripartum Hemorrhage (PPH)

- Major cause of Severe Maternal Morbidity (SMM) and Mortality
  - Blood products
  - ICU admissions
  - Hysterectomies
- Unrecognized and untreated PPH can lead to DEATH in 2 to 6 hours
- Early recognition and treatment can lead to improved survival
- Tremendous emotional and financial impacts

Hypovolemic shock $\rightarrow$ multi-organ dysfunction $\rightarrow$ DEATH
Financial Impact of Severe Maternal Morbidity

Figure 26. Estimated Delivery Cost With and Without Severe Maternal Morbidity, Adjusting for Other Factors,* New York City, 2008–2012

Estimated costs (dollars)

$20,000
$15,000
$10,000
$5,000
0

Delivery with no SMM

$9,357

Delivery with SMM

$15,714

Difference x Total Cases
= $85M Excess

*Adjusted for maternal age, race/ethnicity, payer, method of delivery, plurality and comorbidity and clustered by hospital. The total sample for the adjusted analysis was 582,006 (excludes missing observations).

# Cardiovascular Physiology during Normal Pregnancy

<table>
<thead>
<tr>
<th>Physiologic Component</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Volume</td>
<td>Increases by 25-52% by late pregnancy with a larger (45-50%) increase in plasma volume compared with red cell mass (20%)</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Decreases until mid pregnancy with gradual increase to baseline at term</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>Rises to 120% of baseline by 32 weeks GA</td>
</tr>
<tr>
<td>Cardiac Output/Stroke Volume</td>
<td>CO increases 30-50% with peak in the second trimester</td>
</tr>
<tr>
<td>Systemic Vascular Resistance</td>
<td>Reaches nadir by 24 weeks with a progressive increase by term</td>
</tr>
</tbody>
</table>

Maternal Intravascular Volume Changes

![Graph showing maternal intravascular volume changes over gestation weeks.](image-url)
# Respiratory Physiology during Normal Pregnancy

<table>
<thead>
<tr>
<th>Physiologic Component</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Residual Capacity</td>
<td>10-20% decrease by term</td>
</tr>
<tr>
<td>Minute Ventilation</td>
<td>20-40% increase by term</td>
</tr>
<tr>
<td>Alveolar Ventilation</td>
<td>50-70% increase by term</td>
</tr>
<tr>
<td>Tidal Volume</td>
<td>30-35% increase by term</td>
</tr>
</tbody>
</table>
Hemorrhage Risk: Facility and Provider Resources

- An assessment of the facilities resources; provider and system.
- Clear guidelines for when the patient’s needs exceed the facilities capacity to treat and a process for immediate, safe transfer.
- A method to quantify blood loss, used routinely.
- A thorough review and understanding of blood availability.
  - A massive transfusion protocol
  - A team that reviews all hemorrhages that require 4 or more units of blood
Hemorrhage Risk: Facility and Provider Resources
Hemorrhage Risk: Facility and Provider Resources

- A clear process to follow in the event of maternal blood loss and hemorrhage including clear escalation.
  - A Hemorrhage Team
  - A standard mechanism to document activities related to hemorrhage
  - A no judgement policy if someone calls a hemorrhage code, no intimidation accepted
  - Standard debriefing
  - Supportive administration
- Frequent in-situ, multidisciplinary drills that identify potential problems during hemorrhage (rarely cancelled).
  - A “hemorrhage cart”, reproducible anywhere a hemorrhage could occur
  - A medication box, reproducible anywhere a hemorrhage could occur
  - Recurrent education to all staff that may participate in hemorrhages
    - Nursing and nursing administration
    - Medicine, OB/Gyn, Anesthesia, Gyn/Onc, General surgery
    - RT
    - Blood bank
## HEMORRHAGE RISK: PATIENT

<table>
<thead>
<tr>
<th>Prenatal</th>
<th>Antepartum</th>
<th>Peripartum: Moderate</th>
<th>Peripartum: High</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Suspected previa/accreta/increta/percreta</td>
<td>Placenta accreta 34 0/7 – 35 6/7</td>
<td>• Prior cesarean, uterine surgery, or multiple laparotomies</td>
<td>• Placenta previa/low lying</td>
</tr>
<tr>
<td>• BMI &gt; 50</td>
<td>Placenta previa 36 0/7 – 37 6/7</td>
<td>• Obesity (BMI &gt; 40)</td>
<td>• Suspected accreta/percreta</td>
</tr>
<tr>
<td>• Clinically significant bleeding disorder</td>
<td>Prior classical cesarean 36 0/7 – 37 6/7</td>
<td>• Hematocrit &lt; 30% &amp; other risk</td>
<td>• Multiple gestation</td>
</tr>
<tr>
<td>• Other significant medical/surgical risk (consider patients who decline transfusion)</td>
<td>Prior myomectomy 37 0/7 – 38 6/7</td>
<td>• Prior PPH</td>
<td>• 4 prior births</td>
</tr>
<tr>
<td></td>
<td>Prior myomectomy, if extensive 36-37</td>
<td>• Active bleeding</td>
<td>• Platelet count &lt; 70,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Known coagulopathy</td>
<td>• 2 or more moderate risk factors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Large myomas</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• EFW &gt; 4000 grams</td>
<td></td>
</tr>
<tr>
<td>Transfer to appropriate level of care for delivery</td>
<td>High risk for accreta: Obtain proper imaging Be transferred to appropriate level</td>
<td>Type &amp; SCREEN, review protocol</td>
<td>Type &amp; CROSS, review protocol</td>
</tr>
</tbody>
</table>

Northwell Health®
Significant Blood Loss

• ACOG (reVITALize project) has recently endorsed a revised definition:

• Cumulative blood loss of > 1000 mL OR blood loss accompanied by **sign/symptoms of hypovolemia** within 24 hours following the birth process (Cumulative blood loss of 500-999 mL alone should trigger increased supervision and potential interventions as clinically indicated).
WHY DOES THE PREGNANT STATE DISGUISE BLOOD LOSS?

Pregnant and immediate post partum women have an increased blood volume.

During Massive Hemorrhage there is a reduction in venous return.

There is a compensatory increase in Maternal Heart Rate.

Blood pressure does not change until Heart Rate cannot increase further (CO=SVxHR).

This leads to a 30% blood loss BEFORE BP changes.
# Clinical Signs of Hypovolemia

<table>
<thead>
<tr>
<th>Amount of Blood Loss</th>
<th>% Deficit</th>
<th>Clinical Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 ml</td>
<td>15%</td>
<td>Slight change in blood pressure, heart rate normal, palpitations, respiratory rate normal, dizziness, normal urine output</td>
</tr>
<tr>
<td>1500 ml</td>
<td>15-25%</td>
<td>Narrowed pulse pressure* (SBP-DBP), heart rate over 100, respiratory rate 20-30, diaphoretic, weak, urine output 20-30 mL/hr</td>
</tr>
<tr>
<td>2000 ml</td>
<td>25-40%</td>
<td>Hypotension, narrowed pulse pressure, heart rate over 120, respiratory rate 30-40, pale, extremities cool, restlessness, urine output 5-15 mL/hr</td>
</tr>
<tr>
<td>≥2500 ml</td>
<td>&gt;40%</td>
<td>Profound hypotension, heart rate over 140, respiratory rate over 40, slight urine output or anuria</td>
</tr>
</tbody>
</table>
Shock Index = Heart Rate/Systolic Blood Pressure

- First introduced in 1967
- Used in non-pregnant trauma and non-trauma patients
- Assessment of hypovolemic and non-hypovolemic shock to aid in clinical management
- “Normal” Shock Index = 0.5-0.7

Multiple recent papers that supports that the Shock Index a strong predictor of adverse maternal outcomes

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥0.9</td>
<td>Need to refer</td>
</tr>
<tr>
<td>≥1.4</td>
<td>Urgent intervention in tertiary care center</td>
</tr>
<tr>
<td>≥1.7</td>
<td>High chance of adverse outcome</td>
</tr>
</tbody>
</table>

**SHOCK INDEX**

- **Heart Rate/Systolic Blood Pressure**

<table>
<thead>
<tr>
<th>Heart Rate</th>
<th>Systolic BP</th>
<th>Shock Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>80</td>
<td>1.34</td>
</tr>
<tr>
<td>110</td>
<td>90</td>
<td>1.22</td>
</tr>
<tr>
<td>120</td>
<td>80</td>
<td>1.5</td>
</tr>
<tr>
<td>120</td>
<td>90</td>
<td>1.33</td>
</tr>
<tr>
<td>130</td>
<td>80</td>
<td>1.62</td>
</tr>
<tr>
<td>130</td>
<td>90</td>
<td>1.44</td>
</tr>
</tbody>
</table>

Shock Index = $\frac{\text{Heart Rate (bpm)}}{\text{SBP (mm Hg)}}$
Prevention of Coagulopathy

- Dilution from transfusion of Blood Products without clotting factors (ratio of PRBCs to plasma to platelets)
- Hypothermia leads to platelet dysfunction (even with normal counts)
- Metabolic acidosis prevents clotting enzymes from functioning
TOO FAR, TOO LITTLE, TOO LATE

READINESS, RECOGNITION, RESPONSE, REPORTING

DENIAL LEADS TO DELAY

North Shore University Hospital and Long Island Jewish Medical Center Clinical Guideline

**TOO FAR, TOO LITTLE, TOO LATE**

**READINESS, RECOGNITION, RESPONSE, REPORTING**

**DENIAL LEADS TO DELAY**

---

**Perinatal Huddle**
- Communication that does not require immediate medical evaluation
- Conditions which may require huddle:
  - Maternal medical or obstetrical complication requiring a team/multidisciplinary approach
  - Consult from additional services
  - Suspected fetal abnormality
  - Current treatment plan not effective
  - Maternal transport
  - Patients who refuse blood products
  - Patients who have previously had a multidisciplinary meeting

**Escalate**
- Follow these steps for any or all the items below:
  - Call provider for immediate evaluation
  - Bedside evaluation in 15 minutes
  - Notify nursing leadership and patient's attending
  - Call Safety Officer – apprise of situation
  - Request order for labs as ordered or as listed below
  - Repeat and document VS q15 minutes until stable or return to baseline, escalate as necessary
  - Implement treatment regimen as ordered based on underlying cause
  - Evaluate/assess current IV access and report
  - Notify anesthesiologist
  - If poor response to interventions or a higher level of care is considered, provider must call ICU consult and/or RN to call RRT
  - Call (S)RRT if Safety Officer is unable to respond

**Vital Signs**
- **Shocking index greater than 1**
  - HR/SPB e.g. HR 96/SPB 90 = 1.1
  - Document Shock index (in comment section of vital signs record)
  - SBP of ≤ 90 or ≥ 160
  - DBP ≥ 110
  - HR < 50 bpm or > 120 bpm
  - Respiratory rate ≤ 9 or > 20
  - Any change in SBP or DBP of greater than 30mmHg
  - Temperature less than 96.4 (36°C) or greater than 100.4 (38°C)
  - Urine output < 35ml/hr x 2 hours
  - O2 saturation < 95%

**Lab Values**
- **requiring provider notification**
  - Hgb < 9g
  - Hct < 25% (consider continuous Hgb)
  - WBC > 17,000
  - Platelets < 100,000
  - Fibreenes < 300mg/dL
  - INR > 1.2
  - PTT > 17
  - Lactate >

**Symptoms**
- **requiring provider notification**
  - Dizziness – Obtain orthostatics & VS
  - Lightheadedness – Obtain orthostatics & VS
  - Lethargy – Obtain full set of VS
  - Altered mental status
  - Continued vaginal bleeding – Orthostatics & VS
  - Writhing in pain, restlessness (despite pain medication) can't stay still, suspected hematoma
  - Unusual moderate to severe signs and symptoms for which you cannot determine a cause

---

**CODE OB if:**
- Breach / Head entrapment
- Uterine inversion
- Prolapsed Cord
- Brisk vaginal bleeding >1000ml within 10 min and/or shock index > 1 with hemodynamic compromise
- Shoulder dystocia
- Delivery outside L&D (ante partum, ED, ...)
- Category III tracing
- Main OR OB assistance needed

**NOTE:** There must be reassessment after interventions and escalation/notification should continue until the situation is resolved!

**USE SBAR TO COMMUNICATE CONCERNS – ESPECIALLY THE “R”**

**S**S/RT Response – Critical Care Team (at UMC, PA and/or SCU resident, CIN)
**O**B Team: Service attending, chief or 3rd year resident, primary RN, RN leadership

**Important Reminders:** Document shock index with each set of vital signs. When a patient is returned to PACU for further evaluation and treatment, call a huddle and include the anesthesiologist. If vascular access is an issue, an intravenous line can be placed by MICU trauma nurse X1622 at NSUH. At UMC, call a (S)RRT.

This is a general guideline. The healthcare professionals must use appropriate judgment depending on the particular clinical situation. AF/MP

---

August 31, 2018
MEWS: CRICO

### MEWS TRIGGER CRITERIA*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>systolic BP (mm Hg)</td>
<td>&lt;80 or &gt;160</td>
</tr>
<tr>
<td>diastolic BP (mm Hg)</td>
<td>&gt;105</td>
</tr>
<tr>
<td>heart rate (beats per min)</td>
<td>&lt;50 or &gt;120</td>
</tr>
<tr>
<td>respiratory rate (breaths per min)</td>
<td>&lt;10 or &gt;30</td>
</tr>
<tr>
<td>oxygen saturation % (room air, at sea level)</td>
<td>&lt;95</td>
</tr>
<tr>
<td>oliguria (mL for &gt;2 hours): for catheterized patients</td>
<td>&lt;30</td>
</tr>
<tr>
<td>maternal agitation, confusion, unresponsiveness</td>
<td>if any present</td>
</tr>
<tr>
<td>preeclampsia, with patient reporting non-remitting headache or shortness of breath</td>
<td>if any present</td>
</tr>
</tbody>
</table>

CRICO: Controlled Risk Insurance Company
AIM Safety/Quality Improvement Bundles

Safety Bundles
- Obstetric Hemorrhage
- Severe Hypertension in Pregnancy
- Maternal VTE Prevention
- Safe Reduction of Primary Cesarean Births

Just Released
- Obstetric Care of Women with Opioid Dependence

Safety Tools
- Maternal Early Warning Criteria
- SMM Case Review Forms
- Patient, Family and Staff Support

For Every Mother
- Reducing Disparities in Maternity Care
- Postpartum Care Basics
- Maternal Mental Health
- Interconception Care Coming Soon

www.safehealthcareforeverywoman.org
Maternal Early Warning Signs (MEWS) Protocol

1. Immediate action is required when any of the MEWS criteria are met (see table on page 2***)
   Items that are not in the lower box should be confirmed, within 10 minutes, prior to calling the physician.
   **Not applicable for BP systolic <90 when <=30 min post epidural and anesthesiologist present.

2. When immediate action is required:
   - If the attending physician is immediately available, he/she will provide bedside evaluation of the patient within 10 minutes. The in-house OB will be notified to provide bedside evaluation if the attending physician is not at the bedside within 5 minutes.
   - If the attending physician is not immediately available, the RN will call the in-house OB to provide bedside evaluation of the patient within 10 minutes. The attending physician or CNM will also be notified of the patient’s status. If the CNM is notified, he/she will notify the attending physician.
   - If in-house OB is called but not immediately available, he/she will receive a verbal report and determine what further action is necessary.

3. When called to the bedside, the physician will document by writing a note which includes but is not limited to:
   - Differential diagnosis (the RN will provide this protocol and a differential diagnosis list to the bedside).
   - Planned frequency of monitoring and re-evaluation.
   - Criteria for immediate physician notification.
   - Any diagnostic or therapeutic interventions.
   - "Huddle" participants and summary of management plan.

   The physician will communicate the assessment and plan via a "huddle." Huddle participants include the Primary RN, the Charge RN, the Anesthesiologist, the attending physician if present, and the in-house OB.

4. If MEWS conditions persist after corrective measures undertaken, then MFM consult should be requested. Additionally, intensivist consult &/or Rapid Response Team may be called.

5. Depending on the clinical evaluation, patient laboratory and diagnostic studies to consider include:
   - Pulse oximeter
   - CBC
   - Type and screen or type and cross match if bleeding
   - CMP
   - Magnesium level
   - EKG, particularly in the presence of tachycardia, bradycardia, or chest pain
   - CT angiogram or perfusion scan in patients with acute chest pain
   - CXR if the patient has SOB, particularly if pre-eclamptic
   - Echocardiogram

6. If the primary RN and the charge nurse question any aspect of the patient's care and the issue is not resolved with the attending physician, another appropriate physician (MFM, Department Director or Associate Director, or the Chairman of the QAI committee) and a nurse in the Nursing Chain of Command (Nurse Manager, Clinical Practice Specialist, or Nursing Supervisor/AVP) will be notified.

Immediate Action Required

- Systolic BP; mmHg <90 or >160
- Diastolic BP; mmHg >100
- Heart rate; bpm <50 or >120
- Respiratory rate; bpm <10 or >30
- Oxygen saturation; % <95
- Oliguria; ml/hr x 2h <35

✓ Maternal agitation, confusion, or unresponsiveness
✓ Patient with hypertension reporting a non-remitting headache or shortness of breath
Conclusions

• Pregnant and postpartum women present unique challenges related to identifying emergencies.
• The NYS Hemorrhage Project has increased the # of women assessed for hemorrhage on admission and post partum.
Conclusions

• It is imperative that when an abnormal vital sign(s) is obtained and verified that this information is shared.
• Develop and utilize early warning systems and drills to promote collegiality and identification of system issues that can delay prompt responses.
New York State Obstetric Hemorrhage Project
Ph: 518/473-9883
F: 518/474-1420
NYSPQC@health.ny.gov
www.nyspqc.org

Adriann Combs, DNP, NNP-BC
acombs@northwell.edu
References


