Presentation Objectives

- **Maternal Mortality and Morbidity in New York State (NYS)**
  - Review background and NYS Maternal Mortality Review (MMR) Initiative
  - Discuss MMR results and racial disparities in maternal mortality and morbidity
  - Identify issues for focus

- **New York State Perinatal Quality Collaborative (NYSPQC)**
  - **Overview**
  - **New York State Obstetric Hemorrhage Project**
    - Review project goals, structure, progress to date and racial disparities
    - Provide next steps for ongoing plans to reduce maternal mortality and morbidity in the state
Maternal Mortality & Morbidity in New York State (NYS)
Trends in Maternal Mortality as Reported in Vital Records*

*Causes of death from death records A34, O00-O95,O98-O99.
Trends in Maternal Mortality by Race as Reported in Vital Records*

*Causes of death from death records A34, O00-O95, O98-O99.
National maternal mortality trends derived from CDC Wonder Database available at https://wonder.cdc.gov/
Maternal Mortality Disparities in NYS

Racial disparities in maternal deaths remain significant:

• The Black to White mortality ratio peaked in 2006 at 6 to 1;
• Decreased to 5 to 1 in 2009;
• Continued to decrease to 3.4 to 1 in 2013;
• Continued to decrease to 2.8 to 1 in 2015; and
• Continued to decrease to 2.4 to 1 in 2016.

Data from NY Vital Records.
NYS Maternal Mortality Review Initiative (MMR)

• NYS MMR aims to:
  – Maintain a comprehensive view of factors leading to maternal deaths
  – Inform interventions to reduce the risk of these deaths

• Comprehensive population based examination of maternal mortality:
  – Pregnancy Related Death (directly caused or exacerbated by pregnancy)
  – Pregnancy Associated Death (not a cause of pregnancy or illness exacerbated by pregnancy)
### MMR Results: Pregnancy Related Maternal Mortality in NYS

<table>
<thead>
<tr>
<th>Pregnancy-related deaths</th>
<th>NYS MMR 2006-2008</th>
<th>NYS MMR 2012-2014*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race disparities:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deaths per 100,000 live births</td>
<td>48.9 Black; 14.5 Hispanic; 6.9 White</td>
<td>38.7 Black; 9.0 Hispanic; 8.1 White</td>
</tr>
<tr>
<td>Pre-pregnancy weight: overweight or obese</td>
<td>15% overweight; 30% obese</td>
<td>9% overweight; 51% obese</td>
</tr>
<tr>
<td>Insurance: Medicaid</td>
<td>45%</td>
<td>65%</td>
</tr>
<tr>
<td>Method of delivery: C-section</td>
<td>63%</td>
<td>65%</td>
</tr>
<tr>
<td>Education:</td>
<td>14% high school graduate</td>
<td>29% high school graduate</td>
</tr>
<tr>
<td></td>
<td>11% some college, no degree</td>
<td>13% some college, no degree</td>
</tr>
<tr>
<td>Primary Language: English</td>
<td>63%</td>
<td>70%</td>
</tr>
<tr>
<td>Marital Status: Single; Married</td>
<td>48% ; 48%</td>
<td>48%; 43%</td>
</tr>
<tr>
<td>Parity: First time mothers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One previous live birth</td>
<td>30%</td>
<td>29%</td>
</tr>
<tr>
<td>2 or more previous births</td>
<td>26%</td>
<td>17%</td>
</tr>
<tr>
<td>Unknown</td>
<td>33%</td>
<td>37%</td>
</tr>
<tr>
<td>Unknown</td>
<td>12%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Data source: NYS Maternal Mortality Review

*2014 not complete
Pregnancy-Related Mortality Rate by Race/Ethnicity
2012-2014*

Data source: NYS Maternal Mortality Review
Mortality Rate is death per 100,000 live births in 2012-2014
*2014 not complete
## Pregnancy-Related Deaths by Pre-Pregnancy Weight Status and Race/Ethnicity, 2012-2014*

<table>
<thead>
<tr>
<th>Pre-Pregnancy BMI</th>
<th>Total</th>
<th>White, Non-Hispanic</th>
<th>Black, Non-Hispanic</th>
<th>Hispanic</th>
<th>Other, Non-Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin</td>
<td>1 (1%)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Normal</td>
<td>10 (11%)</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Overweight</td>
<td>6 (7%)</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Obese</td>
<td>48 (52%)</td>
<td>12</td>
<td>31</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Unknown</td>
<td>27 (29%)</td>
<td>10</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>92 (100%)</strong></td>
<td><strong>28</strong></td>
<td><strong>42</strong></td>
<td><strong>15</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>

*Data source: NYS Maternal Mortality Review

*2014 not complete
## 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
### Cause of Death by Race/Ethnicity, 2012-2014*

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Total</th>
<th>White, Non-Hispanic</th>
<th>Black, Non-Hispanic</th>
<th>Hispanic</th>
<th>Other, Non-Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embolism</td>
<td>22(24%)</td>
<td>7</td>
<td>10</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>15 (16%)</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Infection</td>
<td>15 (16%)</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>11 (12%)</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Hypertensive disorders</td>
<td>6 (7%)</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cardiovascular problems</td>
<td>6 (7%)</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Intracerebral Hemorrhage</td>
<td>4 (4%)</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pulmonary Problems</td>
<td>3 (3%)</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Neurological</td>
<td>2 (2%)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>2 (2%)</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Hematopoietic</td>
<td>2 (2%)</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>4 (4%)</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>92(100%)</strong></td>
<td><strong>28</strong></td>
<td><strong>42</strong></td>
<td><strong>15</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>

Data source: NYS Maternal Mortality Review
*2014 not complete
# MMR Result: Hemorrhage Mortality Rate by Delivery Type

Mortality rate is deaths per 100,000 live births in a given year.

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesarean Deliveries</td>
<td>5.99</td>
<td>2.43</td>
<td>4.92</td>
</tr>
<tr>
<td>Vaginal Deliveries</td>
<td>0.63</td>
<td>0.64</td>
<td>0.00</td>
</tr>
<tr>
<td>All Deliveries</td>
<td>2.45</td>
<td>1.25</td>
<td>1.65</td>
</tr>
</tbody>
</table>
Severe Maternal Morbidity (SMM)

Severe maternal morbidity can be thought of as unintended outcomes of the process of labor and delivery that result in significant short-term or long-term consequences to a woman’s health.
Background: SMM at National Level*

https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html
## Hospital Discharge Data: Hemorrhage-Related SMM Indicators, 2016

<table>
<thead>
<tr>
<th>Method of Delivery (n=number of hospital deliveries)</th>
<th>Indicator</th>
<th>Number of Cases</th>
<th>% of Deliveries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cesarean (n=74,262)</strong></td>
<td>Hysterectomy</td>
<td>253</td>
<td>0.34%</td>
</tr>
<tr>
<td></td>
<td>RBC transfusion</td>
<td>2,614</td>
<td>3.5%</td>
</tr>
<tr>
<td></td>
<td>ICU</td>
<td>889</td>
<td>1.2%</td>
</tr>
<tr>
<td></td>
<td>Abruptio placenta</td>
<td>2,215</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Morbidly adherent placenta</td>
<td>234</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Vaginal (n=150,773)</strong></td>
<td>Hysterectomy</td>
<td>42</td>
<td>0.03%</td>
</tr>
<tr>
<td></td>
<td>RBC transfusion</td>
<td>1,399</td>
<td>0.93%</td>
</tr>
<tr>
<td></td>
<td>ICU</td>
<td>377</td>
<td>0.3%</td>
</tr>
<tr>
<td></td>
<td>Abruptio placenta</td>
<td>924</td>
<td>0.6%</td>
</tr>
<tr>
<td></td>
<td>Morbidly adherent placenta</td>
<td>45</td>
<td>0.03%</td>
</tr>
</tbody>
</table>

Note: A woman might have multiple hemorrhage-related SMM indicators.
Summary

- Black mothers had the highest pregnancy related mortality rate (39%) based on 2012-2014* NYS MMR data, while the other race/ethnicity groups had similar rates (8%-9%).

- An increasing majority of pregnancy-related deaths were covered by Medicaid.

- One of the leading causes of death is obstetric hemorrhage.

- Mortality rate due to obstetric hemorrhage was higher for cesarean deliveries than that for vaginal deliveries.

- Cesarean deliveries had a higher percentage of hemorrhage-related SMM indicators.

Data source: NYS Maternal Mortality Review
The NYSPQC aims to provide the best and safest care for women and infants in NYS by collaborating with birthing hospitals, perinatal care providers, professional organizations and other key stakeholders to prevent and minimize harm through the translation of evidence-based guidelines to clinical practice.
New York State Perinatal Quality Collaborative (NYSPQC)

**Obstetric Projects**
- Scheduled Deliveries without a Medical Indication
- Obstetrical Prenatal Education (Scheduled Deliveries)
- Antenatal Corticosteroid Treatment
- Obstetric Hemorrhage

**Maternal Hemorrhage and Hypertension**

**Neonatal Projects**
- Enteral Nutrition
- NICU CLABSI Reduction
- Safe Sleep
- Neonatal Abstinence Syndrome (NAS)/Opioid Use Disorder (OUD)
- Infant Mortality CoiIN 2.0
- NAPPSS-IIN (Safe sleep + breastfeeding)

**Key**
- Completed
- Active
- Sustain Mode
NYS Obstetric Hemorrhage Project
Project Goal

• To reduce maternal morbidity and mortality statewide by translating evidence-based guidelines into clinical practice to improve the assessment and management of obstetric hemorrhage.

• Specific focus is being given to:
  o Increasing hemorrhage risk assessment on admission to the birth hospitalization, as well as in the postpartum period; and
  o Reducing racial disparities in obstetric hemorrhage related morbidity and mortality.
Project Leadership
Project Development Process

- NYSDOH NYSPQC worked with partner organizations to:
  - Develop recruitment materials including:
    - Recruitment and Pre-work Package;
    - Driver Diagrams;
    - Current Practices Survey;
    - Project measures; and
    - Data collection forms
  - Develop educational curriculum schedule and presentations for in-person Learning Sessions and monthly Coaching Call webinars
  - Select and convene Clinical Advisory Work Group members, who provide feedback on all materials
Clinical Advisory Work Group

• A multi-disciplinary group of providers representing a range of birthing hospitals from across the state

• Provide clinical and quality improvement expertise in program development, measurement strategy, implementation, evaluation and sustainability
Quality Improvement Methodology

• Adapts the Institute for Healthcare Improvement (IHI) model for Idealized Perinatal Care and Breakthrough Series Methodology as a framework to guide improvement
  
  ○ This strategy has been executed with the assistance of a long standing partnership with NICHQ

• Participating birthing hospitals implement evidence-based strategies for the assessment and management of obstetric hemorrhage
Recruitment

• All 123 NYS birthing hospitals were sent the project’s Recruitment and Pre-work Package
  
  o Outlines the background, clinical significance, project goals, benefits to participation, hospital’s responsibilities, measurement strategy

• An Informational Call was held to provide information on the project and allow hospital staff to ask questions
NEW YORK STATE OBSTETRIC HEMORRHAGE PROJECT – KEY DRIVER DIAGRAM

GLOBAL AIM:
Reduce maternal morbidity and mortality associated with obstetric hemorrhage in NYS.

SMART AIM:
By June 2019, increase hemorrhage risk assessment on admission and postpartum to 85% of maternity patients.

For more information:
Council On Patient Safety In Women’s Healthcare
ACOG District II Safe Motherhood Initiative (SMI)

PRIMARY DRIVERS

READINESS (EVERY UNIT)
- Have a hemorrhage cart readily available
- Ensure rapid access to medication
- Establish a response team
- Establish massive transfusion and emergency release protocols
- Develop and implement unit education on protocols and unit-based drills with post-event debriefs
- Place copies of the hemorrhage protocols in prominent places in each patient room and OR
- Conduct drills* regularly and ensure all responders participate

RECOGNITION & PREVENTION (EVERY PATIENT)
- Assess hemorrhage risk and prepare based on risk level
- Perform on-going measurement of blood loss, estimated or quantified
- Manage 3rd stage of labor
- Educate patient and family on signs and symptoms and when to call staff/provider

RESPONSE (EVERY HEMORRHAGE)
- Adopt a standard, stage-based, hemorrhage management plan with checklists
- Develop a support program for patients, families and staff for all significant hemorrhages

REPORTING/ SYSTEMS LEARNING (EVERY UNIT)
- Huddle for high risk patients to prepare throughout care
- Debrief to identify successes and opportunities.
- Review of serious hemorrhages** by a multidisciplinary team
- Identify and utilize data collection plan to capture OB hemorrhage events

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* Drills = Right participants, scenarios, demonstration of competency in roles and responsibilities.
** Blood loss greater than ≥500 ml with a vaginal delivery and ≥1000 ml with a cesarean section.
Participation

- 70% (86/123) of NYS birthing hospital are participating:
  - 100% (17/17) RPCs;
  - 74% (25/34) Level III hospitals;
  - 65% (17/26) Level II hospitals; and
  - 54% (25/46) Level I hospitals.
Major Project Activities

- Monthly Coaching Call webinars;
- In-person Learning Sessions;
- Monthly data collection/submission through web-based portal (NYSDOH HCS);
- Access to expert faculty, both clinical and quality improvement;
- Access to project website (www.nyspqc.org); and
- Utilization of project e-mail listserv.
Monthly Coaching Call Webinars
Educational Curriculum Topics

Previous topics
• Structural preparedness
• Hemorrhage drills, huddles and debriefs
• Blood loss quantification methods
• In situ drill simulation
• Team communication tactics

Upcoming topics
• Engaging patients, families, and the community
• Massive Transfusion Protocol
• Sustainability: hardwiring your practice for the long- & short-term
Simulation training at the NYS Obstetric Hemorrhage Project Learning Session #2
Aggregate Data Form

Collects information on:
- Obstetric hemorrhage diagnosis
- Massive transfusion
- Obstetric hemorrhage and:
  - Transfer to higher care
  - Hysterectomy
  - Death
- Risk assessment
  - On admission
  - Postpartum
- Hemorrhage drills

<table>
<thead>
<tr>
<th>Obstetric Hemorrhage Diagnosis</th>
<th>Risk Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of maternity patients admitted to labor and delivery</td>
<td>Number of patients with a documented risk assessment for obstetric hemorrhage completed in the post-partum period (between birth and discharge)</td>
</tr>
<tr>
<td>Number of patients with a vaginal delivery and obstetric hemorrhage defined as ≤ 500 ml blood loss</td>
<td>Number of patients with a documented risk assessment for obstetric hemorrhage completed on admission to the hospital</td>
</tr>
<tr>
<td>Number of patients with an estimated blood loss of ≥ 1,000 ml</td>
<td>Number of patients with a documented risk assessment for obstetric hemorrhage completed in the post-partum period (between birth and discharge)</td>
</tr>
<tr>
<td>Number of patients with a cesarean section and obstetric hemorrhage defined as ≤ 1,000 ml blood loss</td>
<td>Number of patients with a documented risk assessment for obstetric hemorrhage completed in the post-partum period (between birth and discharge)</td>
</tr>
</tbody>
</table>

Hemorrhage Drills
- Number of drills (in Situ and/or Sim Lab) conducted related to obstetric hemorrhage
- Number of post-drill debriefs conducted related to obstetric hemorrhage
## Progress to Date

<table>
<thead>
<tr>
<th>Project Measure</th>
<th>Baseline – March 2018</th>
<th>Current – July 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal deliveries with ≥ 500 ml blood loss</td>
<td>6.5% (602/9,224)</td>
<td>6.4% (495/7,752)</td>
</tr>
<tr>
<td>Vaginal deliveries with ≥ 1,500 ml blood loss</td>
<td>0.5% (43/9,224)</td>
<td>0.5% (36/7,752)</td>
</tr>
<tr>
<td>Cesarean sections with ≥ 1,000 ml blood loss</td>
<td>12.8% (569/4,446)</td>
<td>14.8% (539/3,654)</td>
</tr>
<tr>
<td>Cesarean sections with ≥ 1,500 ml blood loss</td>
<td>2.8% (124/4,446)</td>
<td>3.3% (120/3,654)</td>
</tr>
<tr>
<td>Massive Transfusion (4 or more units of packed red cells)</td>
<td>0.3% (45/13,244)</td>
<td>0.4% (38/10,756)</td>
</tr>
<tr>
<td>Obstetric hemorrhage and admitted to a higher level of care*</td>
<td>2.1% (23/1,083)</td>
<td>1.7% (21/1,247)</td>
</tr>
<tr>
<td>Obstetric hemorrhage and hysterectomy*</td>
<td>1.4% (15/1,083)</td>
<td>0.8% (10/1,247)</td>
</tr>
<tr>
<td>Obstetric hemorrhage and death*</td>
<td>0.0% (0/1,083)</td>
<td>0.0% (0/1,247)</td>
</tr>
<tr>
<td>Documented risk assessment for obstetric hemorrhage completed on admission</td>
<td>59.8% (5,794/9,694)</td>
<td>74.6% (6,126/8,211)</td>
</tr>
<tr>
<td>Documented risk assessment for obstetric hemorrhage completed in the post-partum period</td>
<td>34.0% (3,299/9,694)</td>
<td>51.5% (4,227/8,211)</td>
</tr>
<tr>
<td>Number of hospitals conducting obstetric hemorrhage drills</td>
<td>35</td>
<td>36</td>
</tr>
<tr>
<td>Number of hospitals conducting post-drill debriefs</td>
<td>25</td>
<td>23</td>
</tr>
</tbody>
</table>
Patient Specific Form

- Completed for each patient with one or more of the following:
  - Massive transfusion
  - Obstetric hemorrhage* & transfer to higher care
  - Obstetric hemorrhage* & hysterectomy
  - Obstetric hemorrhage* & death

- Total of 215 patient specific forms completed for March 2018 to July 2018
  - 0.3% (215/62,718) of maternity patients, ≥ 20 weeks completed gestation, admitted to labor and delivery for the birth hospitalization had a qualifying event

*Obstetric hemorrhage is defined as a blood loss of 500mL or greater for a vaginal delivery and 1,000mL or greater for a cesarean section.
Patient Specific Forms Submitted by Hospital Level (N=215)

- Between March 2018 and July 2018:
  - 54% (n=116) of forms were submitted by RPCs;
  - 25% (n=54) of forms were submitted by Level III hospitals;
  - 13% (n=27) of forms were submitted by Level II hospitals; and
  - 8% (n=18) of forms were submitted by Level I hospitals.

- This demonstrates that the majority of severe obstetric hemorrhage cases are occurring at higher level birthing hospitals.
Patient Specific Form Demographics (N=215)

- 33 years old on average
  - Median: 33 years old
  - Range: 16 to 52 years old

- Race/Ethnicity
  - 44% White, non-Hispanic (n=95)
  - 20% Black, non-Hispanic (n=43)
  - 16% Hispanic (n=35)
  - 8% Asian, non-Hispanic (n=18)
  - 7% Unknown (n=14)
  - 5% Other (n=10)
Patient Specific Form Demographics, cont. (N=215)

• Primary Insurer
  o 51% Medicaid (n=110)
  o 45% Private (n=97)
  o 3% Other (n=6)
  o 1% Uninsured (n=2)

• Delivery type
  o 76% Cesarean section (n=164)
  o 24% Vaginal (n=51)
Patient Specific Form Obstetric Hemorrhage Morbidity and Mortality (N=215)

• 2,729 mL average blood loss
  o Median: 2,300 mL
  o Range: 600 to 16,300 mL

• Method of calculating blood loss
  o 46% Mixed methods (n=98)
  o 32% Visual estimation (n=70)
  o 22% Formal quantification (n=47)

• 69% of cases had a post-hemorrhage event debrief (n=149)
# Blood Loss by Hospital Level

<table>
<thead>
<tr>
<th>Hospital Level</th>
<th># of Patients</th>
<th>Average (mL)</th>
<th>Median (mL)</th>
<th>Range (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPC</td>
<td>116</td>
<td>2,686</td>
<td>2,285</td>
<td>700 - 16,300</td>
</tr>
<tr>
<td>Level III</td>
<td>54</td>
<td>2,792</td>
<td>2,500</td>
<td>800 - 11,000</td>
</tr>
<tr>
<td>Level II</td>
<td>27</td>
<td>3,012</td>
<td>2,500</td>
<td>1,000 – 9,100</td>
</tr>
<tr>
<td>Level I</td>
<td>18</td>
<td>2,395</td>
<td>2,138</td>
<td>600 - 5,500</td>
</tr>
</tbody>
</table>
Patient Specific Form Obstetric Hemorrhage-Related* Co-morbidities and Mortality (N=215)

- Percent of Patient Specific Forms with an indication of:
  - 84% massive transfusion (4 or more units of PRBCs) (n=181)
  - 51% transfer to higher care & hemorrhage (n=110)
  - 30% hysterectomy & hemorrhage (n=65)
  - 1% death & hemorrhage (n=2)

Note: Patients can be included in more than one category

*Hemorrhage is defined as a blood loss of 500mL or greater for a vaginal delivery and 1,000mL or greater for a cesarean section.
Patient Specific Form Morbidity by Race/Ethnicity

- White, non-Hispanic: 35% (Massive Transfusion), 24% (Transfer to Higher Care), 11% (Hysterectomy)
- Black, non-Hispanic: 18% (Massive Transfusion), 10% (Transfer to Higher Care), 8% (Hysterectomy)
- Hispanic: 14% (Massive Transfusion), 8% (Transfer to Higher Care), 7% (Hysterectomy)
- Asian, non-Hispanic: 7% (Massive Transfusion), 5% (Transfer to Higher Care), 2% (Hysterectomy)
- Other: 5% (Massive Transfusion), 2% (Transfer to Higher Care), 0% (Hysterectomy)
- Unknown: 5% (Massive Transfusion), 3% (Transfer to Higher Care), 1% (Hysterectomy)
### Percent of Patient Specific Forms with an Indication of Morbidity by Race/Ethnicity

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Massive Transfusion (4 or more units of PRBCs)</th>
<th>Obstetric Hemorrhage* and Transfer to Higher Care</th>
<th>Obstetric Hemorrhage* and Hysterectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>White, non-Hispanic</td>
<td>80% (76/95)</td>
<td>54% (51/95)</td>
<td>25% (24/95)</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>91% (39/43)</td>
<td>49% (21/43)</td>
<td>42% (18/43)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>89% (31/35)</td>
<td>49% (17/35)</td>
<td>43% (15/35)</td>
</tr>
<tr>
<td>Asian, non-Hispanic</td>
<td>78% (14/18)</td>
<td>56% (10/18)</td>
<td>22% (4/18)</td>
</tr>
<tr>
<td>Other</td>
<td>100% (10/10)</td>
<td>40% (4/10)</td>
<td>10% (1/10)</td>
</tr>
<tr>
<td>Unknown</td>
<td>79% (11/14)</td>
<td>50% (7/14)</td>
<td>21% (3/14)</td>
</tr>
</tbody>
</table>
Obstetric Hemorrhage Etiology (n=215)

- Uterine atony: 47.0%
- Abnormally adherent placenta (accreta spectrum): 18.1%
- Lacerations/Hematomas: 13.0%
- Other: 12.6%
- Defects of coagulation (e.g. disseminated intravascular coagulation): 9.3%
- Other intraperitoneal bleeding (uterine rupture excluded): 9.3%
- Retained placenta or products of conception: 8.8%
- Uterine rupture: 4.2%
- Retro-peritoneal bleeding: 3.3%
- Placental abruption: 3.3%
- Amniotic fluid embolism: 0.9%
- Uterine artery ligation: 0.9%
- Uterine inversion: 0.9%

Note: Patients can be included in more than one category.
Patient Specific Form – White, non-Hispanic

• Morbidity
  o 80% (76/95) massive transfusion (4 or more units of PRBCs)
  o 54% (51/95) obstetric hemorrhage* & transfer to higher care
  o 25% (24/95) obstetric hemorrhage* & hysterectomy

• Top three etiologies
  o 45.3% (43/95) Uterine atony
  o 15.8% (15/95) Abnormally adherent placenta (accreta spectrum)
  o 12.6% (12/95) Laceration/hematoma

*Obstetric hemorrhage is defined as a blood loss of 500mL or greater for a vaginal delivery and 1,000mL or greater for a cesarean section.
Patient Specific Form – Black, non-Hispanic

• Morbidity
  o 91% (39/43) massive transfusion (4 or more units of PRBCs)
  o 49% (21/43) obstetric hemorrhage* & transfer to higher care
  o 42% (18/43) obstetric hemorrhage* & hysterectomy

• Top etiologies
  o 60.5% (26/43) Uterine atony
  o 16.3% (7/43) Abnormally adherent placenta (accreta spectrum)
  o 7.0% (3/43) Defects of coagulation
  o 7.0% (3/43) Other intraperitoneal bleeding (uterine rupture excluded)
  o 7.0% (3/43) Lacerations/hematoma
  o 7.0% (3/43) Uterine rupture

*Obstetric hemorrhage is defined as a blood loss of 500mL or greater for a vaginal delivery and 1,000mL or greater for a cesarean section.
Patient Specific Form – Hispanic

• Morbidity
  o 89% (31/35) massive transfusion (4 or more units of PRBCs)
  o 49% (17/35) obstetric hemorrhage* & transfer to higher care
  o 43% (15/35) obstetric hemorrhage* & hysterectomy

• Top three etiologies
  o 42.9% (15/35) Uterine atony
  o 34.3% (12/35) Abnormally adherent placenta (accreta spectrum)
  o 14.3% (5/35) Other intraperitoneal bleeding (uterine rupture excluded)

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

- Ongoing NYS Obstetric Hemorrhage Project events will focus on:
  - Engaging staff, patients, families and communities
    - Support for patients, family, communities and staff that have experienced an obstetric hemorrhage
    - Addition of patients and/or family members to the QI team
Next Steps

- Massive transfusion protocols
  - Developing a massive transfusion protocol with emphasis on the 1:1 ratio
  - Working with patients that refuse a blood transfusion
  - Educating support departments (i.e., blood bank, ICU, etc.)

- Sustainability for the short and long term
  - Staff participation and buy-in
  - Planning meaningful skills building interventions (i.e., simulation)
  - Documentation (i.e., risk assessment)
  - Diffusion of innovation
Contact Information

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