Strategies for Improving Maternal Health

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Secretary’s Advisory Committee on Infant Mortality
December 4, 2019
AGENDA

• The relationship between maternal and infant outcomes
• Data on Pregnancy-Related Deaths
• Efforts to strengthen surveillance through assessment and quality improvement
• Summary
THE RELATIONSHIP BETWEEN MATERNAL AND INFANT OUTCOMES
MATERNAL HEALTH IS A KEY DRIVER OF INFANT HEALTH

Maternal conditions, behaviors, and environments contribute to infant health and mortality, including pre-term births.

- Hypertensive disorder / cardiovascular disease
- Diabetes
- Obesity
- Tobacco
- Substance Use
- Access to fruits and vegetables
- Environment/Social Determinants of Health
- Access to quality care and services

Top causes of infant mortality, affected by maternal health.

- Birth defects/congenital malformations
- Disorders related to short gestation and low birthweight
- Newborn affected by maternal complications of pregnancy
- Sudden Infant Death syndrome
- Newborn injuries

Maternal Morbidities Drive Maternal Outcomes: Maternal Mortality
 TOO MANY MOTHERS DIE

700

- 700 women die each year in U.S. from pregnancy-related causes
- Includes during pregnancy, labor/delivery, or up to a year after the end of pregnancy

2-3X

- American Indian/Alaskan Native 2 times more likely to die than white women
- Black women 3 times more likely to die than white women

66%

- About 66% of these deaths may be preventable
PREGNANCY-RELATED MORTALITY IS NOT IMPROVING

MAJORITY OF PREGNANCY-RELATED DEATHS OCCUR OUTSIDE THE DELIVERY HOSPITALIZATION, AND THE LEADING CAUSES OF DEATH VARY

- **During pregnancy:** cardiovascular conditions
- **At delivery:** severe bleeding and amniotic fluid embolism
- **In the week after delivery:** severe bleeding and hypertensive disorders of pregnancy
- **1 week to 42 days after delivery:** infection
- **43 days to 1 year after delivery:** cardiomyopathy

CAUSES OF PREGNANCY-RELATED DEATHS CHANGED BETWEEN 1987 AND 2013

Source: Pregnancy Mortality Surveillance System

Percent change in Pregnancy-related deaths

- Hemorrhage: -17.3%
- Hypertensive disorder of pregnancy: -10.2%
- Infection: -0.4%
- Thrombotic pulmonary embolism: -2.7%
- Amniotic fluid embolism: -2.1%
- Anesthesia complication: -2.3%
- Cardiovascular Condition: -12.5%
- Cardiomyopathy: -5.4%
- Cerebrovascular accident: -3%
- Other condition: -5.8%

Source: Pregnancy Mortality Surveillance System
RISK INCREASES DIFFERENTLY WITH AGE

DISPARITIES IN MATERNAL MORTALITY BY RACE AND EDUCATION

![Bar chart showing disparities in maternal mortality by race and education level. The x-axis represents different education levels: Less than High School, High School, Some College, College Graduate or Higher. The y-axis represents pregnancy-related deaths per 100,000 live births. The chart includes categories for White, Black, and American Indian/Alaskan Native women.](image-url)
REGARDLESS OF A STATE’S OVERALL RATIO THERE IS A NEED TO ADDRESS DISPARITIES

PRMR: Pregnancy-related mortality ratio

MATERNAL MORTALITY IS THE TIP OF THE ICEBERG

- Need to start somewhere
- Impacts on severe maternal morbidity
LEADING CAUSES OF DEATH ARE LINKED TO SEVERE MORBIDITIES

- Severe maternal morbidity includes unexpected outcomes of labor and delivery that result in significant short- and long-term consequences to a woman’s health
- Severe maternal morbidity is increasing
  - Maternal age
  - Pre-pregnancy obesity
  - Pre-existing chronic medical conditions
- Increased medical costs and hospital stays
### SEVERE MATERNAL MORBIDITY INDICATORS

**Increased**
- Acute myocardial infarction or aneurysm
- Acute renal failure
- Adult respiratory distress syndrome
- Cardiac arrest, fibrillation, or conversion of cardiac rhythm
- Shock
- Ventilation/temporary tracheostomy
- Sepsis
- Hysterectomy
- Blood transfusions

**Same or Decreased**
- Disseminated intravascular coagulation
- Air and thrombotic embolism
- Amniotic fluid embolism
- Acute congestive heart failure or pulmonary edema
- Puerperal cerebrovascular disorders
- Heart failure or arrest during surgery or procedure
- Eclampsia
- Severe anesthesia complications

Indicators calculated using ICD-9 codes from the Nationwide Inpatient Sample of the Healthcare Cost and Utilization Project
WHAT IS CDC DOING TO HELP PREVENT MATERNAL DEATHS AND COMPLICATIONS OF PREGNANCY?
IMPROVING THE DATA: REVIEWING MATERNAL DEATHS

- Maternal Mortality Review Committees (MMRCs)
- Review deaths within one year of pregnancy
- Gather data from multiple sources to provide a deeper understanding
- Multidisciplinary review of deaths
INSIGHT FROM OTHER MORTALITY REVIEW SYSTEMS IMPACTED
MMRC DATA PLATFORM DEVELOPMENT

• Fetal and Infant Mortality Review Community Action Teams
• Maternal Mortality Review Information Application (MMRIA) is being used to standardize recommendations from MMRCs
  • MMRIA Designed in partnership with the CDC Foundation
  • Walks a committee through the review process
  • Gathers the documentation, data, and committee decisions
  • Consistent definitions and process allows CDC to bring together data across jurisdictions for a comprehensive picture of the problem
SYSTEMATIC DATA COLLECTION AND USE THROUGH MMRIA

MMRIA offers platform for comparable data, enables multi-state reporting for national and regional action

- CDC provides ongoing training for abstractors, analysts, and committees to use the system
- Currently finishing the transition to a centrally hosted, CDC system
IMPROVING THE DATA: REVIEWING MATERNAL DEATHS

- Cardiovascular Conditions
- Hemorrhage
- Infection
- Embolism
- Cardiomyopathy
- Mental Health Conditions
- Preeclampsia and Eclampsia

Percentage
LEADING CAUSE OF PREGNANCY-RELATED DEATHS VARY BY RACE/ETHNICITY

- Hemorrhage: 14.4% (non-Hispanic White), 10.5% (non-Hispanic Black)
- Cardiovascular and Coronary Conditions: 15.5% (non-Hispanic White), 12.8% (non-Hispanic Black)
- Infection: 13.4% (non-Hispanic White), 8.1% (non-Hispanic Black)
- Cardiomyopathy: 14.0% (non-Hispanic White), 10.3% (non-Hispanic Black)
- Embolism: 9.3% (non-Hispanic White), 5.2% (non-Hispanic Black)
- Preeclampsia and Eclampsia: 11.6% (non-Hispanic White), 5.2% (non-Hispanic Black)
- Mental Health Conditions: 11.3% (non-Hispanic White), 1.2% (non-Hispanic Black)
On average 3 - 4 contributing factors identified for each death

Expand access to patient navigators, case managers, and peer support

Implement a maternal early warning system

Develop policies to ensure pregnant women are transported to a hospital with an appropriate level of maternal care

Implement obstetric emergency simulation training for emergency department and OB staff members

Prioritize pregnant and postpartum women for temporary housing programs
ENHANCING REVIEWS AND SURVEILLANCE TO ELIMINATE MATERNAL MORTALITY

State is partnering with an awardee.

- ERASE MM awardee
- State is partnering with an awardee
PERINATAL QUALITY COLLABORATIVES (PQCS)

• State or multi-state networks of multidisciplinary teams that are working to improve measurable outcomes for maternal and infant health by
  • Advancing evidence-informed clinical practices and processes using quality improvement (QI) principles.
  • Addressing gaps by working with clinical teams, experts and stakeholders, including patients and families
  • Spreading best practices
  • Reducing variation
  • Optimizing resources to improve perinatal care and outcomes
KEY PQC STRATEGIES

• Collaborative learning model
• Rapid-response data for quality improvement
• QI science support and assistance to clinical teams

• Ultimate goal = improvements in population-level outcomes in maternal and infant health
PQC INITIATIVES

• Obstetric/Maternal
  • Reduction of non-medically indicated deliveries <39 weeks gestation
  • Progesterone for prevention of preterm birth
  • Improve response to and management of
    o obstetric hemorrhage
    o hypertensive disorders of pregnancy
  • Maternal substance abuse
  • Reduction of unnecessary cesarean deliveries

• Neonatal
  • Safe Sleep
  • Neonatal Abstinence Syndrome
  • Healthcare-associated infections in newborns
  • Breastfeeding/Human Milk in NICUs
REDUCING MATERNAL MORBIDITY FROM OBSTETRIC HEMORRHAGE
CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

• A statewide initiative to implement maternal safety bundles to reduce severe maternal morbidity from obstetric hemorrhage
• Implementation of the hemorrhage maternal safety bundle was scaled to a large number of hospitals (99 hospitals with 256,541 births)
• Severe maternal morbidity was reduced by 20.8% among hemorrhage patients
• Severe maternal morbidity was reduced by 11.7% among all women giving birth

ILLINOIS PERINATAL QUALITY COLLABORATIVE
MATERNAL HYPERTENSION INITIATIVE: TIME TO TREATMENT

[Graph showing time to treatment for maternal hypertension cases from 2016 to 2018, with missed opportunity/no action taken cases highlighted in red.]
SEVERE MATERNAL MORBIDITY RATE, DELIVERIES WITH HYPERTENSION, BIRTH CERTIFICATE DATA, ALL ILLINOIS HOSPITALS

Between 2015-Q4 and 2017-Q4, the SMM rate among women experiencing hypertension at delivery was cut in half.

Source: A Borders, ILPQC
CDC LOCATE

• Created based on need identified by states working in risk-appropriate care
• Produces standardized maternal and neonatal level of care assessments for birth facilities
• CDC provides results back to state
• Aligns with guidelines\textsuperscript{1,2,3} published by ACOG/SMFM* and AAP
• Questions about:
  o Hospital equipment & staffing
  o Sub-specialists & their availability
  o Self-designation of care
  o Volume of procedures
  o Drills & protocols for maternal emergencies
  o Transports & facility-level statistics

\textsuperscript{1}Committee on Fetus and Newborn (2012). "Levels of Neonatal Care." Pediatrics 130(3): 587.

* in process of updating to be consistent with 2019 ACOG/SMFM update
>800 facilities
17 jurisdictions
Based on the 2015 ACOG/SMFM guidelines for levels of maternal care, what do you consider your level of maternal care to be?

<table>
<thead>
<tr>
<th>Level</th>
<th>Self-assessment</th>
<th>LOCATE assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; Level I</td>
<td>3%</td>
<td>13%</td>
</tr>
<tr>
<td>Level I</td>
<td>27%</td>
<td>36%</td>
</tr>
<tr>
<td>Level II</td>
<td>32%</td>
<td>40%</td>
</tr>
<tr>
<td>Level III</td>
<td>19%</td>
<td>8%</td>
</tr>
<tr>
<td>Level IV</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Unknown</td>
<td>14%</td>
<td>-</td>
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* Based on data from 767 facilities in 15 jurisdictions
MATERNAL TRANSPORT DATA BY LOCATE LEVEL

Does your facility have a **formal written plan** for **transport of complicated obstetric/maternal patients**?
Yes – 83%

Does this **formal written plan** include...

<table>
<thead>
<tr>
<th></th>
<th>Transport out to higher level of care facility</th>
<th>Receive from a lower level of care facility</th>
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<tbody>
<tr>
<td>&lt; Level I</td>
<td>73%</td>
<td>5%</td>
</tr>
<tr>
<td>Level I</td>
<td>83%</td>
<td>18%</td>
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<tr>
<td>Level II</td>
<td>75%</td>
<td>29%</td>
</tr>
<tr>
<td>Level III</td>
<td>67%</td>
<td>55%</td>
</tr>
<tr>
<td>Level IV</td>
<td>48%</td>
<td>64%</td>
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REVIEW OF MATERNAL TRANSPORT AND TELEMEDICINE POLICIES

• State transport and telemedicine policy status
  • 60% of states have an established state-level policy for maternal transport
  • 33% of states with a transport policy specify reimbursement for maternal transport
  • 2 states have telemedicine policy language specifying maternal risk-appropriate care

• Interpretation
  • Transport is vital for risk-appropriate care—allows for timely provision of care and continuity of care
  • Telemedicine has transitioned from an innovative way of practicing medicine to a practical and necessary tool in addressing the health care needs of the nation
  • Telehealth consultancy with maternal-fetal medicine specialists offer alternative models for provision of care in remote settings
  • Majority of states have the infrastructure for perinatal telemedicine implementation through established policies addressing the telemedicine areas of consultation, diagnosis, and treatment


Based on the **2012 AAP guidelines** for neonatal levels of care, what do you consider your **neonatal level of care** to be?

<table>
<thead>
<tr>
<th></th>
<th>Self-assessment</th>
<th>LOCATE assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td>29%</td>
<td>41%</td>
</tr>
<tr>
<td>Level II</td>
<td>32%</td>
<td>41%</td>
</tr>
<tr>
<td>Level III</td>
<td>21%</td>
<td>14%</td>
</tr>
<tr>
<td>Level IV</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Unknown</td>
<td>11%</td>
<td>-</td>
</tr>
</tbody>
</table>
# Neonatal Transport Data by Location Level

<table>
<thead>
<tr>
<th>Location Level</th>
<th>Receive Complex, High Risk Neonates</th>
<th>Receive Convalescent Neonates</th>
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<tbody>
<tr>
<td>Level I</td>
<td>4%</td>
<td>10%</td>
</tr>
<tr>
<td>Level II</td>
<td>28%</td>
<td>45%</td>
</tr>
<tr>
<td>Level III</td>
<td>88%</td>
<td>70%</td>
</tr>
<tr>
<td>Level IV</td>
<td>100%</td>
<td>56%</td>
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CDC’S ACTIVITIES TO PREVENT MATERNAL AND INFANT DEATHS

Better Understand and Prevent Maternal and Infant Deaths

Ensure Robust Data

Improve Access to Quality Care
THANK YOU.

QUESTIONS?