From Review to Action

Building U.S. Capacity to Review and Prevent Maternal Deaths

Julie Zaharatos
CDC Foundation

Nicole Davis
CDC Division of Reproductive Health

Emily Johnston
Outline

• Overview of maternal mortality in the U.S.
• Steps to establishing a maternal mortality review committee (MMRC)
• Results of Report from Nine Maternal Mortality Review Committees
• Moving MMRC data to action
• State-based Perinatal Quality Collaboratives: a growing movement to improve perinatal health
DC Has Highest Maternal Mortality Rate in US; Council Wants to Learn Why

Maternal Mortality Bill Moves Forward

Shame on us for allowing maternal death rates to soar | Editorial

The horrifying maternal mortality rate in Texas turned out to be wrong, but that's not the biggest issue

The lone star state isn't alone

Here’s One Issue Blue and Red States Agree On: Preventing Deaths of Expectant and New Mothers

From Indiana to Oregon, lawmakers are passing bills to increase scrutiny of maternal deaths. Often, they’re citing our “Lost Mothers” series.

by Nina Martin and Robin Fields, March 26, 5 a.m. EDT

What We’ve Learned So Far About Maternal Mortality From You, Our Readers

Why the US maternal mortality rate is rising

New York City Launches Committee to Review Maternal Deaths

Nearly Dying In Childbirth: Why Preventable Complications Are Growing In U.S.

.ReadKey
Is pregnancy in America much deadlier than in other rich countries?

Too many black women like Erica Garner are dying in America’s maternal mortality crisis

Maternal mortality is the shame of US health care

Mortality rate for pregnant Missouri women is high. Here’s why

Serena Williams and the realities of the 'maternal mortality crisis'

Medicaid pregnancy program helps maternal mortality rates in NC

U.S. Has The Worst Rate Of Maternal Deaths In The Developed World

KEEPING THE FOCUS ON NJ’S HIGH MATERNAL-MORTALITY RATES

State committee would study rising maternal mortality rate in Pennsylvania

If Americans Love Moms, Why Do We Let Them Die?

Texas’ Maternal Mortality Rate: Worst in Developed World, Shrugged off by Lawmakers

If Black Mothers Keep Dying After Giving Birth, Shalon Irving’s Story Explains Why

Lost Mothers

An estimated 700 to 900 women in the U.S. died from pregnancy-related causes in 2016. We have identified 134 of them so far.

by Nina Martin, ProPublica, Emma Ghilardi and Alessandro Furtado, special to ProPublica

Death During Childbirth Has More Than Doubled in the Past 30 Years

NOBODY KNOWS HOW MANY WOMEN DIE IN CHILDBIRTH AND CONGRESS ISN’T DOING ANYTHING ABOUT IT

by CARLOS BALLESTROS ON 10/23/17 AT 10:47 PM

Why Is U.S. Maternal Mortality So High?
The main reason is not medical errors. It's poverty and access to health care.
### Data

<table>
<thead>
<tr>
<th>Data Source</th>
<th>CDC – National Center for Health Statistics (NCHS)</th>
<th>CDC – Pregnancy Mortality Surveillance System (PMSS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Source</td>
<td>Death certificates</td>
<td>Death certificates linked to fetal death and birth certificates</td>
</tr>
<tr>
<td>Time Frame</td>
<td>During pregnancy – 42 days</td>
<td>During pregnancy – 365 days</td>
</tr>
<tr>
<td>Source of Classification</td>
<td>ICD-10 codes</td>
<td>Medical epidemiologists (PMSS-MM)</td>
</tr>
<tr>
<td>Terms</td>
<td>Maternal death</td>
<td>Pregnancy associated, (Associated and) Pregnancy related, (Associated but) Not pregnancy related</td>
</tr>
<tr>
<td>Measure</td>
<td>Maternal Mortality Rate - # of Maternal Deaths per 100,000 live births</td>
<td>Pregnancy Related Mortality Ratio - # of Pregnancy Related Deaths per 100,000 live births</td>
</tr>
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<td>Show national trends and provide a basis for international comparison</td>
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Nicely reviewed in:
- Berg C, et al. (Editors). Strategies to reduce pregnancy-related deaths: from identification and review to action. Atlanta: Centers for Disease Control and Prevention; 2001
Challenge: Trends


*Note: Number of pregnancy-related deaths per 100,000 live births per year.

http://www.cdc.gov/reproductivehealth/maternalinfanthealth/pmss.html
Pregnancy-Related Mortality Ratio, 2011-2013 by Race-Ethnicity and Education

Challenge: Equity

PRMR (Deaths per 100,000 births)
Social determinants of women’s morbidity & mortality?

- Poverty
- Perceived discrimination
- Access to health care
- Chronic stress
- Neighborhood deprivation
- Social support
- Quality of health care

From Michael Kramer at Emory University
## Unique Role of MMRCs

<table>
<thead>
<tr>
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What is a Fully Functional Review Committee?

- It has required authority and protections
- It has defined stakeholders and multidisciplinary membership
- It has a defined purpose, mission, vision, and scope
- It has processes that are established and documented
- It uses data to develop information
- It translates information/recommendations to action (directly/indirectly)
Everyone has a role to play!

- State leadership
- Public health
- Host agency
- Professional membership organizations
- Consumer advocacy
- Perinatal Quality Collaborative

...and more
### MMRC Logic Model

#### Maternal Mortality Review Committee Logic Model

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Activities</th>
<th>Outputs</th>
<th>Short</th>
<th>Intermediate</th>
<th>Long</th>
</tr>
</thead>
</table>
| • Legislative authority and protections  
  - Authority to access required data  
  - Confidentiality  
  - Immunity for committee members from subpoena  
  • Leadership buy-in  
  • Staff  
  • Funding  
  • Defined scope and explicit protocols  
  • Data  
  - Vital records  
  - Medical records  
  - Social Service Records  
  • Defined stakeholders and membership  
  - With status or authority to implement recommendations within their organizations  
  - Broad representation | • Secure any missing inputs (from previous column)  
  • Periodically recruit and train committee members  
  • Identify cases and select cases for abstraction  
  • Abstract cases and produce case summary  
  • Convene committee meeting, review cases, and make key committee decisions  
  • Disseminate recommendations  
  • Identify implementation resources | • Fully functional and sustainable MMRC  
  • Robust, accurate data  
  • Health surveillance and data analysis build evidence base  
  • Recommendations  
  • Reports and presentations  
  • Campaigns, trainings, and initiatives | • Awareness of the existence and recommendations of the MMRC among the public, clinicians, and policy makers  
  • Adoption of policy changes by health systems  
  • Implementation of data driven recommendations e.g. evidence based practices, screenings, and patient education by providers, etc. | • Widespread adoption of patient safety bundles and/or policies that reflect the highest standard of care  
  • Access to holistic care during pregnancy and postpartum period e.g. prenatal, diabetes, mental health, and substance use disorder care, etc.  
  • Coordination of care across providers | • Elimination of preventable maternal death  
  • Reduction in maternal morbidity  
  • Improvement in population health for women of reproductive age including reductions in hypertension, obesity, smoking, substance use, and other chronic diseases |

*MMRC recommendations are part of a cycle of continuous quality improvement for health systems.*

#### Assumptions

- State has a Perinatal Quality Collaborative (PQC), a perinatal center, advocacy organizations, or other infrastructure to support the implementation of MMRC recommendations

#### Contextual Factors

- Geography
- Political will and support
## MMRC Logic Model

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**Assumptions**

State has a Perinatal Quality Collaborative (PQC), a perinatal center, advocacy organizations, or other infrastructure to support the implementation of MMRC recommendations

**Contextual Factors**

• Geography  
• Political will and support
• Systematic data collection and use
  Maternal Mortality Review Information Application (MMRIA)

• Technical assistance and training
  In-person and distance-based, conferences

• Access to resources and learning
  www.ReviewtoAction.org
A Common Language
Authority and Protection
1. Authority to access data
1. Authority to access data
2. Confidentiality and protection of collected data, proceedings and activities
1. Authority to access data
2. Confidentiality and protection of collected data, proceedings and activities
3. Immunity for committee members
1. Authority to access data
2. Confidentiality and protection of collected data, proceedings and activities
3. Immunity for committee members
4. Regular reporting and dissemination of findings
1. Authority to access data
2. Confidentiality and protection of collected data, proceedings and activities
3. Immunity for committee members
4. Regular reporting and dissemination of findings
5. Multidisciplinary committee with local input
Power of MMRCs

- Eliminate preventable maternal deaths
- Reduce maternal morbidity
- Improve population health of women

Cascading Effects of Review Committee Actions

- Deaths
- Near Misses
- Severe Maternal Morbidity
- Maternal Morbidity Requiring Hospitalization
- Maternal Morbidity Resulting in Emergency Department Visit
- Maternal Morbidity Resulting in Primary Care Visit
Report from Nine Maternal Mortality Review Committees
Report from Nine Maternal Mortality Review Committees
The Data

- 9 Committees
  - 855 potentially pregnancy-related deaths
    - 680 valid pregnancy-associated deaths for which pregnancy-relatedness could be determined
    - 237 pregnancy-related deaths
Was the Death Pregnancy-Related?
Distribution of Pregnancy-Related Deaths by Timing of Death in Relation to Pregnancy

- 38% While pregnant
- 45% Within 42 days
- 18% 43 days to 1 year
What was the Cause of Death?
Leading Underlying Causes of Pregnancy-Related Deaths

- Hemorrhage: 14.0%
- Cardiovascular and Coronary Conditions: 14.0%
- Infection: 10.7%
- Cardiomyopathy: 10.7%
- Embolism: 8.4%
- Preeclampsia and Eclampsia: 7.4%
- Mental Health Conditions: 7.0%
Was the Death Preventable?
Distribution of Preventability Among Pregnancy-Related Deaths

**OVERALL**

- **33.5%** Not Preventable
- **63.2%** Preventable
- **3.2%** Unable to Determine
Distribution of Preventability Among Pregnancy-Related Deaths, by Cause of Death

**CARDIOVASCULAR AND CORONARY CONDITIONS**
- **27.3%** Not Preventable
- **68.2%** Preventable
- **4.6%** Unable to Determine

**HEMORRHAGE**
- **25.0%** Not Preventable
- **70.0%** Preventable
- **5.0%** Unable to Determine
What were the Factors that Contributed to this Death?
Distribution of Contributing Factors among Pregnancy-Related Deaths

- Community: 1.9%
- Patient/Family: 38.2%
- Systems of Care: 21.6%
- Facility: 4.4%
- Provider: 33.9%
### Contributing factor level by leading causes of pregnancy-related death

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Community</th>
<th>Facility</th>
<th>Provider</th>
<th>Patient/ Family</th>
<th>Systems of Care</th>
<th>Total Factors</th>
<th>Pregnancy-related deaths*</th>
<th>Factors per death</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiovascular &amp; Coronary Conditions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count of Factors</td>
<td>6</td>
<td>12</td>
<td>26</td>
<td>51</td>
<td>25</td>
<td>120</td>
<td>28</td>
<td>4.3</td>
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<tr>
<td>% of cause-specific factors</td>
<td>5.0</td>
<td>10.0</td>
<td>21.7</td>
<td>42.5</td>
<td>20.8</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Hemorrhage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count of Factors</td>
<td>0</td>
<td>7</td>
<td>31</td>
<td>26</td>
<td>36</td>
<td>100</td>
<td>27</td>
<td>3.7</td>
</tr>
<tr>
<td>% of cause-specific factors</td>
<td>7.0</td>
<td>31.0</td>
<td>26.0</td>
<td>36.0</td>
<td></td>
<td></td>
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<tr>
<td><strong>Infection</strong></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Count of Factors</td>
<td>1</td>
<td>1</td>
<td>36</td>
<td>30</td>
<td>20</td>
<td>88</td>
<td>21</td>
<td>4.2</td>
</tr>
<tr>
<td>% of cause-specific factors</td>
<td>1.1</td>
<td>1.1</td>
<td>40.9</td>
<td>34.1</td>
<td>22.7</td>
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<tr>
<td><strong>Cardiomyopathy</strong></td>
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<td></td>
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<td>0</td>
<td>1</td>
<td>24</td>
<td>31</td>
<td>11</td>
<td>67</td>
<td>16</td>
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<tr>
<td>% of cause-specific factors</td>
<td>1.7</td>
<td>41.4</td>
<td>43.1</td>
<td>13.8</td>
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<td><strong>Embolism</strong></td>
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<tr>
<td>Count of Factors</td>
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<td>0</td>
<td>5</td>
<td>15</td>
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<td>23</td>
<td>14</td>
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<tr>
<td>% of cause-specific factors</td>
<td>21.7</td>
<td>65.2</td>
<td>13.0</td>
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<tr>
<td><strong>Mental Health Conditions</strong></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Pre-eclampsia &amp; Eclampsia</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count of Factors</td>
<td>2</td>
<td>2</td>
<td>29</td>
<td>13</td>
<td>10</td>
<td>56</td>
<td>11</td>
<td>5.1</td>
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<td>% of cause-specific factors</td>
<td>3.6</td>
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<td>51.8</td>
<td>23.2</td>
<td>17.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>14</td>
<td>26</td>
<td>175</td>
<td>203</td>
<td>124</td>
<td>542</td>
<td>131</td>
<td>4.1</td>
</tr>
</tbody>
</table>

*Pregnancy-related deaths that had at least one critical factor identified. Critical factors from at least 7 pregnancy-related deaths included in the 2017 report are not represented here due to changes in data formatting.
## Contributing factors by leading causes of pregnancy-related death

### Hemorrhage

<table>
<thead>
<tr>
<th>Factor Level (% of total factors)</th>
<th>Most Common Factor Class(es) (% of level-specific classes)</th>
<th>Common Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider (31.0%)</td>
<td>Assessment (33.3%)</td>
<td>Delayed or missed diagnosis or treatment</td>
</tr>
<tr>
<td></td>
<td>Knowledge (13.3%)</td>
<td>Ineffective treatments</td>
</tr>
<tr>
<td>Systems of Care (36.0%)</td>
<td>Personnel (27.8%)</td>
<td>Failure to seek consultation</td>
</tr>
<tr>
<td></td>
<td>Policies/Procedures (19.4%)</td>
<td>Inadequate training</td>
</tr>
<tr>
<td></td>
<td>Continuity of Care/Care Coordination (16.7%)</td>
<td>Inadequate or unavailable personnel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of applicable policies and procedures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of coordination and communication between providers that supports patient management</td>
</tr>
</tbody>
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What are the recommendations and actions that address those contributing factors?
Recommendation themes:

Improve training
Enforce policies and procedures
Adopt maternal levels of care/ensure appropriate level of care determination
Improve access to care
Improve patient/provider communication
Improve patient management for mental health conditions
Improve procedures related to communication and coordination between providers
Improve standards regarding assessment, diagnosis and treatment decisions
Improve policies related to patient management, communication and coordination between providers, and language translation
Improve policies regarding prevention initiatives, including screening procedures and substance use prevention or treatment programs
What is the Anticipated Impact of Those Actions if Implemented?
Anticipated Potential for Impact of Actions if Implemented

- Small: 19.5%
- Medium: 40.2%
- Large: 29.0%
- Extra Large: 7.7%
- Giant: 3.6%
Emerging Issues

• Maternal Mental Health Conditions – an Update
• Severe Maternal Morbidity Review
• Incorporating Equity – an Update
We wish you were here!
Moving MMRC Data to Action
MMRC actions take many forms. A few examples...
Urgent Maternal Mortality Message to Providers

- Diagnosis is essential before delivery
  - If placental disorder suspected, get a Maternal-Fetal Medicine consultation.
  - Ultrasonography with supplemental MRI when necessary.
  - If no imaging modality is perfect, if you suspect an issue — transfer to tertiary facility.

- Risk factors
  - Discuss pregnancy and delivery risks with patient and family.
  - The risk of accreta increases with repeat cesarean sections, myomectomy, presence of placenta previa, multi-fetal pregnancy, uterine fibroids, and with advanced maternal age.

- Implementation of hemorrhage protocols in all Florida delivery hospitals is essential, and should include a massive transfusion protocol, simulation drills and hemorrhage carts. For details on implementing a hemorrhage initiative see Florida Perinatal Quality Collaborative’s Toolkit. (1)

- Essential elements of delivery plan
  - Preoperative counselling regarding risks.
  - Timing of admission and delivery. see ACOG guidelines, may vary if patient unstable.
  - Consult with neonatologist regarding corticosteroid administration, if applicable.

- Place blood bank on alert for potential massive transfusion requirements.

Original Research

Maternal Deaths From Suicide and Overdose in Colorado, 2004-2012

Joani D. Mott, MD, MS, Julaine Rossow, MD, M. Camille Hoffman, MD, MPH, Amanda A. Alkhoury, MD, Brenda M. Barthele, MS, and Ingadur A. Blonsdægir, MD, MPH, MS

Overview of Ohio PAMR

Pregnancy-associated: Death during pregnancy or within one year of the end of pregnancy, regardless of cause.
Pregnancy-related: Death during or within one year of pregnancy that is related to the pregnancy.
State-based Perinatal Quality Collaboratives: A Growing Movement to Improve Perinatal Health
Perinatal Quality Collaboratives (PQCs)

- Multidisciplinary networks working together to improve maternal and infant outcomes
- Evidence-informed clinical practices and processes through continuous quality improvement
- PQCs include key leaders in private, public, and academic health care settings
- Ultimate goal = improvements in population-level outcomes in maternal and infant health
Resources to Support PQCs

- CDC PQC website
  [https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pqc.htm](https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pqc.htm)
  - PQC Resource Guide
  - CDC – Perinatal Quality Collaboratives Webinar Series

- National Network of Perinatal Quality Collaboratives (NNPQC)
  - NNPQC Collaboratory [https://nnpqc.community.nichq.org/](https://nnpqc.community.nichq.org/)
  - Webinars available to all state PQCs
Obstetric/Maternal PQC Initiatives

- Reduction of non-medically indicated deliveries <39 weeks gestation
- Progesterone for prevention of preterm birth
- Appropriate use of antenatal steroids
- Improve response to and management of obstetric hemorrhage
- Improve response to and management of hypertensive disorders of pregnancy
- Maternal substance use disorder
- Reduction of unnecessary cesarean deliveries
- Postpartum long-acting reversible contraception (LARC)
Contact Us!

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