PREGNANCY ASSOCIATED MORTALITY REVIEW (PAMR), MISSOURI, 1999-2008

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Definitions

Maternal Mortality Rate
Number of women who die from pregnancy-related causes within 42 days postpartum / the number of live births in that year multiplied by 100,000. (sometimes referred to as the Maternal Mortality Ratio)

Pregnancy-Associated Deaths
Death of a woman within one year postpartum from any cause

Pregnancy-Related Deaths
Death of a woman within one year postpartum related to pregnancy or aggravated by the pregnancy or its management

Not-Pregnancy-Related Deaths
Death of a woman within one year postpartum unrelated to pregnancy or its management

Introduction

- Maternal mortality – rare event in US
- Each year 1,000 American women die of pregnancy-related complications
- U.S. maternal mortality ratio has not decreased in more than 20 years
- Maternal mortality ratio for African American women has been three to four times higher than the ratio for whites since 1940
- CDC’s Safe Motherhood Partnership - 2001
Safe Motherhood Initiative

- In 2001, CDC and its partners published *Strategies to Reduce Pregnancy-Related Death: From Identification and Review to Action*.


- MMR purpose - examine the circumstances of women’s deaths that occur during or around the time of pregnancy and to identify gaps in services and systems that should be improved to prevent future deaths.

Source: 75th Title V Anniversary Celebration, Maternal Mortality in the US, 1935-2007
“Mothers die not because the United States can't provide good care, but because it lacks the political will to make sure good care is available to all women” - Larry Cox, executive director of Amnesty International USA.
Pregnancy-Associated Mortality - a death of a woman, from any cause, while she is pregnant or within 1 year of termination of pregnancy.

Further Classified As:
- Pregnancy-Related
- Possibly Pregnancy-Related
- Not Related
PREGNANCY RELATED MORTALITY RATIO (PRMR)

\[
\frac{\text{Number of pregnancy related deaths}}{\text{Number of resident live births}} \times 100,000
\]

**Example:**

91 pregnancy-related deaths in 2008 among state residents
130,000 live births in 2008 to state residents

\[
\frac{91}{130,000} \times 100,000 = 70.0 \text{ pregnancy-related deaths per 100,000 live births in 2008}
\]

Source: http://www.cdc.gov/reproductivehealth/maternalinfanthealth/pmss.html

Source: CDC, PMSS data 1987-2008
Pregnancy Related Mortality Ratios, US, 2006-09

Disparity Ratio = 3

Data //Source: http://www.cdc.gov/reproductivehealth/MaternalInfantHealth/PMSS.html#5
STEP 1: Hospital discharge data linked to birth, death certificates
Identifies women who died within one year postpartum from any cause (Pregnancy-Associated Cohort)

STEP 2: Additional data gathered for each death
Coroner Reports, Autopsy Results, and additional information from the Death Certificate (e.g., multiple causes of death, recent surgeries, etc.) are obtained and abstracted.

STEP 3: Cases selected for PAMR Committee review
Documented (ICD-10 obstetric (“O”) code) and suspected pregnancy-related deaths are prioritized for review.

STEP 4: Medical records abstracted and summarized
All available labor and delivery, prenatal, hospitalization, transport, and outpatient and emergency department records are obtained and summarized.

STEP 5: Cases reviewed by PAMR Committee
Committee determines whether the death was pregnancy-related, the cause of death, contributing factors and quality improvement opportunities.

Total # of deaths within one year of termination of pregnancy = 468

Eliminated Records = 18

# of deaths that met criteria for PAMR = 450
<table>
<thead>
<tr>
<th>Category of Death</th>
<th>Count</th>
<th>% of total deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR - pregnancy related</td>
<td>108</td>
<td>24.0</td>
</tr>
<tr>
<td>PPR - possibly pregnancy related</td>
<td>61</td>
<td>13.6</td>
</tr>
<tr>
<td>NPR - not pregnancy related</td>
<td>240</td>
<td>53.0</td>
</tr>
<tr>
<td>Undetermined</td>
<td>41</td>
<td>9.1</td>
</tr>
<tr>
<td>Overall</td>
<td>450</td>
<td>100.0</td>
</tr>
</tbody>
</table>
PRMR by data source, 1999-2008

Source: MO Vital statistics Death and Birth files
Timing of maternal deaths, 1999-2008

Source: MO PAMR
Age specific PRMR, 1999-2008

Source: MO PAMR
Racial distribution of MO-PAMR deaths, 1999-2008

Disparity Ratio = 2.7

Source: MO PAMR
Smoking status among PAMR deaths in MO, 1999-2008

Source: MO PAMR
Marital status among MO-PAMR deaths, 1999-2008

Source: MO Vital statistics Death and Birth files.
Payer Source among MO-PAMR deaths, 1999-2008

Source: MO Vital statistics Death and Birth files.
Method of Delivery among MO-PAMR deaths, 1999-2008

Source: MO Vital statistics Death and Birth files
Causes of pregnancy related deaths, 1999-2008

<table>
<thead>
<tr>
<th>Causes of deaths</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embolism</td>
<td>40</td>
<td>23.7</td>
</tr>
<tr>
<td>Other Cardiac Conditions</td>
<td>20</td>
<td>11.8</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>17</td>
<td>10.1</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>17</td>
<td>10.1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>17</td>
<td>10.1</td>
</tr>
<tr>
<td>Malignancy</td>
<td>13</td>
<td>7.7</td>
</tr>
<tr>
<td>Infection</td>
<td>7</td>
<td>4.1</td>
</tr>
<tr>
<td>Cerebro-Vascular Accident(CVA)</td>
<td>8</td>
<td>4.7</td>
</tr>
<tr>
<td>Suicide</td>
<td>7</td>
<td>4.1</td>
</tr>
<tr>
<td>Other: causes</td>
<td>23</td>
<td>13.6</td>
</tr>
<tr>
<td>Unknown</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: MO PAMR
Summary

- First ever comprehensive review of maternal deaths in Missouri
- PRMR using the PAMR process are higher than those reported by vital statistics – enhanced surveillance
- African-Americans have significantly higher PRMR than whites across all demographics - similar to national observations
- Embolism and cardiovascular diseases are the leading causes of death
Maternal Mortality and Morbidity Review Boards

States without a maternal mortality review board

Source: Deadly Delivery, Amnesty International, 2010
National Steps to address maternal mortality

- Federal bill HR 894
  Maternal Health Accountability
  Bill of 2011
Managing Maternal Hemorrhage

Vital Signs
- Airway—intubate
  If inadequate ventilation or to assist airway protection
- Breathing
  Supplemental O2, 5-7 L/min by tight face mask to assist O2 carrying capacity
- Circulation
  Pallor, delayed capillary refill and decreased urine output can indicate compromised blood volume without change in BP or HR.
  Late signs of compromise are: decreased urine output, low BP, and tachycardia.

Infusions
- Start 2nd large bore (16 gauge or larger)
- RL or NS replaces blood loss at 3:1
- Volume expanders 1:1 (albumin, hetastarch, dextran)
- Transfusion (PRBC, Coagulation factors)
- Warm blood products and infusions to prevent hypothermia, coagulopathy and arrhythmias

Medication for uterine atony
- Oxytocin
  10-40* units in 1 liter NS or RL IV rapid infusion
  *30-40 unit/liter most commonly used dose for hemorrhage
- Methylergonovine (Methergine)
  0.2 milligrams intramuscular q 2-4 hrs maximum 5 doses; avoid with hypertension
- Prostaglandin F2 Alpha (Hemabate)
  250 micrograms intramuscular, intramyometrial, repeat q 15-90 minutes, maximum 8 doses; avoid with asthma or hypertension
- Prostaglandin E2 suppositories (Dinoprostone, Prostin E2)
  20 milligrams per rectum q 2 hrs; avoid with hypotension
- Misoprostol (Cytotec)
  1000 micrograms per rectum or sublingual (ten 100 microgram tabs or five 200 microgram tabs)
- Surgical interventions
  May be a life-saving measure and should not be delayed

Poster for Labor and Delivery and Operating Rooms
Problem: Hemorrhage

Intervention: hemorrhage education program.

Mandated participation

Ambulances directed to hospitals with obstetric care.
What we did in Texas!

- Legislative Advocacy
- Public Awareness
- Quality of Care/Service Delivery
- Resource Enrollment
Why Texas Needs an MMRB?

- Identify reasons for maternal mortality and morbidity
  (Preventable deaths range from 40 - 75 %)
- Determine plan of action to improve the death rate, and eventually the morbidity
- Implement the plan
- Evaluate for positive outcomes
- Continue to track and trend (CQI)
Legislation proposed by Rep Walle and coauthored by Rep Farrar

Heard in Public Health Committee – failed to receive required votes.

Went to special Study status from the Senate

Healthy Texas Babies Expert Panel
  ◦ Maternal Mortality Review Committee
Texas 2013 Legislative Session

- HB 1085 - Rep Walle sponsor and co-sponsored by Rep Davis, Rep Collier

- SB 495 – Senator Huffman and co-sponsored Senator West
Resources

Women Deliver http://www.womendeliver.org

World Health Organization (WHO)
  http://www.who.int/reproductivehealth/publications/en/
  http://www.who.int/maternal_child_adolescent/en/

Every mother counts http://www.everymothercounts.org/

Center for Disease Control (CDC)

The California Maternal Quality of Care Collaborative
  http://www.cmqcc.org/

United Nations Population Fund UNFPA
  http://www.unfpa.org/public/mothers/

United Nations Development Program (UNDP)
  http://www.undp.org/content/undp/en/home/mdgovoverview.html
Next Steps

- Do we continue PAMR in MO?
- Staffing / funding / MMR Board composition
- Data Dissemination / in-depth analyses of issues/ Missing data
- Coroner’s / ME’s/ Professional Organizations – Annual Meetings to showcase PAMR results
- Collaborate with other agencies within the state (OMH, OWH, MHA, DSS, DMH), MMR boards form other states for guidance (Illinois, Florida, California)
- Utilize existing resources / toolkits— www.cmmqcc.org
Email: Venkata.Garikapaty@health.mo.gov

Phone: 573-526-0452