Maternal Death
Is It Preventable?

Washington C. Hill, MD, FACOG
Medical Director, Labor and Delivery
Director, Maternal-Fetal Medicine
Sarasota Memorial Hospital
1700 South Tamiami Trail
Sarasota, Florida 34239-3555
washington-hill@smh.com
(941) 917-6260 / (800) 892-7088
Mead Johnson sponsors programs such as this to give healthcare professionals access to scientific and educational information provided by experts. The presenter has complete and independent control over the planning and content of the presentation, and is not receiving any compensation from Mead Johnson for this presentation. The presenter’s comments and opinions are not necessarily those of Mead Johnson. In the event that this presentation contains statements about uses of drugs that are not within the drugs' approved indications, Mead Johnson does not promote the use of any drug for indications outside the FDA-approved product label.
Maternal Death Is It Preventable?
Maternal Death
Is It Preventable?

I have no commercial disclosures or potential conflicts of interest
Objectives - At the end of this presentation the participant will be able to:

1- Understand what causes maternal death.

2- Understand how maternal death can be prevented and when it cannot.

3- Understand the possible medical legal issues when maternal death occurs.
Maternal Mortality Ratio

- The number of maternal deaths (direct - hemorrhage and indirect - asthma) that result from the reproductive process per 100,000 live births.
- Numerator = number of deaths regardless of pregnancy outcome
- Denominator = the number of live births
- Used less often than maternal mortality rate or maternal death rate
Maternal Mortality Rate
(maternal deaths per 100,000 live births)

- Colorado-11.0
- California-11.3
- Florida-13.1
- Healthy People 2010 Goal-3.3
Maternal Mortality Rate

- Overall in U.S. about 13.3 per 100,000
- Significant racial disparity
- Whites 5.3 per 100,000
- African Americans 19.6 per 100,000
- Reasons are unclear

Source: CDC-1999
Pregnancy-Associated Mortality

Defined as the death of a woman from any cause while she is pregnant or within one year of termination

CDC and ACOG
Known Risk Factors For Maternal Death

- Advanced maternal age-due to associated illnesses such as obesity, diabetes and hypertension.
- Increasing parity-due to increased incidence of abruptio placenta, placenta previa and uterine rupture.
- Hospital to large or to small
- Inexperienced providers
- Non-white race
Mortality Rates

- Have decreased over the last two decades
- Highest in the Southern states
- Lowest in the Western states
- Modest rise from 1987-1990
- Wide discrepancies between whites and non-whites
Most Common Causes Of Maternal Death In The Nation

- Bleeding or hemorrhage
- Embolism
- Preeclampsia and hypertensive disease
- Infection
- Cardiomyopathy
- Anesthesia

Most causes have decreased but infection and cardiomyopathy have increased for unknown reasons.
Bleeding or Hemorrhage

Causes of Maternal Death

- Postpartum hemorrhage/uterine atony
- Uterine rupture
- Uterine inversion
- Fibroids
- Reproductive tract lacerations
- Coagulopathy
Chart 2: Distribution of Pregnancy-Related Causes of Death, Florida 1999-2005 (n=264)

- Other*: 22%
- Hypertensive Disorders: 15%
- Hemorrhage: 12%
- Thrombotic Embolism: 12%
- Infection: 11%
- Cardiomyopathy: 11%
- Amniotic Fluid Embolism: 9%
- Other Cardiovascular Problems: 8%

*The Other cause category includes deaths due to cancer, gastrointestinal disorders, HIV/AIDS, and hematopoietic disorders.

Let’s Look Closer At Bleeding or Hemorrhage
Bleeding or Hemorrhage

Causes of Maternal Death

- Trauma: shoulder dystocia, operative delivery
- Previous tocolysis
- History of postpartum hemorrhage
- Abruptio placenta and placenta previa
- Placenta previa and previous C/S
- Placenta accreta which will increase
Bleeding or Hemorrhage

Clinical Pearls

- Hemorrhage is a sign, NOT a diagnosis
- The first step is to determine the cause
- Large bore IV access
- Don’t underestimate blood loss
- Notify early anesthesia and blood bank
Bleeding or Hemorrhage

Clinical Pearls

- Act quickly in delivery room
- Don’t get behind
- Uterine massage
- Uterotonic medications
  - pitocin
  - methergine
  - hemobate
  - misoprostol
What Can We Learn From This?
PRACTICE, Practice, practice
Bleeding or Hemorrhage
Clinical Pearls

- Repair lacerations
- Remove placenta and do D and C if necessary
- Diagnose and treat coagulopathy
- Initiate blood component therapy quickly
- Move on to surgical treatment
Bleeding or Hemorrhage

Clinical Pearls

- Surgical treatment
  - uterine packing
  - uterine artery ligation
  - B-Lynch suture
  - utero-ovarian arterial anastomosis ligation
  - oversew of placental implantation site
  - bilateral hypogastric artery ligation
  - embolization
  - supracervical hysterectomy
Bleeding or Hemorrhage
Medical Legal Issues

- Failure to establish differential diagnosis and appreciate degree of blood loss
- Lack of attention to blood loss
- Delayed or concealed bleeding
- Slow recognition of hemorrhage
- Slow treatment of coagulopathy
- Hysterectomy not considered or performed too late
Bleeding or Hemorrhage
Medical Legal Issues

- False reliance on initial CBC
- Getting behind in treatment
- Not enough blood components
- Treating patient in the wrong location
- Hemorrhage could have been prevented or predicted
- Lack of experienced personnel
Estate of Becky Brown v. The Medical Center and Dr. K.
Becky is a G7P6 patient of Dr. K. who had an uncomplicated prenatal course. Admitted in spontaneous labor at 38 weeks. Augmentation of labor was necessary because of failure to progress. Pitocin was administered according to the hospital protocol and she delivered without complication, however after delivery of the infant there was massive vaginal bleeding.
Bleeding or Hemorrhage
Case Review

Her uterus was massaged, uterotonic medication was given, and D & C was done, but hemorrhage persisted. Anesthesia was in attendance and initiated immediately appropriate diagnostic tests and therapy. Hypotensive, Becky was taken to the OR and explored, where a retroperitoneal hematoma was found from a laceration of the uterus.
Bleeding or Hemorrhage
Case Review

A gynecological oncologist was called in and a Supracervical hysterectomy was performed. An attempt was made to stop bleeding into the retroperitoneal hematoma. During the procedure, however, Becky coded and could not be resuscitated. The family filed a law suit against Dr. K. and the hospital.
A Model For Reviewing Your Pregnancy Associated Maternity Mortality

Florida’s Pregnancy-Associated Mortality Review
Our Report Is Available Online
The International Experience
What’s up in developing countries...

http://www.heartsafire.us
Maternal Mortality Around The World

1996 Maternal deaths per 100,000 live births

- Afghanistan 1700
- Tanzania 770
- Ghana 740
- Kenya 650
- United States 12
- United Kingdom 9
- Norway 6
- Canada 6

http://www.unicef.org/pon96/leag1wom.htm
The Florida Experience
1996-Present
To reduce pregnancy-related deaths, we must examine:

- Why are women dying?

- What action steps can be taken to reduce these deaths?
Components of PAMR

- Case Ascertainment
- Abstraction Team
- Interdisciplinary Case Review
- State Level Coordination
- Data Maintenance, Analysis, and Dissemination
Overview
1999-2005

- PAMR committee reviewed 381 pregnancy-associated deaths

- Identified 264 (71%) as pregnancy-related
Chart 1: PAMR Pregnancy-Related Mortality Ratios
Florida, 1999-2005

<table>
<thead>
<tr>
<th>Year</th>
<th>All</th>
<th>White</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>20.3</td>
<td>15.0</td>
<td>40.0</td>
</tr>
<tr>
<td>2000</td>
<td>19.1</td>
<td>13.3</td>
<td>40.2</td>
</tr>
<tr>
<td>2001</td>
<td>16.1</td>
<td>9.9</td>
<td>36.1</td>
</tr>
<tr>
<td>2002</td>
<td>15.1</td>
<td>9.9</td>
<td>34.7</td>
</tr>
<tr>
<td>2003</td>
<td>19.3</td>
<td>8.9</td>
<td>55.2</td>
</tr>
<tr>
<td>2004</td>
<td>23.0</td>
<td>14.4</td>
<td>53.2</td>
</tr>
<tr>
<td>2005</td>
<td>13.3</td>
<td>8.4</td>
<td>27.1</td>
</tr>
</tbody>
</table>
Leading Causes of Death

Chart 2: Distribution of Pregnancy-Related Causes of Death, Florida 1999-2005 (n=264)

- Other * 22%
- Hypertensive Disorders 15%
- Hemorrhage 12%
- Thrombotic Embolism 12%
- Infection 11%
- Cardiomyopathy 11%
- Amniotic Fluid Embolism 9%
- Other Cardiovascular Problems 8%

*The Other cause category includes deaths due to cancer, gastrointestinal disorders, HIV/AIDS, and hematopoietic disorders.
Timing of Death

Chart 3: Timing of Death for PAMR
Pregnancy-Related Deaths, 1999-2005
(n=264)

- Postpartum: 76%
- Prenatal: 18%
- Labor and Delivery: 5%
- No Source Data: 1%
- Labor and Delivery: 5%
# Timing of Death - Revised

## Table 1: Interval Between Date of Hospital Discharge and Date of Death Pregnancy-Related Deaths, 1999-2005

<table>
<thead>
<tr>
<th>Interval between Date of Hospital Discharge and Date of Death</th>
<th>Pregnancy-Related Deaths</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 weeks or less</td>
<td>53</td>
<td>59%</td>
</tr>
<tr>
<td>6 weeks to 3 months</td>
<td>13</td>
<td>14%</td>
</tr>
<tr>
<td>3 months or &gt;</td>
<td>17</td>
<td>19%</td>
</tr>
<tr>
<td>Data Not Present</td>
<td>7</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Leading Cause of Death during the first six weeks postpartum - Discharged Home

- Infection (23%)
- Thrombotic Embolism (21%)
- Cardiomyopathy (20%)
Leading Cause of Death
During the first six weeks-
Remained in Hospital

- Hypertension (26%)

- Amniotic Fluid Embolism (15%)

- Hemorrhage (12%)
What Are The Risk Factors?

- Women most at risk for pregnancy-related death:
  - Age 35 and older (RR=3.65)
  - Black non-Hispanic (RR=3.32)
  - High school education or less (RR=1.72, 1.50, respectively)
  - Received no prenatal care (RR=9.95)
  - Cesarean Delivery (RR=5.09)
  - Overweight (OR= 2.13)
  - Obese Categories 1,2,or 3 (OR=3.5, 3.5, 8.0)
Issues/Recommendations or Why Do This Anyway?
Issues/Recommendations

The purpose of Florida’s PAMR is to:

- Elucidate gaps in care
- Identify systemic service delivery issues
- Make recommendations to facilitate improvements in overall systems of care.
Summary

- Recommendations were categorized into 4 improvement categories:
  - Clinical Factors
  - Systems Factors
  - Individual/Community Factors
  - Death Review Factors
Issues & Recommendations

**Clinical Factors:**

- Incomplete assessments
- Inadequate documentation
- Deficient communication
- Lack of association with change in mental status.
Clinical Factors

Recommendations:

- Care Coordination/Follow-Up
- Thorough Assessments
- Educate on postpartum warning signs
- Raise awareness of postpartum thrombotic embolism risk
Issues & Recommendations

Clinical Factors

Recommendations:

- Preconception education and counseling
- Family planning-chronic illness
- Screen, treat and refer for substance abuse, domestic violence and depression.
Issues & Recommendations

**System Factors**

**Issues:**
- Lack of standard treatment policy for prevention of thrombotic embolism
- Postpartum Education not inclusive of signs of thrombosis and cardiovascular events.
Issues & Recommendations

System Factors

Recommendations:

- Develop standards and guidelines for prevention/treatment of thrombotic embolism
- Postpartum education needs to be more inclusive and delivered more effectively.
- Establish policies regarding care coordination for high risk pregnant/postpartum women.
Issues & Recommendations

Individual/Community Factors

Issues:

- Pre-Existing Medical Conditions
- Informed Consent
Issues & Recommendations

Individual/Community Recommendations:

- Educate women with a chronic illness on risk of pregnancy
- Obtain “informed consent” on all medical procedures for all women.
  (Particularly for inductions and Cesarean delivery of women who are obese or have a chronic illness.)
Issues & Recommendations

Death Review Factors

Issues:
- Lack of autopsy on unexplained or inconclusive deaths
- Inaccurate/Incomplete documentation on death certificates
Summary

- Black pregnancy-related mortality ratio remains three or more times greater than the White ratio.

- The overall leading causes of death were hypertension, hemorrhage and thrombotic embolism.

- Most of the pregnancy-related deaths occurred during the postpartum period with the majority occurring during the first 6 weeks after discharge.
Summary

- The PAMR committee recommendations were categorized into 4 improvement categories, 71% were classified as clinical factors potentially modifiable by practitioners.
For additional information on Florida’s PAMR project, please contact:

Ms. Deborah Burch, R.N., B.S., C.P.C.E. at: Deborah_Burch@doh.state.fl.us
Telephone: 850/245-4465 x2969
Finally….
What Does The Joint Commission Have To Say About Preventing Maternal Death?
According to the HCA study, the most common preventable errors are:

- Failure to adequately control blood pressure in hypertensive women
- Failure to adequately diagnose and treat pulmonary edema in women with pre-eclampsia
- Failure to pay attention to vital signs following Cesarean section
- Hemorrhage following Cesarean section

There Are Existing Joint Commission requirements:

- Have a process for recognizing and responding as soon as a patient’s condition appears to be worsening.
There Are Existing Joint Commission requirements:

- Have a process for recognizing and responding as soon as a patient’s condition appears to be worsening.
- Develop written criteria describing early warning signs of a change or deterioration in a patient’s condition and when to seek further assistance.
There Are Existing Joint Commission requirements:

- Based on the hospital’s early warning criteria, have staff seek additional assistance when they have concerns about a patient’s condition.
- Inform the patient and family how to seek assistance when they have concerns about a patient’s condition.
Joint Commission suggested actions

Each case of maternal death needs to be identified, reviewed, and reported in order to develop effective strategies for preventing pregnancy-related mortality and severe morbidity. To this end, The Joint Commission encourages participation by hospital physicians, including obstetrician-gynecologists, in state-level maternal mortality review and collaboration with such review committees in sharing data and records needed for review.
Preventing Maternal Death
Joint Commission Sentinel Event Alert
Issue 44, January 26, 2010

- The following **6 suggested actions** from the Joint Commission can help hospitals and providers (that is us) prevent maternal death:
1. **Educate** physicians and other clinicians who care for women with underlying medical conditions about the additional risks that could be imposed if pregnancy were added; how to discuss these risks with patients; the use of appropriate and acceptable contraception; and pre-conceptual care and counseling. **Communicate** identified pregnancy risks to all members of the health care delivery team.
2. **Identify specific triggers** for responding to changes in the mother’s vital signs and clinical condition and develop and use protocols and drills for responding to changes, such as hemorrhage and pre-eclampsia. **Use the drills to train staff** in the protocols, to refine local protocols, and to identify and fix systems problems that would prevent optimal care.
3. **Educate emergency room personnel**

about the possibility that a woman, whatever her presenting symptoms, may be pregnant or may have recently been pregnant. Many maternal deaths occur before the woman is hospitalized or after she delivers and is discharged. These deaths may occur in another hospital, away from the woman’s usual prenatal or obstetric care givers. Knowledge of pregnancy may affect the diagnosis or appropriate treatment.
4. **Refer high-risk patients** to the care of experienced prenatal care providers with access to a broad range of specialized services
5. Make **pneumatic compression devices** available for patients undergoing Cesarean section who are at high risk for pulmonary embolism.
6. Evaluate patients who are at high risk for thromboembolism for low molecular weight heparin for postpartum care.
Maternal Death: Is It Preventable?

Sometimes, YES

Sometimes, NO
However, you do not have time to make all the mistakes and must learn from those of others!
Thank You For Listening!