North Carolina Maternal Mortality Review

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- Review definitions
- Describe the North Carolina Enhanced Maternal Mortality System
- Review some of the results from the past 20 years
- How have we used the data
  - Identify opportunities for quality improvement
- Next steps
  - AMCHP grant for collaborative learning and funding for translational activities.
Maternal death (WHO) prior to ICD 10
Death of a woman while pregnant or within 42 days of the end of pregnancy, from any cause related to or aggravated by pregnancy.

ICD 10 Maternal Death and Late Maternal Death
Extends the time period to 365 days with Late Maternal Deaths defined as those between 43 and 365 days of end of pregnancy.

Pregnancy-associated death (ACOG/CDC)
Death of a woman while pregnant or within 1 year of the end of pregnancy, from any cause.
Pregnancy-related death (ACOG/CDC)
Death of a woman while pregnant or within 1 year of the end of pregnancy, from any cause related to or aggravated by pregnancy:

Not pregnancy-related
- Death of a woman while pregnant or within 1 year of the end of pregnancy, from causes UNRELATED TO PREGNANCY.
  - Medical conditions such as cancer
  - Injury deaths
Enhanced Maternal Mortality Review System

Annual Review
How are these deaths identified?

- All death certificates assigned by nosologist any ICD code from the pregnancy chapter
- All death certificates with any mention of pregnancy
- Matching of vital records since 1988
  - NC was the leader in this method and it has been duplicated by most other States
- Search of Hospital Discharge Database for individuals with pregnancy-related ICD codes and discharge status as deceased
• All of the deaths identified by one or more of these methods is reviewed by the Committee
  • Death certificate
  • Matching livebirth or fetal death certificate
  • Hospital discharge codes sometimes
  • Autopsies are requested if performed through the Office of the Chief Medical Examiner. Includes pathology, clinical summary, toxicology

• An underlying cause of death is assigned
• Grouped into broader categories
• Results of the committees analysis are reported to the SCHS
• De-identified results are published periodically in the NC Medical Journal and national journals and are available on the SCHS web site: www.schs.state.nc.us/data/other
Maternal Mortality 1916-1970

North Carolina

Pregnancy-Related Deaths per 100,000 Live Births, 1992-2001
Pregnancy-Related Deaths per 100,000 Live Births, 2002-2011

Deaths during pregnancy or within one year of delivery or other pregnancy outcome, 2004-2011, Total = 510

Causes of Death

- Pregnancy-Related: 169 (33.1%)
- Not Pregnancy-Related: 341 (66.9%)
Pregnancy-Related Deaths, 2004-2011
Total = 169

Cause of Death
- Cardiac 53 (32%)
- Infection 23 (13.6%)
- Hypertensive Diseases 19 (11.2%)
- Thromboembolism 18 (10.6%)
- Hemorrhage 17 (10.1%)
- Other 17 (10.1%)
- CNS Events 11 (6.5%)
- Amniotic Fluid Embolus 7 (4.1%)
- Undetermine 4 (2.3%)

Not-Pregnancy-Related Deaths, 2004-2011, Total = 341

Causes of Death
- Medical Unrelated 131 (38.4%)
- MVA 82 (24%)
- Accidental Drug OD 54 (15.8%)
- Homicide 41 (12%)
- Suicide 21 (6.2%)
- Undetermined 5 (1.5%)
- Other injury 6 (1.8%)
Pregnancy-Related Mortality by Race, 2002-2011

Relative Risk of Pregnancy-Related Death Associated with Black Race
How have we used the data
• Violent Maternal Deaths, 1992-1994
  • Role of domestic violence and awareness of providers of abuse prior to death in those cases of homicide by an intimate partner

• Racial Disparity Study, 1992-1998
  • Identify factors that might explain the racial disparity

• International Study, pregnancy-related deaths in four regions of Europe and the United States, 1999-2000

• Preventability Study, 1995-1999
  • Determine what portion of pregnancy-related deaths are potentially preventable
    • Preconception care and counseling
    • Patient actions
    • System factors
    • Quality of care
• Educational campaign to raise level of awareness about peripartum cardiomyopathy
• Birth Prevalence and fatality from peripartum cardiomyopathy in North Carolina, 2002-2003
• Analysis of deaths from accidental drug overdose, 1996-2007

Accidental Deaths from Drug Overdose

<table>
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<th>2000-3</th>
<th>2004-7</th>
<th>Total</th>
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<td>All Prescription Opioids</td>
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<td></td>
<td>1</td>
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<td>Methadone Mentioned (subgroup of all)</td>
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<td>14</td>
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<td>Illicit drugs</td>
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Next steps
AMCHP Grant
AMCHP
Association of Maternal and Child Health Programs

AMCHP
Supports state maternal and child health programs
- providing capacity building and technical assistance
- disseminating best practices
- convening leaders to share experiences and ideas
- advising states about involving partners to reach common goal of healthy children, healthy families, and healthy communities
The AMCHP *Every Mother Initiative*

- Action Learning Collaborative
- Money to support a translational activity
- Six states were funded, including North Carolina

The AMCHP *Every Mother Initiative*

- Supported by Merck
- Goal: Enhance state maternal mortality surveillance systems and facilitate use of the data to develop and implement strategies and policies aimed at preventing maternal death and improving maternal health outcomes.
North Carolina

*Every Mother Initiative*

- Expand our North Carolina Maternal Mortality Review Committee
- Implement a translational activity which will address leading causes of maternal mortality in the State
- Work with State leaders to
  - facilitate access to hospital and other medical records
  - provide protection for the committee proceeding
Results

- 108 Pregnancy-related deaths
- 105 with an identifiable cause
- 102 able to assess preventability
40% preventable
### Cause of Death

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<thead>
<tr>
<th>Cause of Death</th>
<th>% of all preg-related deaths</th>
<th>% Preventable</th>
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<tbody>
<tr>
<td>Cardiomyopathy</td>
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<td>Hemorrhage</td>
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<td>PIH</td>
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<td>Chronic condition</td>
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<td>Amniotic fluid embolus</td>
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</table>

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>% of all preg-related deaths</th>
<th>% Preventable</th>
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<tr>
<td>Infection</td>
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<td>Pulmonary embolus</td>
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<td>Microangiopathic hemolytic syndromes</td>
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