DSHS Leadership Update

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June 15, 2018
Overview

1. Identifying Maternal Deaths in Texas Using an Enhanced Method, 2012

PUBLIC HEALTH IMPLICATIONS

2. Increase Death Certificate Accuracy

3. Continued Focus on Maternal Health & Safety
   a. Awareness and knowledge of maternal health
   b. Risk appropriate maternal care
   c. TexasAIM — maternal safety bundles

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Maternal Death

World Health Organization (WHO) definition:

“The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.”
Maternal Mortality Rate (MMR)

• Number of maternal deaths (within 42 days postpartum) per 100,000 live births

• Standard method for identifying maternal deaths (numerator):
  ➢ Relies on an ICD-10 obstetric cause-of-death code on the official death record
  ➢ Obstetric codes indicating pregnancy at time of death or within 42 days of date of death: A34, O00-O95, O98-O99
Maternal Mortality Rate: Texas and the United States

Prepared by: Office of Program Decision Support, Division for Family and Community Health, Texas Department of State Health Services.
Data Sources: Centers for Disease Control and Prevention, National Center for Health Statistics.
Underlying Cause of Death and Natality public use data 2005-2015 on CDC WONDER Online Database.
MMR computed within 42 days following the end of pregnancy, using ICD-10 codes A34, O00-O95, O98-O99.
Conclusions: The observed increase in maternal mortality in Texas from 2006-2010 to 2011-2015 is likely a result of both a true increase in rates and increased overreporting of maternal deaths, as indicated by implausibly high and increasing rates for women aged ≥40 years and among nonspecific causes of death. Efforts are needed to strengthen reporting of death certificate data, and to improve access to quality maternal health care services.
Research Goals

• Further investigate accuracy of maternal death identification using obstetric cause-of-death codes on death records (standard method)

• Determine extent of maternal death misclassification for 2012
  ➢ Obtain more accurate count of maternal deaths
  ➢ More accurately estimate Texas MMR
Methods
Enhanced Method for Maternal Death Identification

- Death records for all 2012 Texas resident deaths with an obstetric cause-of-death code were obtained from CDC NCHS and reviewed for evidence of pregnancy

**Step 1:** Matched death records with records of live births and fetal deaths

**Step 2:** For deaths that did not match, medical autopsy, and other records requested and reviewed for evidence of pregnancy
• Additionally, we tried to identify other maternal deaths in 2012 that were missed by the standard method

**Step 3**: Match all other female TX resident death records with records of live births and fetal deaths
Obstetric-Coded Unconfirmed Maternal Deaths within 42 Days

• Three categories:
  - No evidence of pregnancy
  - Outside of timeframe (death occurred 43+ days postpartum)
  - Insufficient information to make a determination
Criteria for ‘No Evidence of Pregnancy’

- No mention of a pregnancy, miscarriage, or delivery event within a year of death
- Medical history of bilateral tubal ligation or hysterectomy
- Negative hCG test result
- Absence of uterus or fetus on autopsy (for women reported pregnant at time of death)
- Death certifier indicated a woman was not in fact pregnant at time of death or within 42 days of death
Statistical Methods

• Maternal mortality rates (MMRs) calculated for 2012:
  ➢ Definition: Number of maternal deaths per 100,000 live births
  ➢ Numerator: Confirmed maternal deaths
  ➢ Denominator: Live births to TX residents, 2012

• MMRs calculated:
  ➢ Texas overall
  ➢ By race/ethnicity (White, Black, Hispanic, Other)
  ➢ By maternal age group (≤24, 25-34, 35+)
Statistical Methods

• Compared our 2012 MMRs with estimates using standard method

• Assessed accuracy of standard method for maternal death identification
  ➢ Calculated sensitivity, specificity, PPV of standard method
  ➢ Confirmed maternal deaths with enhanced method used as a proxy for true maternal deaths in TX in these analyses
Results
Number of Maternal Deaths within 42 Days Following End of Pregnancy, Texas, 2012

147

ENHANCED METHOD

23 + 24

Maternal deaths identified using death certificates alone
(STANDARD METHOD TOTAL)

Maternal deaths identified using data-matching and record review
(ENHANCED METHOD TOTAL)

STEP 1
Maternal deaths identified using death certificates matched with birth/fetal deaths

STEP 2
For unmatched deaths, records reviewed for evidence of pregnancy including miscarriage

STEP 3
All female deaths matched with birth/fetal deaths to identify additional maternal deaths
Of 147 obstetric-coded deaths in 2012:

- Only 47 (32%) were confirmed to be maternal deaths

- For the rest of these deaths:
  - 74 (50%) had no evidence of pregnancy upon review
  - 11 (8%) occurred outside of 42-day timeframe
  - 15 (10%) had insufficient evidence to make a determination
### MMR Using Enhanced Method

<table>
<thead>
<tr>
<th>Maternal Characteristic</th>
<th>No. of Live Births</th>
<th>Enhanced Texas MMR* (n)</th>
<th>Standard Method Texas MMR† (n)</th>
<th>( P^* )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>382,438</td>
<td>14.6 (56)</td>
<td>38.4 (147)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Enhanced Maternal Mortality Rate by Race/Ethnicity, Texas, 2012

From: Baeva et al., Obstetrics & Gynecology, 2018
Prepared by: DSHS Maternal & Child Health Epidemiology
# Enhanced MMR by Age Group, Texas, 2012

| Maternal Characteristic | No. of Live Births | Enhanced Texas MMR* (n) | Standard Method Texas MMR† (n) | P†  
|-------------------------|--------------------|------------------------|-------------------------------|-----
| Age (y)                 |                    |                        |                               |     
| 24 or younger           | 138,566            | 8.7 (12)               | 13.0 (18)                     | .16  
| 25–34                   | 194,183            | 14.4 (28)              | 26.3 (51)                     | .001 
<p>| 35 or older             | 49,684             | 32.2 (16)              | 157.0 (78)                    | &lt;.001 |</p>
<table>
<thead>
<tr>
<th>Maternal Characteristic</th>
<th>Sensitivity (%) (95% CI)</th>
<th>Specificity (%) (95% CI)</th>
<th>PPV (%) (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>83.9 (71.7–92.4)</td>
<td>99.0 (98.7–99.2)</td>
<td>32.0 (24.5–40.2)</td>
</tr>
<tr>
<td>Race and ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>72.2 (46.5–90.3)</td>
<td>99.2 (98.9–99.4)</td>
<td>25.5 (14.3–39.6)</td>
</tr>
<tr>
<td>Black</td>
<td>91.7 (61.5–99.8)</td>
<td>98.2 (97.4–98.7)</td>
<td>23.9 (12.6–38.8)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>95.2 (76.2–99.9)</td>
<td>99.0 (98.5–99.3)</td>
<td>43.5 (28.9–58.9)</td>
</tr>
<tr>
<td>Other II</td>
<td>60.0 (14.6–94.7)</td>
<td>99.6 (98.0–100)</td>
<td>75.0 (19.4–99.4)</td>
</tr>
<tr>
<td>Age (y)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 or younger</td>
<td>91.7 (61.5–99.8)</td>
<td>99.1 (98.2–99.6)</td>
<td>61.1 (35.7–82.7)</td>
</tr>
<tr>
<td>25–34</td>
<td>82.1 (63.1–93.9)</td>
<td>97.6 (96.6–98.4)</td>
<td>45.1 (31.1–59.7)</td>
</tr>
<tr>
<td>35 or older</td>
<td>81.3 (54.4–96.0)</td>
<td>99.1 (98.9–99.3)</td>
<td>16.7 (9.2–26.8)</td>
</tr>
</tbody>
</table>
Pregnancy Status on Death Certificate

- Both cause-of-death narrative and pregnancy status on death certificate are used by CDC to determine whether to assign an obstetric cause-of-death code.
- Positive pregnancy status is a primary factor considered.

36. IF FEMALE:
- Not pregnant within past year
- Pregnant at time of death
- Not pregnant, but pregnant within 42 days of death
- Not pregnant, but pregnant 43 days to 1 year before death
- Unknown if pregnant within the past year
Pregnancy Status Often Inaccurate

- False-positive pregnancy status was reported for 67 of all 147 obstetric-coded deaths in 2012 (45.6%)

- 76% of obstetric-coded deaths with no evidence of pregnancy upon review reported pregnancy at time of death on death certificate
User Error Filling out Electronic Death Certificate Likely Responsible

• ‘Pregnant at time of death’ option directly below ‘not pregnant within past year’ in dropdown list – could have led to erroneous selection
Study Strengths & Limitations

**Strengths:**
- All 2012 Texas obstetric-coded deaths rigorously examined
- Additional maternal deaths also identified

**Limitations:**
- 15 deaths had insufficient info available to determine recent pregnancy
- Might not have identified all additional maternal deaths missed by standard method, esp. deaths during early pregnancy
A Note of Caution…

- Our enhanced method is different from the standard method used by others to identify maternal deaths and calculate corresponding MMRs.

- Therefore, this new 2012 MMR cannot be compared with MMRs for other states or for other years in Texas.

- However, we will use enhanced method to confirm maternal deaths and calculate MMRs for additional years going forward.
Conclusion

- Using enhanced method resulted in a 2012 MMR less than half that obtained using standard method.

- Results show that identifying maternal deaths solely using death certificate data can lead to inaccurate MMR estimates.

- Enhanced method is labor-intensive, but necessary to understand and improve maternal death identification and reporting.

- Miscoding of obstetric deaths likely occurs in other states and affects accuracy of their MMRs as well.
Public Health Implications

Manda Hall, MD
Associate Commissioner, Community Health Improvement

June 15, 2018
Increase Death Certificate Accuracy

• To more efficiently identify maternal deaths from pregnancy status and cause of death as intended, consistent with Rider 36 (85th Texas Legislature)

• Action plan calls for:
  ➢ Focused outreach
  ➢ Best-practice guidelines (Senate Bill 1599, 85th Texas Legislature)
  ➢ Training and education
  ➢ Texas Electronic Vital Events Registrar (TxEVER)
Continued Focus on Maternal Health & Safety

• What does this recent research mean for maternal mortality and morbidity in Texas?
  ➢ While the numbers changed, the 2016 recommendations and related legislative charges remain relevant

• Why does the analysis of maternal mortality still matter?
  ➢ 1 maternal death should not be viewed in isolation
  ➢ 1 maternal death represents 50-100 women suffering from severe maternal morbidity in Texas
TexasAIM Maternal Safety Bundles

- To reduce severe maternal morbidity using evidence-based systems to enhance maternal care
- Implementing AIM bundles for:
  - Obstetric hemorrhage
  - Obstetric care for women with opioid use disorder
  - Severe hypertension in pregnancy
- Hospitals can participate in either TexasAIM Basic or TexasAIM Plus.
- For more information, email TexasAIM@dshs.texas.gov or visit www.dshs.texas.gov/mch/TexasAIM.aspx
TexasAIM Current Hospitals as of May 31, 2018
Over Frequency of Hemorrhage Cases

Legend
- Enrolled hospitals (n=166)

Frequency of hemorrhage cases
- 1 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 3,000
- 3,001 and above
- 0 cases

Sources:
- TexasAIM Enrollment Data
- Texas Hospital Inpatient Discharge Public Use Data File, 2011-2015.
- The AIM SIMM codes list v8.1-2017 was used to identify hemorrhage cases among delivery hospitalizations. Year 2015 only includes data from the first 3 quarters.
TexasAIM Leadership Summit and Orientation

• June 4th, 2018 in Austin, Texas

• Over 150 hospitals participating in TexasAIM attended

• Attendees also included representatives from:
  • AIM Implementation Workgroup
  • Maternal Mortality and Morbidity Task Force
  • Texas Collaborative for Healthy Mothers and Babies
  • Regional Advisory Councils
  • ACOG National and State Representatives
Sec. 34.0156. MATERNAL HEALTH AND SAFETY INITIATIVE.
(a) Using existing resources, the department, in collaboration with the task force, shall promote and facilitate the use among health care providers in this state of maternal health and safety informational materials, including tools and procedures related to best practices in maternal health and safety.
Next Steps

• TexasAIM Basic enrollment is ongoing

• **June 29, 2018:** TexasAIM Plus enrollment ends

• **Summer 2018:** Start Quality Improvement Basics Webinars and calls for enrolled hospitals

• **Fall 2018:** Begin in person action meetings
Thank you