Appendix

Maternal Mortality in Texas: A Comparison of Maternal Mortality Rate Change Using Different Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Year</th>
<th>Deaths (CDC Wonder)</th>
<th>Live Births (CDC Wonder)</th>
<th>MMR Rate</th>
<th>Deaths (CDC Wonder)</th>
<th>Live Births (CDC Wonder)</th>
<th>MMR Rate</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trendline Estimated Rates for 2011 and 2014</td>
<td>2010</td>
<td>426,118</td>
<td>386,118</td>
<td>11.1</td>
<td>426,118</td>
<td>386,118</td>
<td>11.1</td>
<td>+7.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2011</td>
<td>377,475</td>
<td>337,475</td>
<td>10.2</td>
<td>377,475</td>
<td>337,475</td>
<td>10.2</td>
<td>-3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2012</td>
<td>382,727</td>
<td>342,727</td>
<td>10.7</td>
<td>382,727</td>
<td>342,727</td>
<td>10.7</td>
<td>+25%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013</td>
<td>387,340</td>
<td>347,340</td>
<td>11.4</td>
<td>387,340</td>
<td>347,340</td>
<td>11.4</td>
<td>-12%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2014</td>
<td>399,706</td>
<td>359,706</td>
<td>11.8</td>
<td>399,706</td>
<td>359,706</td>
<td>11.8</td>
<td>-12%</td>
</tr>
</tbody>
</table>

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**METHOD 1** Using data from CDC Wonder, compared estimated MMRs based on a trendline for a later year to an actual MMR for an earlier year, yielding a percent change in MMR within 42 days following the end of pregnancy (as determined by ICD-10 codes A34, O00-O09, O18-O19) among Texas residents. The maternal death count in CDC Wonder include: a) Texas residents whose death did not occur in Texas, which might not have been reported to TDSHS; and/or b) initial cause of death as pregnancy-related but is later updated by TDSHS not to be pregnancy-related or vice versa.

**METHOD 2** Using data from CDC Wonder, compared an actual MMR for a later year to an actual MMR for an earlier year, yielding a percent change in MMR within 42 days following the end of pregnancy (as determined by ICD-10 codes A34, O00-O09, O18-O19) among Texas residents. The maternal death count in CDC Wonder include: a) Texas residents whose death did not occur in Texas, which might not have been reported to TDSHS; and/or b) initial cause of death as pregnancy-related but is later updated by TDSHS not to be pregnancy-related or vice versa.

**METHOD 3** Using data from CHS at TDSHS, compares an actual MMR for a later year to an actual MMR for an earlier year, yielding a percent change in MMR within 42 days following the end of pregnancy (as determined by ICD-10 codes A34, O00-O09, O18-O19) among Texas residents.

**METHOD 4** Using data from CHS at TDSHS, compares an actual MMR for a later year to an actual MMR for an earlier year, yielding a percent change in MMR within 42 days following the end of pregnancy (as determined by ICD-10 codes A34, O00-O09, O18-O19), but excluding A34 among Texas residents.

- The Maternal Mortality Rate (MMR) in Texas increased from 2010 to 2011.
- However, the percent change or the magnitude of the increase in MMR from 2010 to 2011 in Texas differs depending on the method used to compute it:
  - **METHOD 1** by MacDorman et al. (2016) uses counts of live births and maternal deaths among Texas residents from the CDC Wonder system, that occur within 42 days following the end of pregnancy, if one or more of these codes from the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) are present on the death certificate: A34, O00-O09, O18-O19. The maternal death count in CDC Wonder include: a) Texas residents whose death did not occur in Texas, which might not have been reported to TDSHS; and/or b) initial cause of death as pregnancy-related but is later updated by TDSHS not to be pregnancy-related or vice versa. This maternal death count is then used to compute the MMR each year, except for years 2011 and 2014, for which METHOD 1 instead uses trendline-estimated MMRs (these MMRs are based on a linear trendline calculated using actual MMRs from 2011 through 2014, and assumes there is a linear relationship between MMR and calendar year). METHOD 1 then compares the trendline-estimated MMR for 2011 (33.0 maternal deaths per 100,000 live births) to an actual MMR for 2010 (18.6 maternal deaths per 100,000 live births), yielding a 77% increase in MMR within 42 days following the end of pregnancy among Texas residents.
  - **METHOD 2** by CDC is identical to METHOD 1, except that METHOD 2 compares an actual MMR for 2011 (30.2 maternal deaths per 100,000 live births) to an actual MMR for 2010 (18.6 maternal deaths per 100,000 live births), yielding a 62% increase in MMR within 42 days following the end of pregnancy among Texas residents.
  - **METHOD 3** by TDHS uses counts of live births and maternal deaths among Texas residents from its Center for Health Statistics, that occur within 42 days following the end of pregnancy, if one or more of these codes from ICD-10 are present on the death certificate: A34, O00-O09, O18-O19. METHOD 3 then compares an actual MMR for 2011 (26.5 maternal deaths per 100,000 live births) compared to an actual MMR for 2010 (18.7 maternal deaths per 100,000 live births), yielding a 42% increase in MMR within 42 days following the end of pregnancy among Texas residents.
  - **METHOD 4**, also by TDHS, uses counts of live births and maternal deaths among Texas residents from its Center for Health Statistics, that occur within and beyond 1 year following the end of pregnancy if one or more of these (natural death) ICD-10 codes are present on the death certificate: 000-095, 098-099, and O96 (obstetric cause of death occurring more than 42 days but less than one year after delivery) and O97 (death from sequelae of direct/indirect obstetric cause occurring 1 year or more after delivery), but excluding A34 (abstruse tetanus). METHOD 4 then compares an actual MMR for 2011 (30.7 maternal deaths per 100,000 live births) to an actual MMR for 2010 (24.6 maternal deaths per 100,000 live births), yielding a 25% increase in MMR within and beyond 1 year following the end of pregnancy among Texas residents.

- The MMR in Texas decreased from 2013 to 2014.
- Like the increase, the percent change or the magnitude of the decrease in MMR from 2013 to 2014 in Texas differs depending on the method used to compute it:
  - **METHOD 1** by MacDorman et al. (2016) compares the trendline-estimated MMR for 2014 (35.8 maternal deaths per 100,000 live births) to an actual MMR for 2013 (36.1 maternal deaths per 100,000 live births), yielding a 1% decrease in MMR within 42 days following the end of pregnancy among Texas residents.
  - **METHOD 2** by the CDC compares an actual MMR for 2014 (33.8 maternal deaths per 100,000 live births) to an actual MMR for 2013 (36.1 maternal deaths per 100,000 live births), yielding a 7% decrease in MMR within 42 days following the end of pregnancy among Texas residents.
  - **METHOD 3** by TDHS compares an actual MMR for 2014 (31.5 maternal deaths per 100,000 live births) to an actual MMR for 2013 (32.5 maternal deaths per 100,000 live births), yielding a 3% decrease in MMR within 42 days following the end of pregnancy among Texas residents.
  - **METHOD 4**, also by TDHS, compares an actual MMR for 2014 (34.8 maternal deaths per 100,000 live births) to an actual MMR for 2013 (39.5 maternal deaths per 100,000 live births), yielding a 12% decrease in MMR within and beyond 1 year following the end of pregnancy among Texas residents.