Kansas Severe Maternal Morbidity and Maternal Mortality, 2016-2020

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The Kansas Department of Health and Environment, Bureau of Family Health will release the *2016-2020 Kansas Maternal Mortality Report, Including Severe Maternal Morbidity* in Summer 2023. To view the full report, please visit https://kmmrc.org/.

Executive Summary

The issue of maternal morbidity and mortality is complex. Severe maternal morbidity (SMM) occurs nearly 100 times more frequently than maternal death, the "tip of the iceberg" for adverse maternal outcomes.[1] Death certificates do not include all the information needed to evaluate the proximate and contributory causes of maternal mortality, whether the deaths were actually related to the pregnancy, and whether the deaths were preventable. Nationally, the Centers for Disease Control and Prevention (CDC), Pregnancy Mortality Surveillance System (PMSS) indicates the pregnancy-related mortality ratios have been relatively stagnant in the past decade[2], which underscores the need for more work in optimizing maternal health. The Kansas Department of Health and Environment (KDHE) identifies all pregnancy-associated deaths, or deaths occurring while a woman is pregnant or within a year of pregnancy, to collect data on maternal mortality. KDHE has worked with the Kansas Maternal Mortality Review Committee (KMMRC) to review cases of pregnancy-associated death that occurred in Kansas from 2016 to 2020. KMMRC is a multi-disciplinary committee that convenes at the state level to comprehensively review deaths of women during or within a year of pregnancy. KMMRCs have access to clinical and non-clinical information (e.g., vital records, medical records, social service records) to more fully understand the causes and circumstances surrounding each death, and to develop statewide recommendations for action to prevent future maternal deaths, as well as determine whether the deaths were pregnancy-related (occurring due to a pregnancy complication) and whether they were preventable.[3]

Key Findings

Severe Maternal Morbidity: Using the Kansas hospital discharge data and International Classification of Diseases (ICD), 10th Revision, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) following the CDC-developed definition of SMM[4], from 2016 to 2020, of the 164,049 delivery hospitalizations of Kansas residents, 1,019 deliveries with one or more severe maternal morbidities were identified, representing a rate of 62.1 per 10,000 delivery hospitalizations. This implies that approximately ***1 in 161 women who delivered a baby experienced SMM***. The SMM rate steadily significantly increased from 56.1 in 2016 to 71.0 per 10,000 delivery hospitalizations in 2020, with an annual percent change (APC) of 6.4%.

- The top five most common indicators of SMM were disseminated intravascular coagulation, acute renal failure, adult respiratory distress syndrome, sepsis, and hysterectomy (13.1, 10.7, 10.3, 10.1, 8.5 per 10,000 delivery hospitalizations, respectively).
- Some conditions often involved procedural intervention. In 2016-2020, 27.3% of deliveries with shock had a hysterectomy.
- SMM was ***highest among women aged 40+ years*** and lowest for those aged 25-29 years (155.3 and 48.1 per 10,000 delivery hospitalizations, respectively).
- Despite the downward trend in the SMM rate of non-Hispanic Black women from 2016 to 2020, the overall rate of SMM per 10,000 delivery hospitalizations for non-Hispanic Black women was 103.5: 83.5% higher than the rate among non-Hispanic White women (56.4), 52.7% higher than the rate among non-Hispanic Asian/Pacific Islanders (67.8), and 42.2% higher than the rate among Hispanics (72.8). The SMM rate for ***non-Hispanic Blacks was significantly higher than any other race and ethnicity***.
- Compared with other deliveries, ***women who were enrolled in Medicaid or from low-income ZIP Codes were more likely to experience SMM***.

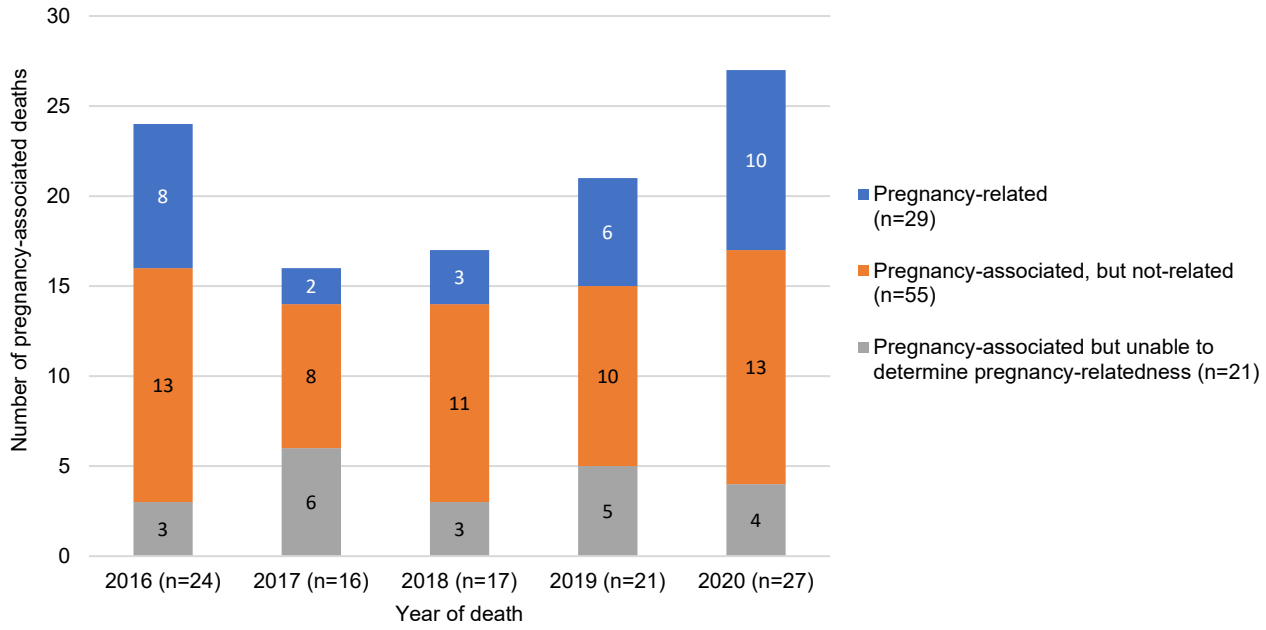
Maternal Mortality: Analyzing the KMMRC data, of the 132 identified deaths that occurred in Kansas (regardless of residency) in 2016-2020, the KMMRC determined that 105 deaths were pregnancy-associated.

- A pregnancy-associated death is defined as the death of a woman during or within one year of pregnancy, regardless of the cause.[5]
- A pregnancy-related death is defined as the death of a woman during or within one year of pregnancy, from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.[5]
- A pregnancy-associated, but not related death is defined as the death of a woman during or within one year of pregnancy, from a cause that is not related to pregnancy.[5]
- Pregnancy-associated deaths make up the universe of maternal mortality; within that universe are pregnancy-related deaths and pregnancy-associated, but not related deaths.[5]

Of the 105 pregnancy-associated deaths reviewed, the KMMRC determined (Figure 1):

- 29 deaths (27.6%) were pregnancy-related
- 55 deaths (52.4%) were pregnancy-associated, but not-related, and
- 21 deaths (20.0%) were pregnancy-associated but unable to determine pregnancy-relatedness.

Figure 1. Number of pregnancy-associated deaths by pregnancy-relatedness, Kansas, 2016-2020



Source: Kansas Maternal Mortality Review Committee

From 2016 to 2020, there were ***105 pregnancy-associated deaths***. This translated to a pregnancy-associated mortality ratio (PAMR) of ***56 deaths per every 100,000 live births that occurred in Kansas***. The PAMRs appeared to be trending upward from 61.0 in 2016 to 75.3 per 100,000 live births in 2020, with an APC of 7.1%. However, the upward trend was not statistically significant.

- Timing of death:
  - 30 deaths (28.6%) occurred during pregnancy.
  - 20 deaths (19.0%) occurred within 42 days of the end of pregnancy.
  - 55 deaths (***52.4%***) ***occurred 43 days to one year*** after the end of pregnancy.
- The leading causes of death were motor vehicle crash, followed by cardiovascular conditions, and homicide.
- KMMRC determinations on circumstances surrounding death were:

    - ***Substance use disorder contributed to one in four*** (28 deaths, 26.7%) of pregnancy-associated deaths.
    - ***Obesity contributed to approximately one in four*** (25 deaths, 23.8%).
    - ***Mental health conditions contributed to nearly one in four*** (24 deaths, 22.9%).

From 2016 to 2020, ***29 deaths*** (27.6%) were ***pregnancy-related***. This translated to a pregnancy-related mortality ratio (PRMR) of ***15 deaths per every 100,000 live births that occurred in Kansas***. Based on the three-year rolling average, the PRMRs appeared to be trending upward from 11.3 in 2016-2018 to 17.2 per 100,000 live births in 2018-2020, with an APC of 25.5%. However, the upward trend was not statistically significant.

- Timing of death:
    - 10 deaths (34.5%) occurred during pregnancy.
    - 13 deaths (***44.8%***) ***occurred within 42 days*** of the end of pregnancy.
    - 6 deaths (20.7%) occurred 43 days to one year after the end of pregnancy.
- The leading causes of death were cardiovascular conditions, followed by embolism-thrombotic (non-cerebral), hypertensive disorder, and infection.
- Committee determinations on circumstances surrounding death were:
    - ***Obesity contributed to two in three*** (18 deaths, including 1 probably contributed, 62.1%) of the pregnancy-related deaths.
    - ***Substance use disorder contributed to one in four*** (8 deaths, 27.6%).
    - ***Discrimination contributed to approximately one in four*** (4 deaths that were determined as 'probably contributed', 23.5%), among all 17 pregnancy-related deaths reviewed after May 29, 2020, when the CDC added a discrimination field to the Committee Decisions Form.
- 23 (***79.3%***) of the 29 deaths ***were preventable**** with 13 deaths (44.8%) showing a good chance of prevention and 10 deaths (34.5%) showing some chance. *A death is considered preventable if there was at least some chance of the death being prevented by one or more reasonable changes to patient, family, provider, facility, system, and/or community factors. This definition is used by MMRCs to determine if a death they review is preventable.[5]
- ***Racial and ethnic minorities were disproportionately affected.*** Approximately two-thirds (18 deaths, 62.1%) of the women were racial and ethnic minorities and 11 (37.9%) were non-Hispanic White women.
- ***Most deaths*** (24 deaths, 82.8%) *occurred between the* ***ages of 25 and 39 years.***
- More than half (16 deaths, 55.2 %) of the women had ***either completed high school or general educational development (GED), or had less education than high school.***
- Just over a third (11 deaths, 37.9 %) of the women had private insurance, ***while the other 62.1% had Medicaid, no insurance or unknown insurance status.***

From 2016 to 2020, ***55 deaths*** (52.4%) were ***pregnancy-associated, but not-related***. Based on the three-year rolling average, the death rates of pregnancy-associated, but not-related appeared to be trending upward from 27.8 in 2016-2018 to 30.7 per 100,000 live births in 2018-2020, with an APC of 5.2%. However, the upward trend was not statistically significant.

- Timing of death:
    - 15 deaths (27.3%) occurred during pregnancy.
    - 3 deaths (5.5%) occurred within 42 days of the end of pregnancy.
    - 37 deaths (***67.3%***) ***occurred 43 days to one year*** after the end of pregnancy.
- The leading causes of death were motor vehicle crash, followed by homicide and malignancies.
- Committee determinations on circumstances surrounding death were:
    - ***Substance use disorder and/or mental health contributed to a quarter*** (14 deaths, 25.5%).
    - ***More than two-thirds*** (9 deaths, 69.2%) ***of deaths that noted substance use disorder*** (13 deaths) as a contributing factor ***also had co-occurring mental health conditions*** as a contributing factor.
- ***One-third*** (19 deaths, 34.5%) were the result of a ***motor vehicle crash***.

From 2016 to 2020, ***21 deaths*** (20.0%) were ***pregnancy-associated but unable to determine pregnancy-relatedness***. Based on the three-year rolling average, the death rates of pregnancy-associated but unable to determine pregnancy-relatedness appeared to be trending slightly upward from 10.4 in 2016-2018 to 10.8 per

100,000 live births in 2018-2020, with an APC of 2.0%. However, the slight upward trend was not statistically significant.

- Timing of death:
  - 5 deaths (23.8%) occurred during pregnancy.
  - 4 deaths (19.0%) occurred within 42 days of the end of pregnancy.
  - 12 deaths (***57.1%***) ***occurred 43 days to one year*** after the end of pregnancy.
- The leading causes of death were suicides and motor vehicle crashes.

Key KMMRC recommendations for action for pregnancy-related deaths

The key KMMRC recommendations based on 23 preventable pregnancy-related deaths are as follows***:***

- ***Screen, provide brief intervention, and referrals*** for:
  - Comorbidities and chronic illness
  - Intimate partner violence
  - Pregnancy intention
  - Mental health conditions (including postpartum anxiety and depression)
  - Substance use disorder
- ***Better communication and multi-disciplinary collaboration*** between providers, including referrals
- ***Patient education and empowerment***

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References

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