Kansas Maternal Mortality Report 2016-2020

Including Severe Maternal Morbidity, 2016-2020

December 2023

Kansas Maternal Mortality Review Committee

KANSAS MATERNAL & CHILD HEALTH

Kansas Department of Health and Environment

Kansas Maternal Mortality Review

Purpose

The purpose of this review is to determine the factors contributing to maternal mortality in Kansas and identify public health and clinical interventions to improve systems of care. Maternal Mortality includes deaths occurring during pregnancy and up to one year after pregnancy.

Mission

The mission of this review is to increase awareness of the issues surrounding pregnancy-related death and to promote change among individuals, communities and healthcare systems in order to reduce the number of deaths.

Vision

The vision of this review is to eliminate preventable maternal deaths in Kansas.

December 2023

Dear Fellow Kansans:

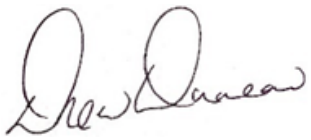
As we release the second Kansas Maternal Mortality Report, we want to acknowledge the mothers who lost their lives and extend our sincerest sympathies to the families and loved ones of those impacted by the loss of these individuals. I also want to recognize the discipline and passion it takes to review these difficult cases and guide the development of this report.

The Kansas Maternal Mortality Review Committee (KMMRC) was tasked with reviewing maternal deaths that occurred in Kansas from 2016 to 2020, and this report is the culmination of four years of work. Despite the unprecedented public health emergency posedbyCOVID-19, the KMMRC continued to review cases, meeting virtually March 2020 to Feb. 2021 to ensure the review of 2019 and 2020 cases were completed.

The purpose of this report is to identify statewide trends in maternal mortality and provide recommendations to prevent mortality in mothers of Kansas. The recommendations included in this report focus on five primary categories: women and their families, health care providers, hospitals, facilities, system of care and community. Each set of recommendations addresses specific areas of concern based on the KMMRC's findings and proposes actions which, once implemented, are expected to prevent and reduce maternal mortalities.

The Kansas Department of Health and Environment (KDHE) extends its appreciation and thanks to those who serve on the KMMRC. Thank you for your engagement, dedication and commitment to working together for a healthier Kansas.

Sincerely,



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Executive Summary

The issue of maternal morbidity and mortality is complex. Effectively the "tip of the iceberg" for adverse maternal outcomes, severe maternal morbidity (SMM) occurs nearly 100 times more frequently than maternal death.[1] Death certificates do not provide all the information needed to evaluate the proximate and contributory causes of maternal mortality to determine whether the deaths were related to the pregnancy and to what extent, preventable. Nationally, the Centers for Disease Control and Prevention (CDC), Pregnancy Mortality Surveillance System (PMSS) indicate that pregnancy-related mortality ratios have been relatively stagnant in the past decade[2] and underscores the need for more work to optimize maternal health. The Kansas Department of Health and Environment (KDHE) identifies all deaths occurring during pregnancy 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 pregnancy-associated deaths that occur during or within a year after pregnancy. KMMRCs have access to clinical and non-clinical information (e.g., vital records, medical records, social service records) to better understand the causes and circumstances surrounding each death and to develop statewide recommendations for action to prevent future maternal deaths. During these reviews, the committee also determines whether the deaths were pregnancy-related (occurring due to a pregnancy complication) and the degree to which they were preventable.[3]

Severe Maternal Morbidity: Based on the analysis of Kansas hospital discharge data and the International Classification of Diseases, 10th Revision, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS) using the CDC-developed definition of severe maternal morbidity (SMM)[4], the following findings were observed from 2016 to 2020. Out of the 164,049 delivery hospitalizations of Kansas residents, a total of 1,019 deliveries with one or more severe maternal morbidities were identified, resulting in a rate of 62.1 cases per 10,000 delivery hospitalizations. This indicates that approximately one in 161 women who gave birth experienced severe maternal morbidity. Furthermore, it was observed that the rate of severe maternal morbidity showed a consistent and statistically significant increase over the study period. The rate increased from 56.1 cases per 10,000 delivery hospitalizations in 2016 to 71.0 cases per 10,000 delivery hospitalizations in 2020. This corresponds to an annual percent change (APC) of 6.4 percent.

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[1] Ohio Department of Health. Severe Maternal Morbidity (SMM) Factsheet. https://odh.ohio.gov/wps/wcm/connect/gov/db0ab299-4e0d-411e-a107-2db1f555106a/SMM-Factsheet.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOTWORKSPACE.Z18_M1HGGIK0N0JO00QO9DDDDM3000-db0ab299-4e0d-411e-a107-2db1f555106a-mMBwu6k.

[2] Centers for Disease Control and Prevention. Pregnancy Mortality Surveillance System. https://www.cdc.gov/maternal-mortality/php/pregnancy-mortality-surveillance/?CDC_AAref_Val=https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm.

[3] Centers for Disease Control and Prevention. Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM). https://www.cdc.gov/reproductivehealth/maternal-mortality/erase-mm/index.html#:~:text=Maternal%20Mortality%20Review%20Committees%20(MMRCs,(pregnancy%2Dassociated%20deaths).

[4] Centers for Disease Control and Prevention. Severe Maternal Morbidity Indicators and Corresponding ICD Codes during Delivery Hospitalizations. https://www.cdc.gov/maternal-infant-health/php/severe-maternal-morbidity/icd.html.

- The five most frequently observed indicators of severe maternal mortality in this study were disseminated intravascular coagulation, acute renal failure, adult respiratory distress syndrome, sepsis, and hysterectomy. The rates per 10,000 delivery hospitalizations for these indicators were 13.1, 10.7, 10.3, 10.1 and 8.5, respectively.
- During the period of 2016-2020, it was observed that a significant proportion of deliveries with shock required procedural intervention. Specifically, 27.3 percent of deliveries associated with shock necessitated a hysterectomy.
- The prevalence of SMM varied across different age groups, with the highest rates observed among women aged **40 years and older**. Among this age group, the rate of SMM was 155.3 per 10,000 delivery hospitalizations. Conversely, the lowest rates of SMM were found among women aged 25-29 years, with a rate of 48.1 per 10,000 delivery hospitalizations.
- Despite observing a downward trend in the SMM rate among non-Hispanic Black women from 2016 to 2020, the overall SMM rate per 10,000 delivery hospitalizations for this group remained **significantly higher** compared to other racial and ethnic groups. The SMM rate for non-Hispanic Black women was 103.5, which is 83.5 percent higher than the rate among non-Hispanic White women (56.4), 52.7 percent higher than the rate among non-Hispanic Asian/Pacific Islanders (67.8), and 42.2 percent higher than the rate among Hispanics (72.8).
- 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 data from the Kansas Maternal Mortality Review Committee (KMMRC), a total of 132 deaths that occurred in Kansas (regardless of residency) from 2016 to 2020 were identified. Out of these deaths, the KMMRC determined that 105 were pregnancy-associated. The other 27 deaths were not pregnancy-related or associated (i.e., false positives, women were not pregnant within one year of her death).

It's important to understand the distinctions between different types of maternal deaths. A **pregnancy-associated** death refers to the death of a woman during or within one year of pregnancy, irrespective of the cause. A **pregnancy-related** death, on the other hand, occurs when a woman dies during or within one year of pregnancy due to a pregnancy complication, a chain of events initiated by pregnancy, or the exacerbation of an unrelated condition caused by the physiological effects of pregnancy. Lastly, a **pregnancy-associated, but not related,** death refers to the death of a woman during or within one year of pregnancy from a cause unrelated to pregnancy. Pregnancy-associated deaths encompass the entire spectrum of maternal mortality. Within this category, there are both pregnancy-related deaths and pregnancy-associated, but not related deaths, each with their own distinct characteristics and underlying causes.

The KMMRC determined of the 105 pregnancy-associated deaths reviewed (Figure 1):

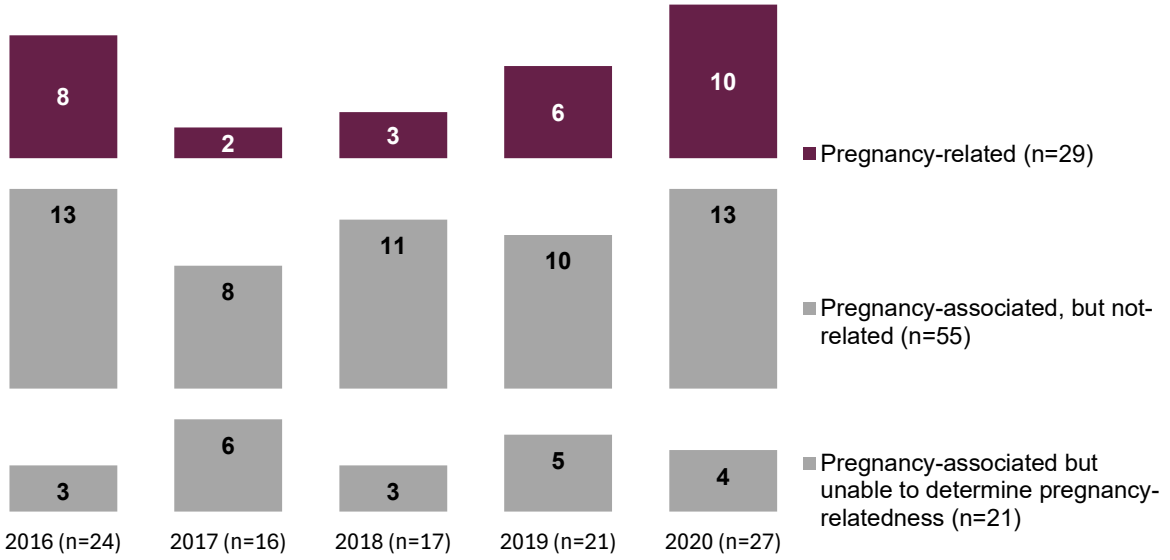
- Twenty-nine deaths (27.6 percent) were pregnancy-related,
- Fifty-five deaths (52.4 percent) were pregnancy-associated, but not-related and
- Twenty-one deaths (20.0 percent) were pregnancy-associated but unable to determine pregnancy-relatedness.

Figure 1.

The number of pregnancy-related death has steadily increased since 2017.

Pregnancy-Associated Deaths by Pregnancy-Relatedness, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee



Pregnancy-Associated Deaths

Based on the KMMRC data analyzed from 2016 to 2020, there were a total of 105 pregnancy-associated deaths in Kansas. This resulted in a pregnancy-associated mortality ratio (PAMR) of 56 deaths per every 100,000 live births that took place in the state. The PAMR showed a slight upward trend during the study period, increasing from 61.0 per 100,000 live births in 2016 to 75.3 per 100,000 live births in 2020. However, it is important to note that this upward trend was not statistically significant. The annual percent change (APC) calculated for the PAMR was 7.1 percent, but it did not reach the level of statistical significance.

Please note that on March 11, 2020, the World Health Organization (WHO) declared COVID-19, the disease caused by the SARS-CoV-2, a pandemic. Therefore, the year 2020 includes the first year of the pandemic. No pregnancy-associated deaths/cases of SARS-CoV-2 were reported in 2020 in Kansas.

- Timing of death:
  - Thirty deaths (28.6 percent) occurred during pregnancy.
  - Twenty deaths (19.0 percent) occurred within 42 days of the end of pregnancy.
  - Fifty-five deaths (**52.4 percent**) **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 percent) of pregnancy-associated deaths.
- **Obesity contributed to approximately one in four** (25 deaths, 23.8 percent).
- **Mental health conditions contributed to nearly one in four** (24 deaths, 22.9percent).

Pregnancy-Related Deaths

Over the period of 2016-2020, a total of 29 deaths (27.6 percent) in Kansas were determined to be pregnancy-related. This equated to a pregnancy-related mortality ratio (PRMR) of 15 deaths per every 100,000 live births that occurred in the state. Analyzing the three-year rolling average, the PRMRs exhibited an apparent upward trend. This trend corresponded to an annual percent change (APC) of 25.5 percent. However, it is important to note that the observed upward trend was not statistically significant.

- Timing of death:
  - Ten deaths (34.5 percent) occurred during pregnancy.
  - Thirteen deaths (**44.8 percent**) **occurred within 42 days** of the end of pregnancy.
  - Six deaths (20.7 percent) 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 percent) of the pregnancy-related deaths.
  - **Substance use disorder contributed to one in four** (8 deaths, 27.6 percent).
  - **Discrimination a likely factor in one in four** (4 deaths that were determined as 'probably contributed', 23.5 percent), among all 17 pregnancy-related deaths reviewed after May 29, 2020, when the CDC added a discrimination field to the Maternal Mortality Review Committee Decisions Form (Appendix G).
- Twenty-three (**79.3 percent**) of the 29 deaths **were preventable*** with 13 deaths (44.8 percent) showing a good chance of prevention and 10 deaths (34.5percent) 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.
- **People from racial and ethnic minority groups were disproportionately represented in pregnancy-related deaths**. Approximately two-thirds (18 deaths, 62.1 percent) of the women were racial and ethnic minorities, while 11 (37.9 percent) were non-Hispanic White women.
- **More deaths** occurred between the ages of 25 and 39 years (24 deaths, 82.8 percent) than any other age group.

- **More than half** (16 deaths, 55.2 percent) of the women had either completed high school or obtained a General Educational Diploma (GED) or had less education than high school.
- **Over one-third** (11 deaths, 37.9 percent) of the women had private insurance, while the other 62.1 percent had Medicaid (16 deaths, 55.2 percent), no insurance (one death, 3.4 percent), or unknown insurance status (one death, 3.4 percent).

Factors that Contributed to Preventable Pregnancy-Related Deaths

Contributing factors are defined as factors identified by KMMRC that contributed to pregnancy-related deaths. These are steps along the way that, if altered, may have prevented the woman's death. The factors may be related to the patient, health care providers, facilities/hospitals where the woman sought care, or to the systems that influence the lifestyle, care, and health services for the woman.

A total of **103 contributing factors** were identified during review. These factors related to the systems that influence the lifestyle, care, and health services for the woman (26.2 percent), health care providers (26.2 percent), the patient/family (23.3 percent), facilities/hospitals where the woman sought care (15.5 percent), or community (8.7 percent) were identified by the KMMRC as contributing to pregnancy-related deaths (Figure 2). While system, provider and patient/family level factors were the most common, it is important to acknowledge they were often dependent on facility and community level factors.

Figure 2.

KMMRC identified system, provider, and patient/family level factors as the most common that contributed to preventable pregnancy-related deaths.

Distribution of Levels of Contributing Factors Among Preventable Pregnancy-Related Deaths, Kansas, 2016-2020
Source: Kansas Maternal Mortality Review Committee

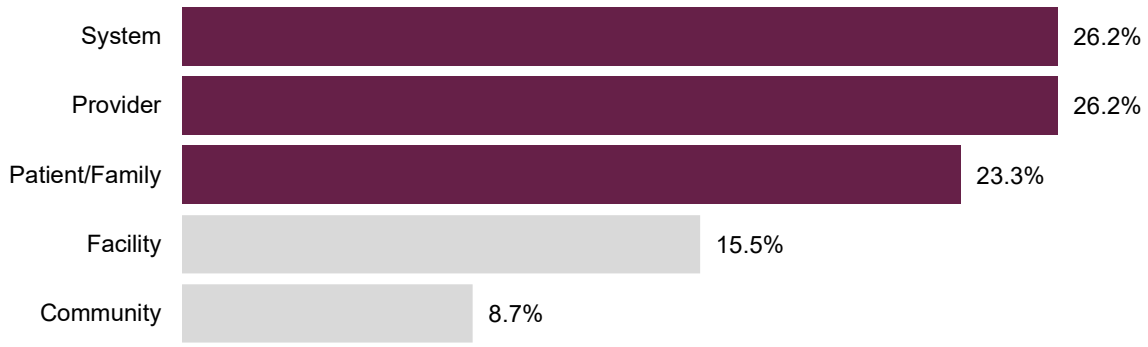
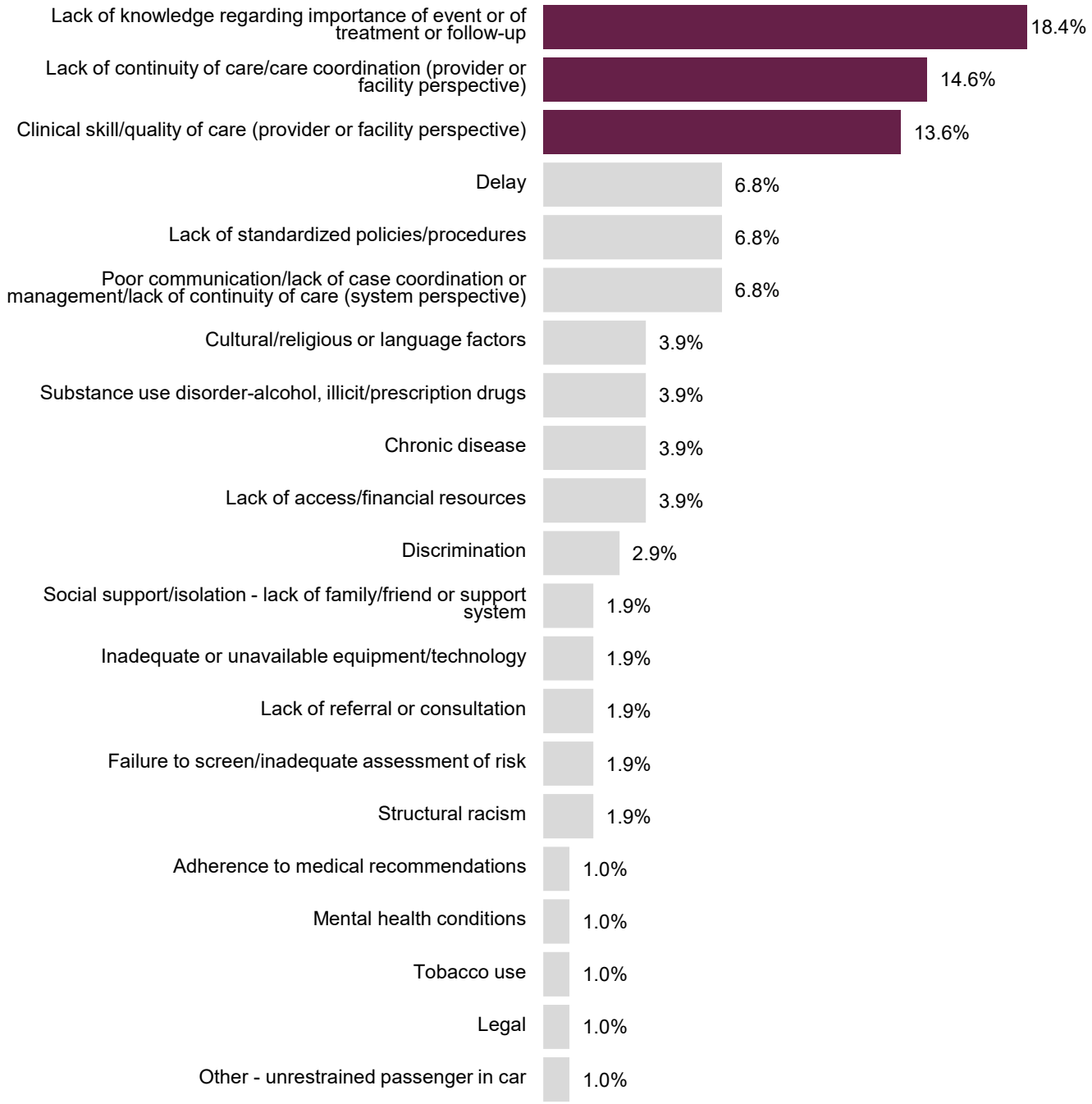


Figure 3.

KMMRC identified lack of knowledge regarding importance of event or of treatment or follow-up, lack of continuity of care/care coordination, and clinical skill/quality of care as the leading contributing factors to preventable pregnancy-related deaths.

Source: Kansas Maternal Mortality Review Committee

Overall (103) - the proportion of each contributing factor was:



Key KMMRC Recommendations For Action and Contributing Factors for Pregnancy-Related Deaths

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

- **Patient education** and **empowerment**
- **Screen**, **brief intervention,** and **referral to treatment (SBIRT)** for:
    - Comorbidities and chronic illness
    - Intimate partner violence (IPV)
    - Pregnancy intention
    - Mental health conditions (including postpartum anxiety and depression)
    - Substance use disorder – alcohol, illicit, or prescription drugs
    - Social determinants of health
- **Improved communication** and **multi-disciplinary collaboration** between providers, including referrals.

Type of Prevention for Recommendations and Expected Impact of Actions if Implemented for Pregnancy-Related Deaths

Prevention types are categorized by the following three definitions:

1. Primary prevention: Prevents the contributing factor before it ever occurs.
2. Secondary prevention: Reduces the impact of the contributing factor once it has occurred (i.e., treatment).
3. Tertiary prevention: Reduces the impact or progression of what has become an ongoing contributing factor (i.e., management of complications).

Most recommendations were identified as resulting in either primary (45.7 percent) or secondary (38.8 percent) prevention, and 15.5 percent of recommendations were identified as resulting in tertiary prevention.

Expected impacts are categorized by the following five definitions:

1. Small impact: Education/counseling (e.g., community- and/or provider-based health promotion and education activities).
2. Medium impact: Clinical intervention and coordination of care across continuum of well-woman visits (e.g., protocols, prescriptions).
3. Large impact: Long-lasting protective intervention (e.g., improve readiness, recognition and response to obstetric emergencies or long-term interventions such as long-acting reversible contraceptives (LARCs)).
4. Extra large impact: Change in context (e.g., promote environments that support healthy living/ensure available and accessible services).
5. Giant impact: Address social determinants of health (e.g., poverty, inequality).

The **level of impact** if the recommendation was implemented was **expected to be large, extra-large or giant for 57.9 percent of recommendations**.

More consistent use of screening tools, providing brief interventions, referrals to treatment, patient education and empowerment, communication and collaboration between health care providers, community engagement and education, and family planning education would likely have a larger impact for prevention.

For more information, please visit kmmrc.org/ or contact the KMMRC Coordinator.

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List of Abbreviations

ACOG	American College of Obstetricians and Gynecologists
AIM	Alliance for Innovation on Maternal Health
APC	Annual Percent Change
AWHONN	Association of Women's Health, Obstetric and Neonatal Nurses
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CDC ERASE MM	CDC's Enhancing Reviews and Surveillance to Eliminate Maternal Mortality
CDC MMRIA	CDC's Maternal Mortality Review Information Application
CDC PMSS	CDC's Pregnancy Mortality Surveillance System
CHW	Community Health Worker
COVID-19	Coronavirus disease - an infectious disease caused by the SARS-CoV-2
DVT	Deep Vein Thrombosis
ED	Emergency Department
ER	Emergency Room
FAD	Federally Available Data Resource Document
FTI	Fourth Trimester Initiative
GED	General Educational Development or General Educational Diploma
HB	House Bill
HRSA	Health Resources and Services Administration
ICD-10-CM/PCS	International Classification of Diseases, 10th Revision, Clinical Modification/Procedure
ICD-9-CM	International Classification of Diseases, 9th Revision, Clinical Modification
INH	Isoniazid
IPV	Intimate Partner Violence
KDHE	Kansas Department of Health and Environment
KHA	Kansas Hospital Association
KMMRC	Kansas Maternal Mortality Review Committee
KPCC	Kansas Perinatal Community Collaboratives
KPQC	Kansas Perinatal Quality Collaboratives
KSA	Kansas Statutes Annotated
K-TRACS	Kansas Prescription Drug Monitoring Program
LARC	Long-Acting Reversible Contraceptive
LFTs	Liver Function Tests
MCH	Maternal and Child Health
MCHB	Maternal and Child Health Bureau
MCO	Managed Care Organization
MMRCs	Maternal Mortality Review Committees
MWS	Maternal Warning Signs
NCHS	CDC's National Center for Health Statistics
OB	Obstetrics/Obstetrical

P&P	Policy and Procedure
PAMR	Pregnancy-Associated Mortality Ratio
PBWS	Post-Birth Warning Signs
PE	Pulmonary Embolism
PRMR	Pregnancy-Related Mortality Ratio
PROM	Premature Rupture of Membranes
PSA	Public Service Announcement
SARS-CoV-2	Severe Acute Respiratory Syndrome Related Coronavirus 2
SAS	Statistical Analysis System
SBIRT	Screening, Brief Intervention, and Referral to Treatment
SMFM	Society for Maternal-Fetal Medicine
SMM	Severe Maternal Morbidity
THC	Tetrahydrocannabinol
VTE	Venous Thromboembolism
WHO	World Health Organization

Dedication

This report is dedicated to all women who lost their lives during and within one year after pregnancy from any cause. We pay tribute to the 105 women who died while pregnant or within one year of childbirth in Kansas from 2016 to 2020 and offer our deepest condolences to their families. Our hope is that by understanding the underlying causes of maternal mortality, we can prevent other Kansas families from experiencing this same heartbreak.

Acknowledgements

The establishment of the Kansas Maternal Mortality Review Committee (KMMRC) was made possible in part by the Centers for Disease Control and Prevention (CDC), Division of Reproductive Health's Building U.S. Capacity to Review and Prevent Maternal Deaths Program. We express our gratitude to Julie Zaharatos, Deborah Burch, Dr. Nicole Davis, and Dr. Dave Goodman from the CDC for their technical assistance and support in establishing and launching the KMMRC. We would also like to thank Brittany Dunigan-Willis, Tegan Callahan, Susanna Trost, Dr. Ashley Busacker, Dr. Lisa Hollier, Toby Merkt, Ashley Smoots and other members of the CDC Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM), CDC Foundation, for their continued support.

We would like to offer special thanks to the KMMRC Chairs and Co-Chairs, and the remainder of the members of the KMMRC who participated in the committee meetings and case reviews that occurred from 2016 through 2020. We appreciate their dedication, commitment, and the time they spent in serious discussion to further this important public health initiative.

We acknowledge the efforts of those involved in the passage of Senate Substitute for House Bill (HB) 2600 (originally HB 2573) during the 2018 Legislative Session that authorized comprehensive review of maternal deaths. The amended law (K.S.A. 65-177) strengthened efforts related to monitoring maternal health, including pregnancy-associated deaths. It enables the Kansas Department of Health and Environment (KDHE) to access all necessary information to implement a comprehensive process to review each pregnancy-associated death and to protect all people, records, and interviews obtained as part of each review. The law also allows for routine compilation and wide distribution of aggregate, non-individually identifiable data to further the study of causes and problems associated with deaths. This process leads to informed, data-driven recommendations for actions that reduce death and support health and wellness during the pregnancy, childbirth and postpartum periods.

The review of pregnancy-associated deaths in Kansas would not be possible without the data, expertise, and collaboration of the KDHE Bureau of Epidemiology and Public Health Informatics, Office of Vital Statistics. We also extend our appreciation for the diligent work of the case abstractors in their careful and thorough abstraction of case materials.

KDHE KMMRC Honors the Life, Leadership and Legacy of Amy St. Pierre

We are shocked and saddened by the loss of our Kanas Department of Health and Environment Kansas Maternal Mortality Review Committee friend and colleague, Amy St. Pierre, who tragically died in a mass shooting on May 3, 2023, in Atlanta, Georgia.

> We lost a beloved friend and colleague here in Atlanta yesterday. Amy St. Pierre, 39, CDC Maternal Mortality Prevention Team Deputy, was killed yesterday in a mass shooting in Atlanta.
>
> Amy was the first staff person hired at the program's inception in 2016. She helped build and launch the CDC's Maternal Mortality Review Information Application (2017) and the Enhancing Reviews and Surveillance to Eliminate Maternal Mortality program (2019).
>
> We cannot begin to express our devastation over her tragic and untimely death. She drove our team to be good and strive for equity in outcomes for all pregnant and postpartum people.
>
> Amy pulled us all together and kept us going. She was composed and professional and drove us to answer the hard questions and do hard things. In remote work she kept our virtual gatherings personal and human. She tackled management tasks with fresh eyes, kept us organized and made everything she touched better. She built cooperative agreements and contracts, she maintained a large and complex budget, running it like a well-oiled machine. She wrangled federal acquisition machinery with poise.
>
> She was an incredible mother. She was an incredible friend. She was present, she was giving, she was a true Atlanta local who gave it her all. She was an incredible writer. She wrote the loveliest longhand notes. She fostered and adopted dogs. She was a regular at the dog park. She was a swimmer. She was a ballet dancer. She was a book club member. She bicycle commuted. She was active in her community. She advocated for positive change. Our community grieves her loss deeply.

Source: Maternal Mortality Prevention Team, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention

Introduction

In the United States, there are two national sources for trends and information on maternal mortality using vital statistics data (Table 1).[5] The first, the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS) uses two pieces of information on the death certificate – the pregnancy checkbox and the certified recording of the cause of death to assign International Classification of Diseases, 10th Revision (ICD-10) codes – are used together to identify maternal deaths and produce a maternal mortality rate (follows the World Health Organization (WHO) definition, i.e., maternal deaths while pregnant or within 42 days postpartum per 100,000 live births).[6,7] The second, the CDC's Pregnancy Mortality Surveillance System (PMSS) uses death certificates that show a relationship to pregnancy, identified by a linked birth or fetal death certificate registered in the year preceding death or using causes of death and pregnancy status information on the death records.[8] Medical epidemiologists review this information to identify pregnancy-related deaths and produce a pregnancy-related mortality ratio (i.e., pregnancy-related deaths while pregnant or within a year postpartum per 100,000 live births).[9]

Relying on vital statistics data alone to measure maternal mortality makes it challenging to determine whether changes observed are the result of improved identification or changes in the risk.[10] While surveillance using vital statistics data can tell us approximate trends and disparities, Maternal Mortality Review Committees (MMRCs) have access to multiple sources of information that is more comprehensive and provide more insight of the circumstances surrounding each pregnancy-associated death (Table 1).[11] For this reason, MMRCs are better positioned to comprehensively assess each death, develop actionable recommendations, and identify opportunities to prevent for future deaths.

Kansas Maternal Mortality Review Committee

The Kansas maternal mortality work began in 2018 with the passage of HB 2573. The bill amended existing public health law (K.S.A. 65-177) to strengthen efforts related to monitoring maternal morbidity and mortality, thus, establishing the first Kansas Maternal Mortality Review Committee (KMMRC). In FY 2019, CDC announced 24 awards, supporting 25 states for the Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) Program.[12] This funding supports agencies and organizations that coordinate and manage Maternal Mortality Review Committees to identify, review and characterize pregnancy-associated deaths, and identify prevention opportunities. Kansas was one of 25 states awarded a grant through the Preventing Maternal Deaths Act to support MMRCs.

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[5] Building U.S. Capacity to Review and Prevent Maternal Deaths. 2018. Report from nine maternal mortality review committees. https://www.cdcfoundation.org/sites/default/files/files/ReportfromNineMMRCs.pdf.
[6] Ibid.
[7] Centers for Disease Control and Prevention. Maternal Mortality, Implementation of New Coding Methods. https://www.cdc.gov/nchs/maternal-mortality/implementation.htm.
[8] Report from nine maternal mortality review committees. Op. cit., p. 5.
[9] Ibid.
[10] Report from nine maternal mortality review committee, op. cit., p. 5.
[11] Ibid.
[12] Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM). https://www.cdc.gov/maternal-mortality/php/erase-mm/index.html.

The KMMRC membership includes approximately 40 members representing diverse professional backgrounds including obstetrics, anesthesiology, midwives, social service, local public health and law enforcement. Learn more about the KMMRC and follow progress at kmmrc.org/.

The KMMRC continues to review maternal death cases with the goal of reviewing all maternal deaths that occur in the state within two years from the date of death. Data are stored in the CDC's Maternal Mortality Review Information Application (MMRIA). This data sharing allows CDC to produce national reports from MMRIA data shared by Kansas and other states to provide a deeper understanding of pregnancy-related deaths and opportunities for prevention.

In 2021, the Kansas Perinatal Quality Collaborative (KPQC) began its' second initiative, the Fourth Trimester Initiative (FTI), which continues to this day. FTI is a maternal health quality initiative aimed at decreasing maternal morbidity and mortality. Data from KDHE Vital Statistics and the KMMRC reveal that targeted assessment and intentional intervention in the postpartum period should be the primary focus to improve maternal health outcomes. FTI was designed to be a cutting-edge approach to study and improve the experience of mothers and families in Kansas. FTI focuses on chronic disease, behavioral health (including mental health and substance use disorder), breastfeeding, health equity, and access to care. The KMMRC's work and recommendations are a guiding source for the KPQC and Maternal and Child Health (MCH) activities and initiatives.

The KMMRC works collaboratively with the KPQC to disseminate action alerts, practice recommendations, and implement the maternal health quality initiative (FTI). Additionally, Kansas officially enrolled in the Alliance for Innovation on Maternal Health (AIM) in October 2021. AIM is a national, data-driven maternal safety initiative based on proven implementation approaches to improving maternal safety and outcomes in the country. AIM works through state teams and health systems to align national, state, and hospital level efforts to improve maternal and perinatal health outcomes. AIM is available to any state as part of state-level PQC quality efforts/initiatives. More information on AIM can be found at saferbirth.org/.

Using data from completed reviews as well as MCH priority data, Kansas enrolled in the Postpartum Care Transition AIM bundle for implementation. This bundle positions Kansas to leverage all existing MCH investments, including the Kansas Perinatal Community Collaboratives (KPCC) which has been improving and expanding over the last eleven years. With two effective sites in Geary and Saline counties implementing the KPCC model, program evaluation tools were refined and standardized in 2013 in partnership with evaluators from the University of Kansas School of Medicine-Wichita and Wichita State University. Since 2014, KDHE committed to partner with the March of Dimes for further expansion of the model across the state, as well as securing long-term sustainability of the program by integrating it into Title V MCH services.

Table 1.

Maternal Mortality Review Committees (MMRCs) are multidisciplinary groups that have access to comprehensive information from multiple sources, enabling them to gain deeper insights into the circumstances surrounding each pregnancy-associated death.

National Sources of Maternal Mortality Information[13]

	CDC – National Center for Health Statistics (NCHS)	CDC – Pregnancy Mortality Surveillance System (PMSS)	Maternal Mortality Review Committees
Data Source	Death certificates	Death certificates linked to fetal death and birth certificates	Death certificates linked to fetal death and birth certificates, **medical records, social service records, autopsy, informant interviews…**
Time Frame	During pregnancy – 42 days	During pregnancy – 365 days	During pregnancy – 365 days
Source of Classification	Pregnancy checkbox ICD-10 codes	Medical epidemiologists (PMSS-MM)	**Multidisciplinary committees**
Terms	Maternal death	Pregnancy associated, (Associated and) Pregnancy related, (Associated but) Not pregnancy related	Pregnancy associated, (Associated and) Pregnancy related, (Associated but) Not pregnancy related
Measure	Maternal Mortality Rate - # of Maternal Deaths per 100,000 live births	Pregnancy Related Mortality Ratio - # of Pregnancy Related Deaths per 100,000 live births	Pregnancy Related Mortality Ratio - # of Pregnancy Related Deaths per 100,000 live births
Purpose	Show national trends and provide a basis for international comparison	Analyze clinical factors associated with deaths, publish information that may lead to prevention strategies	**Understand medical and non-medical contributors to deaths, prioritize interventions that effectively reduce maternal deaths**

[13] Credit: Julie Zaharatos, MPH, Kansas MMRIA Training Slides. June 12, 2018. Adapted from St. Pierre A, Zaharatos J, Goodman D, Callaghan WM. Jan 2018. Challenges and opportunities in identifying, reviewing, and preventing maternal deaths. Obstetrics and Gynecology. 131; 138-142.

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Kansas Title V is an advocate for policy change, as well as developing action alerts and bulletins. It also identifies and develops public/patient education initiatives for statewide implementation through the KPQC as a result of MMRC findings. In 2016-2018, findings indicated the majority of “pregnancy-related deaths” are related to chronic pre-existing conditions exacerbated by the pregnancy, or conditions of pregnancy that worsen in the postpartum period (e.g., cardiovascular/coronary; preeclampsia/eclampsia; embolism; infection), where symptoms are not recognized as emergent or life threatening and appropriate treatment is not sought/provided quickly enough - 92.3 percent were found to be preventable.

One example of acting on the data is the Maternal Warning Signs (MWS) initiative. This initiative is now formally underway with the Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN) to implement their Post-Birth Warning Signs (PBWS) Education Program statewide. Adaptations to resources will support a comprehensive public health approach. Training seats for this curriculum have been purchased and are available for local Title V grantees, KPCC sites and partnering birthing facilities, and facilities enrolled in the FTI. Title V includes resources from multiple other national campaigns such as CDC’s Hear Her Campaign and National Institutes of Health’s Mom’s Mental Health Matters. The state also utilizes resources and tools developed specifically for families and support individuals, as well as racially and ethnically disparate and low-literacy populations. The intent and purpose of this comprehensive MWS statewide initiative is to provide consistent and repeat messaging across all health care sectors, in all communities. MWS also includes an online toolkit, TA webinars and other resources to assist with implementation. More information on the KPQC and the FTI can be found at kansaspqc.org/.

Additional public health campaigns will be implemented to address causes of deaths found to be “pregnancy-associated, but not related.” Most pregnancy-associated Kansas deaths have been the result of motor vehicle accidents and situations with other underlying factors, like substance use and intimate partner violence (IPV).

KPQC/KMMRC promotes and incorporates screening, brief intervention, and referral to treatment (SBIRT) across MCH programming and perinatal service providers. The SBIRT process is used as a comprehensive, integrated, public health approach for the early identification and intervention of MCH patients exhibiting health risk behaviors. These behaviors

include substance use and mental health issues. Educational efforts include integration of screening and education on IPV, utilizing resources from the Futures Without Violence Initiative.

Severe Maternal Morbidity

According to American College of Obstetricians and Gynecologists and the Society for Maternal-Fetal Medicine, "Severe maternal morbidity can be thought of as unintended outcomes of the process of labor and delivery that result in significant short-term or long-term consequences to a woman's health. Severe maternal morbidity is associated with a high rate of preventability, similar to that of maternal mortality. It also can be considered a near miss for maternal mortality because without identification and treatment in some cases, these conditions would lead to maternal death. Identifying severe morbidity early is critical for preventing such injuries that lead to mortality, in addition to highlighting opportunities to avoid repeat injuries." [14] Severe maternal morbidity (SMM) occurs nearly 100 times more frequently than maternal death.[15] Because several maternal morbidity and maternal mortality are closely related, investigation of SMM can provide critical insights into contributing causes of maternal death.[16]

To identify delivery hospitalization with SMM, this report follows the CDC-developed definition of SMM from hospital discharge procedure and diagnosis codes that indicate a potentially life-threatening condition or maternal complication.[17,18] Delivery hospitalizations were identified by diagnosis codes for an outcome of delivery, diagnosis-related group delivery codes, and procedure codes for selected delivery-related procedures.[19,20] The 2016-2020 Kansas hospital discharge data were used and analyzed adapting the latest Statistical Analysis System (SAS) code from the Health Resources and Services Administration (HRSA), Maternal and Child Health Bureau (MCHB), Federally Available Data Resource Document (FAD).[21] The revised FAD SAS code helps bridge the ICD-10-CM transition through formal forward and reverse mapping. A total of 82 codes were added while 16 codes were dropped in ICD-10-CM that were either of dubious severity or implausible at delivery (e.g., first trimester). In addition, shock codes involving sepsis and anesthesia were moved to those respective indicator categories as the primary causes. The impact of these changes had small increases in ICD-10-CM rates. The new method continues to exclude blood transfusion alone and may not indicate severe morbidity in the absence of other codes. Thus, a total of 20 SMM indicators were included in the analysis. Data for 2016 and onward are based on ICD-10-CM/PCS and may not be comparable to previous ICD-9-CM estimates.

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[14] American College of Obstetricians and Gynecologists and the Society for Maternal-Fetal Medicine, Kilpatrick SK, Ecker JL. Severe maternal morbidity: screening and review. *Am J Obstet Gynecol*. 2016;215(3):B17-B22. doi:10.1016/j.ajog.2016.07.050. https://www.acog.org/-/media/project/acog/acogorg/clinical/files/obstetric-care-consensus/articles/2016/09/severe-maternal-morbidity-screening-and-review.pdf.

[15] Ohio Severe Maternal Morbidity Factsheet, op. cit., p. iii.

[16] Ibid.

[17] Centers for Disease Control and Prevention. Severe Maternal Morbidity in the United States. https://www.cdc.gov/maternal-infant-health/php/severe-maternal-morbidity/index.html.

[18] Maternal and Child Health Bureau. Federally Available Data (FAD) Resource Document. July 10, 2024; Rockville, MD: Health Resources and Services Administration. National Outcome Measure 2 - Rate of severe maternal morbidity per 10,000 delivery hospitalizations. SAS code and data notes. https://mchb.tvisdata.hrsa.gov/Home/FADDocuments.

[19] Ibid.

[20] Kuklina EV, Whiteman MK, Hillis SD, Jamieson DJ, Meikle SF, Posner SF, et al. An enhanced method for identifying obstetric deliveries: implications for estimating maternal morbidity. Matern Child Health J 2008;12:469–77.

[21] Maternal and Child Health Bureau. Federally Available Data (FAD) Resource Document, op. cit., p. 9.

Both the numerator (number of delivery hospitalizations with an indication of SMM from diagnosis or procedure codes, Appendix E) and denominator (number of delivery hospitalization, Appendix F) were limited to deliveries at community hospitals*, of Kansas residents, to women aged 12-55 years, and to records with sex equal to female.[22,23,24]

*Kansas hospital discharge data are provided by the Kansas Hospital Association (KHA). Data are reported on a calendar year basis, compiled from surveys submitted by most Kansas community hospitals. Community hospitals are non-federal, short-term, general or other specialty hospitals whose facilities are open to the public. Community hospitals, including those out of state to which Kansas residents are admitted, are asked to submit data voluntarily to Kansas Hospital Association (KHA) which in turns compiles the dataset and provides it to the state of Kansas. While most of the state's hospitals are community hospitals, facilities that are not included are: hospital units of institutions, long-term care hospitals, psychiatric hospitals, federal hospitals, and alcoholism and chemical dependency facilities.[25]

The most recent updated list of SMM indicators is (Appendix E):

1. Acute Myocardial Infarction
2. Aneurysm
3. Acute Renal Failure
4. Adult Respiratory Distress Syndrome
5. Amniotic Fluid Embolism
6. Cardiac Arrest/Ventricular Fibrillation
7. Conversion of Cardiac Rhythm
8. Disseminated Intravascular Coagulation
9. Eclampsia
10. Heart Failure/Arrest During Procedure or Surgery
11. Puerperal Cerebrovascular Disorders
12. Pulmonary Edema/Acute Heart Failure
13. Severe Anesthesia Complications
14. Sepsis
15. Shock
16. Sickle Cell Disease with Crisis
17. Air and Thrombotic Embolism
18. Hysterectomy
19. Temporary Tracheostomy
20. Ventilation

[22] Centers for Disease Control and Prevention. Severe Maternal Morbidity in the United States. op. cit., p. 9.
[23] Fingar KF (IBM Watson Health), Hambrick MM (AHRQ), Heslin KC (AHRQ), Moore JE (Institute for Medicaid Innovation). Trends and Disparities in Delivery Hospitalizations Involving Severe Maternal Morbidity, 2006–2015. HCUP Statistical Brief #243. September 2018. Agency for Healthcare Research and Quality, Rockville, MD. https://hcup-us.ahrq.gov/reports/statbriefs/sb243-Severe-Maternal-Morbidity-Delivery-Trends-Disparities.pdf.
[24] Maternal and Child Health Bureau. Federally Available Data (FAD) Resource Document, op. cit., p. 9.
[25] Kansas Hospital Discharge Data - Notes and Limitations. http://kic.kdheks.gov/OHA/kicnote.html#Discharge.

SMM indicators were then categorized into seven groups to monitor and potentially inform action. They are not mutually exclusive and may not reflect underlying causes.

1. Hemorrhage complications:
    - disseminated intravascular coagulation.
    - shock
    - hysterectomy
2. Respiratory complications:
    - adult respiratory distress syndrome
    - temporary tracheostomy
    - ventilation
3. Cardiac complications:
    - acute myocardial infarction
    - aneurysm
    - cardiac arrest/ventricular fibrillation
    - conversion of cardiac rhythm
    - heart failure/arrest during procedure or surgery
    - pulmonary edema/acute heart failure
4. Renal complications:
    - acute renal failure
5. Sepsis complications:
    - sepsis
6. Other obstetric complications:
    - amniotic fluid embolism
    - eclampsia
    - severe anesthesia complications
    - air and thrombotic embolism
7. Other medical complications:
    - puerperal cerebrovascular disorders
    - sickle cell disease with crisis

From 2016 to 2020 of the 164,049 delivery hospitalizations of Kansas residents, 1,019 deliveries (0.6 percent**) with one or more SMMs were identified**, using the ICD-10-CM/PCS codes as defined by 20 SMM indicators, representing a rate of 62.1 per 10,000 delivery hospitalizations (Table 2 and Table 3). This translates to approximately **one in 161 women who delivered a baby experienced SMM**. The SMM rate among delivery hospitalizations in Kansas has been steadily increasing in recent years, from 56.1 in 2016 to 71.0 per 10,000 delivery hospitalizations in 2020, a 26.6 percent increase (Table 2). Figure 4 shows trends in SMM in Kansas between 2016 and 2020. The SMM rate steadily significantly increased by 6.4 percent per year (95 percent Confidence Interval: 4.2 percent, 8.7 percent).

Table 2.

Approximately 1 in 161 women who delivered a baby experienced severe maternal morbidity.

Numbers and Rates of Delivery Hospitalizations Involving Severe Maternal Morbidity, Kansas, 2016-2020
Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)

Year	Deliveries involving any severe maternal morbidity	Delivery hospitalizations	Rate per 10,000 deliveries		
			Rate	95 percent conference interval	
2016	196	34,952	56.1	48.2	63.9
2017	190	33,499	56.7	48.7	64.8
2018	196	31,739	61.8	53.1	70.4
2019	214	32,453	65.9	57.1	74.8
2020	223	31,406	71.0	61.7	80.3
Total	**1,019**	**164,049**	**62.1**	**58.3**	**65.9**

Figure 4.

The Severe maternal morbidity rate steadily significantly increased by 6.4% per year.

Trends in Delivery Hospitalizations Involving Severe Maternal Morbidity, Kansas, 2016-2020
* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)

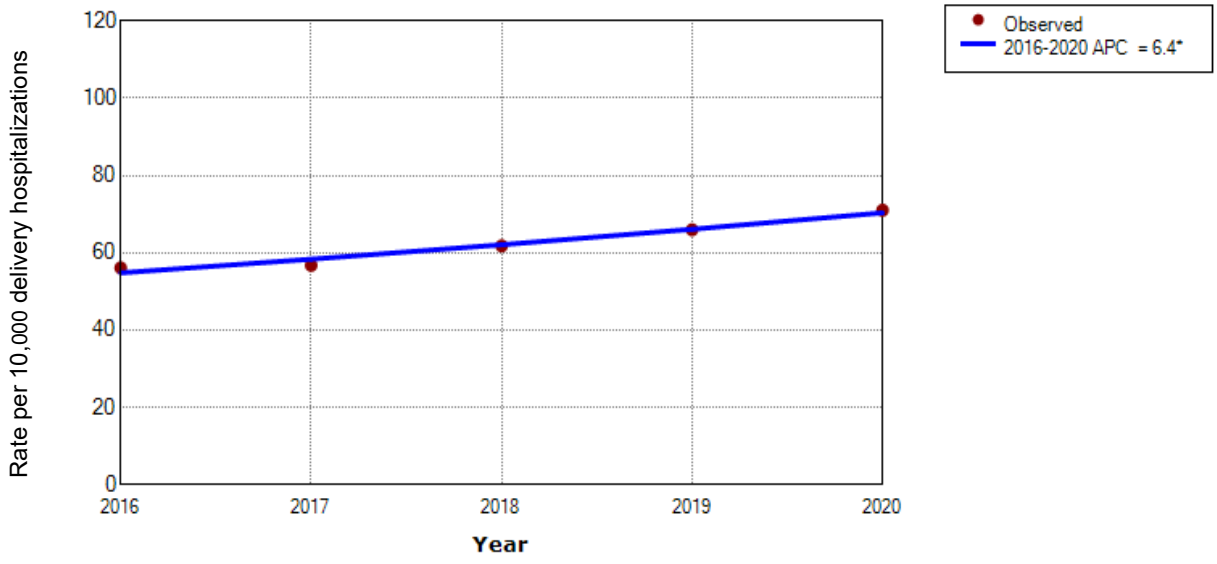


Table 3 presents numbers, distributions, and rates of delivery hospitalizations involving SMM, overall and each of the 20 SMM indicators from 2016 through 2020. As noted, there were 1,019 deliveries with one or more SMMs in 2016-2020. A total of 1,397 SMMs were identified. If a delivery involved multiple indicators of SMM, it was counted in each category. The five most common indicators of SMM in Kansas were:

1. disseminated intravascular coagulation (15.4 percent)
2. acute renal failure (12.6 percent)
3. adult respiratory distress syndrome (12.1 percent)
4. sepsis (11.9 percent), and
5. hysterectomy (10.0 percent)

Table 3.

Disseminated intravascular coagulation was the most common indicator of severe maternal morbidity.

Delivery Hospitalizations Involving Severe Maternal Morbidity, Overall and for Each Indicator of Severe Maternal Morbidity, Kansas, 2016-2020

Percentages may not total 100 due to rounding.

Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)

Severe maternal morbidity indicators	[a] Deliveries involving any severe maternal morbidity		Rate per 10,000 deliveries		
	Number	Percent	Rate	95 percent conference interval	
Any severe maternal morbidity	**1,019**	**100.0**	**62.1**	**58.3**	**65.9**
Disseminated intravascular coagulation	215	15.4	13.1	11.4	14.9
Acute renal failure	176	12.6	10.7	9.1	12.3
Adult respiratory distress syndrome	169	12.1	10.3	8.7	11.9
Sepsis	166	11.9	10.1	8.6	11.7
Hysterectomy	140	10.0	8.5	7.1	9.9
Eclampsia	115	8.2	7.0	5.7	8.3
Shock	88	6.3	5.4	4.3	6.6
Pulmonary edema/acute heart failure	86	6.2	5.2	4.2	6.5
Ventilation	70	5.0	4.3	3.3	5.4
Puerperal cerebrovascular disorders	51	3.7	3.1	2.3	4.1
Air and thrombotic embolism	44	3.1	2.7	1.9	3.6
Severe anesthesia complications	15	1.1	0.9[b]	0.5	1.5
Cardiac arrest/ventricular fibrillation	12	0.9	0.7[b]	0.4	1.3
Conversion of cardiac rhythm	12	0.9	0.7[b]	0.4	1.3
Sickle cell disease with crisis	11	0.8	0.7[b]	0.3	1.2
Acute myocardial infarction	9	0.6	-	-	-
Amniotic fluid embolism	8	0.6	-	-	-
Temporary tracheostomy	6	0.4	-	-	-
Aneurysm	3	0.2	-	-	-
Heart failure/arrest during procedure	1	0.1	-	-	-

[a] There were 1,019 deliveries with one or more severe maternal morbidities in 2016-2020. A total of 1,397 severe maternal morbidities were identified. If a delivery involved multiple indicators of severe maternal morbidity, it was counted in each category.

[b] The rate is based on fewer than 20 cases, does not meet the requirement for a minimum degree of accuracy, and should be interpreted with caution.

- Counts are less than 10, therefore the corresponding rates are suppressed due to lack of statistical reliability.

These five indicators made up approximately 62.0 percent (866) of the total 20 SMM indicators analyzed (1,397). Figure 4 displays the percentage of deliveries involving hysterectomy (one of the most common types of procedures indicating SMM) among deliveries with a condition indicating SMM. More than a quarter (27.3 percent) of deliveries involving shock and nearly one in five deliveries involving ventilation and temporary tracheostomy (18.6 percent and 16.7 percent, respectively) involved a hysterectomy. Furthermore, approximately one in 10 deliveries

involving adult respiratory distress syndrome (12.9 percent), acute myocardial infarction (11.1 percent), disseminated intravascular coagulation (8.8 percent), or cardiac arrest/ventricular fibrillation (8.3 percent) involved a hysterectomy.

Figure 5.

Shock was the most common condition of severe maternal morbidity among deliveries involving hysterectomy.

Percent of Deliveries Involving Hysterectomy Among Deliveries with A Condition Indicating SMM, Kansas 2016-2020

Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)

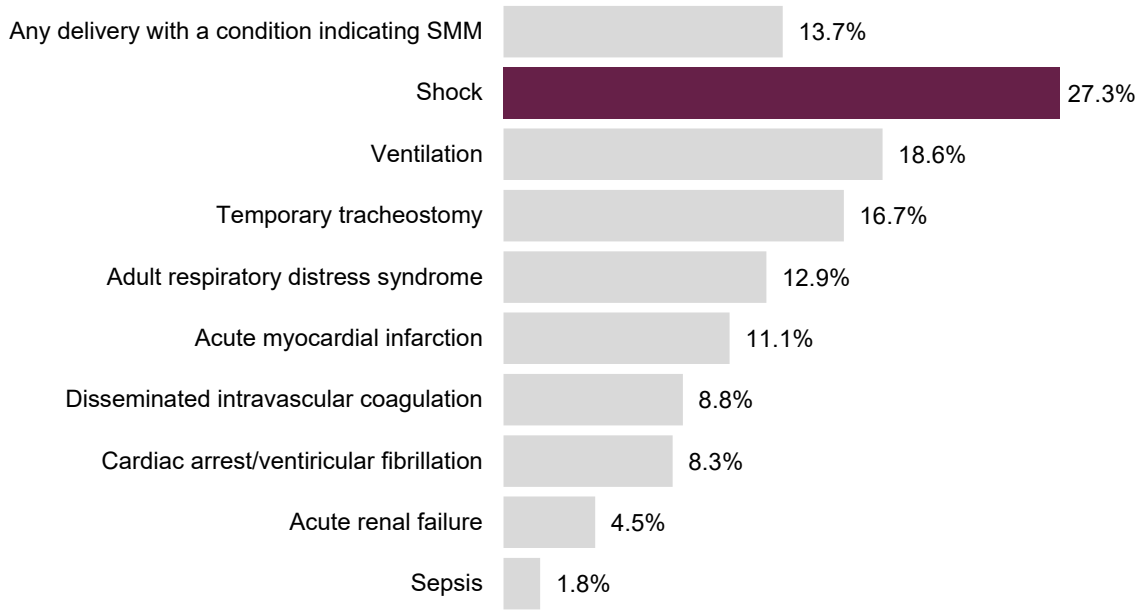


Table 4 below presents data on delivery hospitalizations involving SMM by seven groups of complications. As previously noted, these are complication groupings and are not mutually exclusive. The most common complication was obstetric hemorrhage (disseminated intravascular coagulation, shock, hysterectomy), occurring in nearly one-third of all SMM inpatients. Other complications were respiratory (14.4 percent), other obstetric (14.1 percent), renal (13.8 percent), sepsis (13.0 percent), cardiac (9.3 percent), and other medical complications (4.9 percent).

Table 4.

Obstetric hemorrhage (disseminated intravascular coagulation, shock, hysterectomy) was the most common complication.

Delivery Hospitalizations by Complication Group, Kansas, 2016-2020

Percentages may not total 100 due to rounding.

Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)

Group of complication	[a] Deliveries involving any severe maternal morbidity		Rate per 10,000 deliveries		
	Number	Percent	Rate	95 percent conference interval	
Hemorrhage complications	389	30.5	23.7	21.4	26.1
Respiratory complications	183	14.4	11.2	9.5	12.8
Other obstetric complications	180	14.1	11.0	9.4	12.6
Renal complications	176	13.8	10.7	9.1	12.3
Sepsis complications	166	13.0	10.1	8.6	11.7
Cardiac complications	118	9.3	7.2	5.9	8.5
Other medical complications	62	4.9	3.8	2.9	4.8

Note: There were 1,019 deliveries with one or more severe maternal morbidities in 2016-2020. The 21 SMM indicators were then categorized into seven groups. These are complication groupings and are not mutually exclusive. They may not reflect underlying causes.

Table 5 presents characteristics of deliveries with and without SMM from 2016 to 2020. Deliveries involving SMM were more likely than deliveries that did not involve SMM to be in the **youngest** (aged<20 years, 7.1 percent vs. 5.6 percent) **and oldest** (aged 40+ years, 5.5 percent vs. 2.2 percent) age ranges. Also, interesting to note, rates of SMM generally followed a similar pattern as these percentage distributions. One example, the rate of deliveries involving SMM per 10,000 delivery hospitalizations generally **increased** with age (from 55.4 among women aged 20-24 years to 155.3 among those aged 40+ years). This rate was also elevated among women under 20 years of age (77.9).

Table 5.

Deliveries involving SMM were more likely than deliveries that did not involve SMM to be in the youngest and oldest age ranges.

Characteristics of Deliveries With and Without Severe Maternal Morbidity, Kansas, 2016-2020

Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident); U.S. Census. American Community Survey.

Characteristic	Deliveries with any severe maternal morbidity		Deliveries without severe maternal morbidity		Rate of any severe maternal morbidity per 10,000 delivery hospitalizations		
	Number	Percent[a]	Number	Percent[a]	Rate	95 percent conference interval	
All	1,019	100.0	163,030	100.0	62.1	58.3	65.9
Age group, years							
<20	72	7.1	9,171	5.6	77.9	60.9	98.1
20-24	198	19.4	35,539	21.8	55.4	47.7	63.1
25-29	246	24.1	50,918	31.2	48.1	42.1	54.1
30-34	273	26.8	44,860	27.5	60.5	53.3	67.7
35-39	174	17.1	18,992	11.6	90.8	77.3	104.3
≥40	56	5.5	3,550	2.2	155.3	117.3	201.7
Race and ethnicity*							
Non-Hispanic White	640	64.4	112,809	71.0	56.4	52	60.8
Non-Hispanic Black	126	12.7	12,051	7.6	103.5	85.4	121.5
Non-Hispanic Native American	5	0.5	769	0.5	-	-	-
Non-Hispanic Asian (n=34)/Pacific Islander (n=2)	36	3.6	5,276	3.3	67.8	47.5	93.8
Non-Hispanic Other Race	41	4.1	8,143	5.1	50.1	36.0	68.0
Hispanic[b]	146	14.7	19,922	12.5	72.8	61.0	84.6
Primary payer							
Medicaid	374	36.7	51,165	31.4	72.6	65.2	79.9
Private	515	50.5	96,442	59.2	53.1	48.5	57.7
Uninsured	98	9.6	10,098	6.2	96.1	78.0	117.1
Other	32	3.1	5,325	3.3	59.7	40.9	84.3
Median household income of maternal residential ZIP Code[c]							
Quartile 1 (poorest)	323	31.9	41869	25.8	76.6	68.2	84.9
Quartile 2	224	22.2	39471	24.3	56.4	49.0	63.8
Quartile 3	266	26.3	40993	25.2	64.5	56.7	72.2
Quartile 4 (wealthiest)	198	19.6	40196	24.7	49.0	42.2	55.8
Location of residence[d]							

Large Fringe Metropolitan	317	31.1	52,100	32.0	60.5	53.8	67.1
Medium Metropolitan	319	31.3	39,709	24.4	79.7	70.9	88.4
Small Metropolitan	122	12.0	21,462	13.2	56.5	46.5	66.6
Non-Metropolitan	261	25.6	49,759	30.5	52.2	45.8	58.5
Location of residence by public health region							
Northeast	472	46.3	79,974	49.1	58.7	53.4	64.0
North Central	24	2.4	7,057	4.3	33.9	21.7	50.4
Northwest	16	1.6	3,972	2.4	40.1[e]	22.9	65.2
Southeast	66	6.5	10,572	6.5	62.0	48.0	78.9
South Central	368	36.1	50,270	30.8	72.7	65.2	80.1
Southwest	73	7.2	11,185	6.9	64.8	50.8	81.5

[a] Percentages may not total 100 due to rounding.
[b] Includes persons of any race.
[c] Based on the median household income of the maternal ZIP Code of last residence. Quartiles are defined so that the total Kansas population is evenly distributed. Cut-offs for the quartiles are determined using ZIP Code demographic data obtained from the U.S. Census, American Community Survey, 2016-2020, Table S1903, Median Income in the Past 12 Months (in 2020 inflation-adjusted dollars). Each ZIP Code was classified into quartiles based on median household income of each ZIP Code. These quartiles are the following: quartile 1: $1 to $48,695; quartile 2: $48,696 to $57,025; quartile 3: $57,026 to $76,121; quartile 4: $76,122 or more.
[d] Location of residence is based on 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties. Large fringe metropolitan is defined as metropolitan areas with at least 1 million residents (Johnson, Leavenworth, Linn, Miami, Wyandotte). Medium metropolitan is defined as metropolitan areas of 250,000-999,999 residents (Butler, Harvey, Kingman, Sedgwick, Sumner). Small metropolitan is defined as metropolitan areas of less than 250,000 residents (Doniphan, Douglas, Jackson, Jefferson, Osage, Pottawatomie, Riley, Shawnee, Wabaunsee). Non-metropolitan is defined as micropolitan and noncore (rural) areas (Remainder of the state).
[e] The rate is based on fewer than 20 cases, does not meet the requirement for a minimum degree of accuracy, and should be interpreted with caution.
- Counts are less than 10, therefore the corresponding rates are suppressed due to lack of statistical reliability.
* Persons with missing or unknown ethnicity are excluded.

Figure 6 displays the distribution of race and ethnicity among deliveries with any SMM compared with all other deliveries in 2016-2020. Non-Hispanic White women constituted a 9.3 percent lower percentage of deliveries (64.4 percent) with any SMM than other deliveries (71.0 percent). In contrast, most ethnic and racial minority groups consistently constituted a higher percentage of deliveries with any SMM than other deliveries. The distribution of non-Hispanic Blacks and Hispanics among deliveries with any SMM was 67.1 percent and 17.6 percent higher, respectively, than the distribution of these racial/ethnic groups among deliveries without SMM. **Approximately 12.7** percent **of deliveries involving SMM were among women who were non-Hispanic Black compared with 7.6** percent **of deliveries without SMM.** Among deliveries involving SMM, women also were more likely to be Hispanic (14.7 percent vs. 12.5 percent) compared with deliveries without any SMM.

Figure 6.

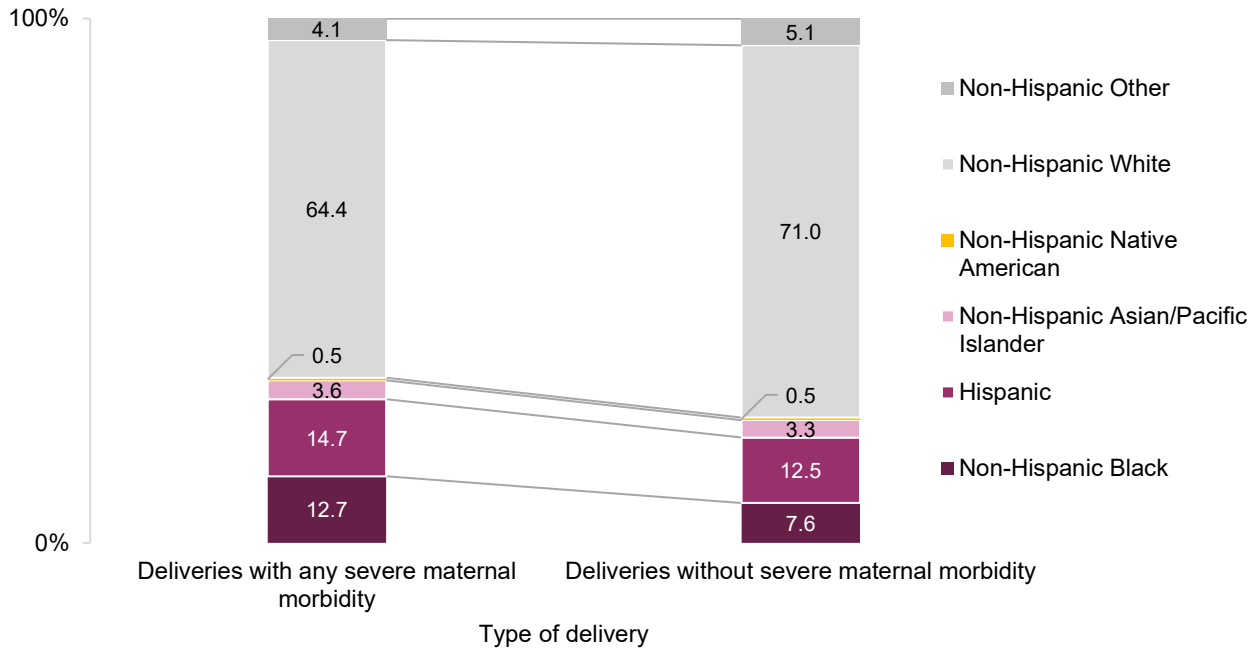
Racial and ethnic minorities made up a higher percentage of deliveries with severe maternal morbidity than other deliveries.

The Distribution of Maternal Race and Ethnicity Among Delivery Hospitalizations, According to Whether the Delivery Involved any Severe Maternal Morbidity, Kansas, 2016-2020

Percentages may not total 100 due to rounding.

Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)

Data interpretation example: The lines display comparing distributions of race and ethnicity among deliveries with any severe maternal morbidity (SMM) and without SMM. Disproportionality refers to the state of being out of proportion. Approximately 12.7% of deliveries involving SMM were among women who were non-Hispanic Black in Kansas from 2016 to 2020 compared with 7.6% of deliveries without SMM.



When in the youngest and oldest age groups, women have a greater risk of SMM.[26,27] Because **maternal age may differ across ethnic and racial groups**, Figure 7 shows the age distribution of all delivery hospitalizations (combining those with and without any SMM) in 2016-2020, by patient's race and ethnicity and also provides context when examining racial/ethnic disparities in SMM. A large percentage of non-Hispanic Black and Hispanic women with a delivery hospitalization were in the youngest age groups: <20 years (9.6 percent each respectively) or 20-29 years (59.6 percent and 55.9 percent, respectively). By comparison, fewer non-Hispanic White women with a delivery hospitalization were in these younger age groups (4.4 percent aged <20 and 52.0 percent aged 20-29 years). Compared with

[26] Fingar, Hambrick, Heslin and Moore, op. cit., p. 10.

[27] Creanga AA, Bateman BT, Kuklina EV, Callaghan WM. Racial and ethnic disparities in severe maternal morbidity: a multistate analysis, 2008-2010. American Journal of Obstetrics & Gynecology. 2014;210(5):435.e1-8.

non-Hispanic White women, non-Hispanic Asian/Pacific Islander women with a delivery hospitalization were more likely to be older (58.9 percent vs. 43.6 percent aged >=30 years).

Figure 7.

Maternal age may differ across ethnic and racial groups.

The Distribution of Age of all Delivery Hospitalizations by Maternal Race and Ethnicity, Kansas 2016-2020
Percentages may not total 100 due to rounding.
Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)

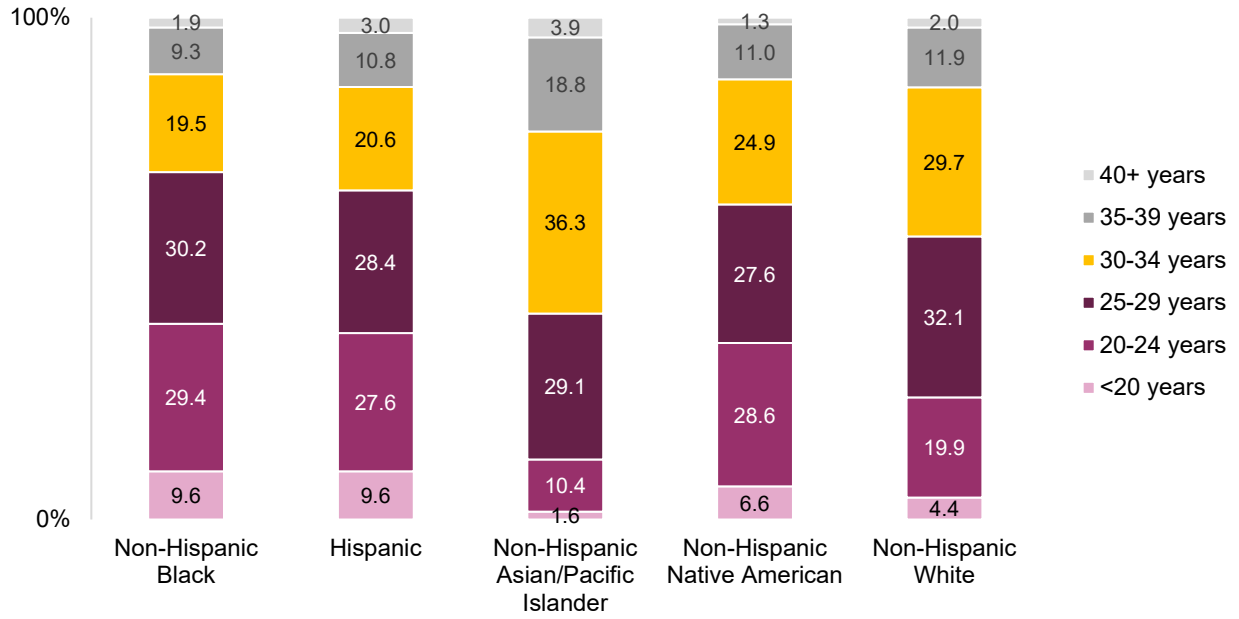


Table 6 and Figure 8 show trends in SMM rates by race and ethnicity in Kansas between 2016 and 2020. SMM rates for non-Hispanic Black decreased by 1.5 percent per year (95% Confidence Interval (CI): -12.5 percent, 10.9 percent), although not statistically significant, while non-Hispanic White increased by 3.2 percent per year (95 percent CI: 0.1 percent, 6.5 percent) and Hispanic by 17.6 percent per year (95 percent CI: -2.9 percent, 34.5 percent). These increases were statistically significant. While SMM rates of non-Hispanic Black women from 2016 to 2020 have decreased over that time, the rate of SMM per 10,000 delivery hospitalizations for non-Hispanic Black women remains remarkably high at 103.5. The rate is 83.5 percent higher than the rate among non-Hispanic White women (56.4), 52.7 percent higher than the rate among non-Hispanic Asian/Pacific Islanders (67.8) and 42.2 percent higher than the rate among Hispanic (72.8) (Table 6). **The SMM rate for non-Hispanic Black women was significantly higher than any other race and ethnicity.**

Table 6.

The severe maternal morbidity rate for non-Hispanic Black women was significantly higher than any other race and ethnicity.

Rates of Severe Maternal Morbidity per 10,000 Delivery Hospitalizations, by Maternal Race and Ethnicity, Kansas, 2016-2020

Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)

Year	Non-Hispanic White			Non-Hispanic Black			Non-Hispanic Asian/Pacific Islanders			Hispanic		
	Number	Deliveries	Rate	Number	Deliveries	Rate	Number	Deliveries	Rate	Number	Deliveries	Rate
2016	129	23,986	52.1	28	2,415	115.9	-	1,154	-	19	4,158	45.7
2017	127	23,417	52.1	25	2,477	100.9	-	1,088	-	25	3,966	63.0
2018	121	22,223	53.1	21	2,426	86.6	-	987	-	32	3,858	82.9
2019	135	22,377	57.2	27	2,445	110.4	-	1,058	-	30	4,028	74.5
2020	128	21,446	59.7	25	2,414	103.6	10	1,025	97.6[a]	40	4,058	98.6
Total	**640**	**113,449**	**56.4**	**126**	**12,177**	**103.5**	**36**	**5,312**	**67.8**	**146**	**20,068**	**72.8**

[a] The rate is based on fewer than 20 cases, does not meet the requirement for a minimum degree of accuracy, and should be interpreted with caution.

- Counts are less than 10, therefore the corresponding rates are suppressed due to lack of statistical reliability.

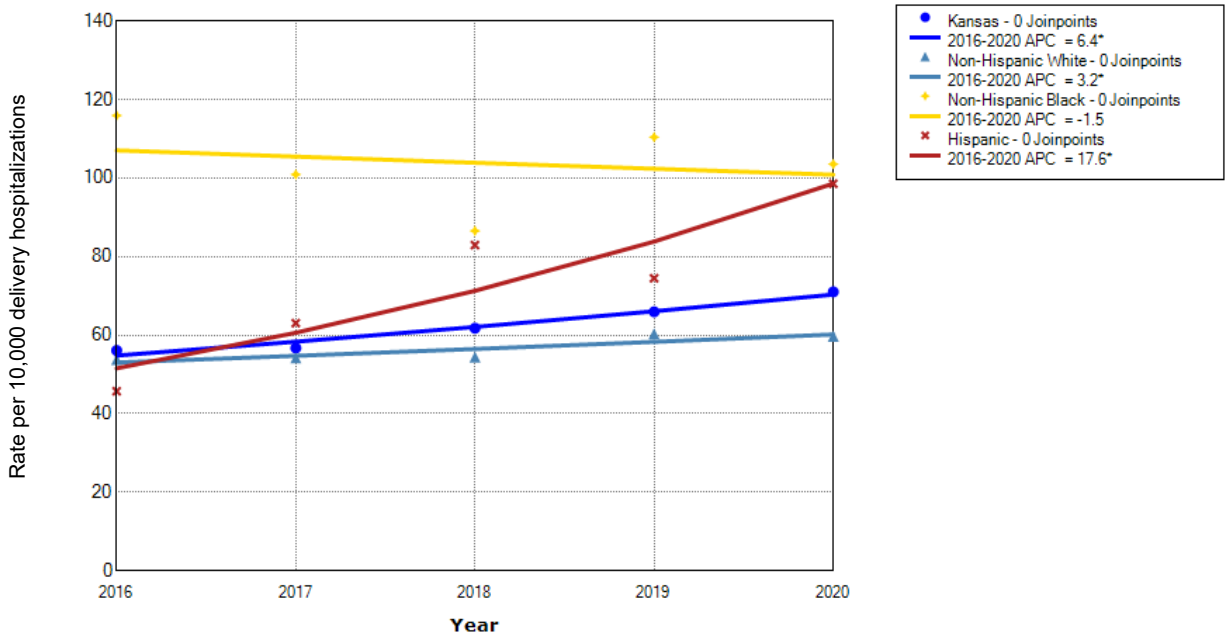
Figure 8.

While severe maternal morbidity (SMM) rates of non-Hispanic Black women from 2016 to 2020 have decreased over that time, the rate of SMM per 10,000 delivery hospitalizations for non-Hispanic Black women remains remarkably high at 103.5.

Trends in Delivery Hospitalizations Involving Severe Maternal Morbidity, by Maternal Race and Ethnicity, Kansas, 2016-2020

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.

Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)



As shown in Table 5, rates of SMM were **significantly higher** for women whose delivery was covered by Medicaid compared with private insurance (72.6 vs. 53.1). Figure 9 displays rates of SMM based on the median household income of the maternal ZIP Code of residence. Quartiles are defined so that the total Kansas population is evenly distributed. Cut-offs for the quartiles are determined using ZIP Code demographic data obtained from the U.S. Census, American Community Survey, 2015-2020, Table S1903, Median Income in the Past 12 Months (in 2020 inflation-adjusted dollars). There was a total of 700 ZIP Codes in Kansas, 698 within Kansas and 2 partially in two states, Kansas and Nebraska. Thirty-seven ZIP Codes within Kansas had no computed estimates available due to either no sample observations or too few sample observations. Additionally, 30 ZIP Codes were in the Kansas hospital discharge data but were not in the ACS. Therefore, the income quartile is missing for these ZIP Codes. Each ZIP Code was classified into quartiles based on median household income of each ZIP Code. These quartiles are the following: quartile 1: $1 to $48,695; quartile 2: $48,696 to $57,025; quartile 3: $57,025 to $76,121; quartile 4: $76,122 or more. Table 4 and Figure 7 show SMM rates decreased as levels of the median household income of the maternal ZIP Code of residence increased from 76.6 in quartile 1 (poorest) to 49.0 in quartile 4 (wealthiest). Compared with other deliveries, women residing in ZIP Codes in the lowest quartile of median household income were **significantly more** likely to experience SMM.

Rates of SMM were significantly higher in medium metropolitan areas (79.7) compared with other areas measured (Table 5). Compared with deliveries that did not involve SMM, those that did were more likely to occur in the southcentral (36.1 percent vs. 30.8 percent) and the southwest (7.2 percent vs. 6.9 percent) than other areas. In general, rates of SMM generally followed a similar pattern as these percentage distributions. The rate of SMM was **significantly higher in the southcentral** (72.7) where most of medium metropolitan counties are located, compared with the northeast (58.7) where most large fringe metropolitan counties are located, the northwest (40.1), and the north central (33.9) public health regions (Figure 10).

Figure 9.

Women residing in ZIP Codes in the lowest quartile of median household income were significantly more likely to experience SMM.

Severe Maternal Morbidity (SMM) Rates per 10,000 Delivery Hospitalizations, by Median Household Income of the Maternal ZIP Code of Residence, Kansas 2016-2020

Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident); U.S. Census. American Community Survey

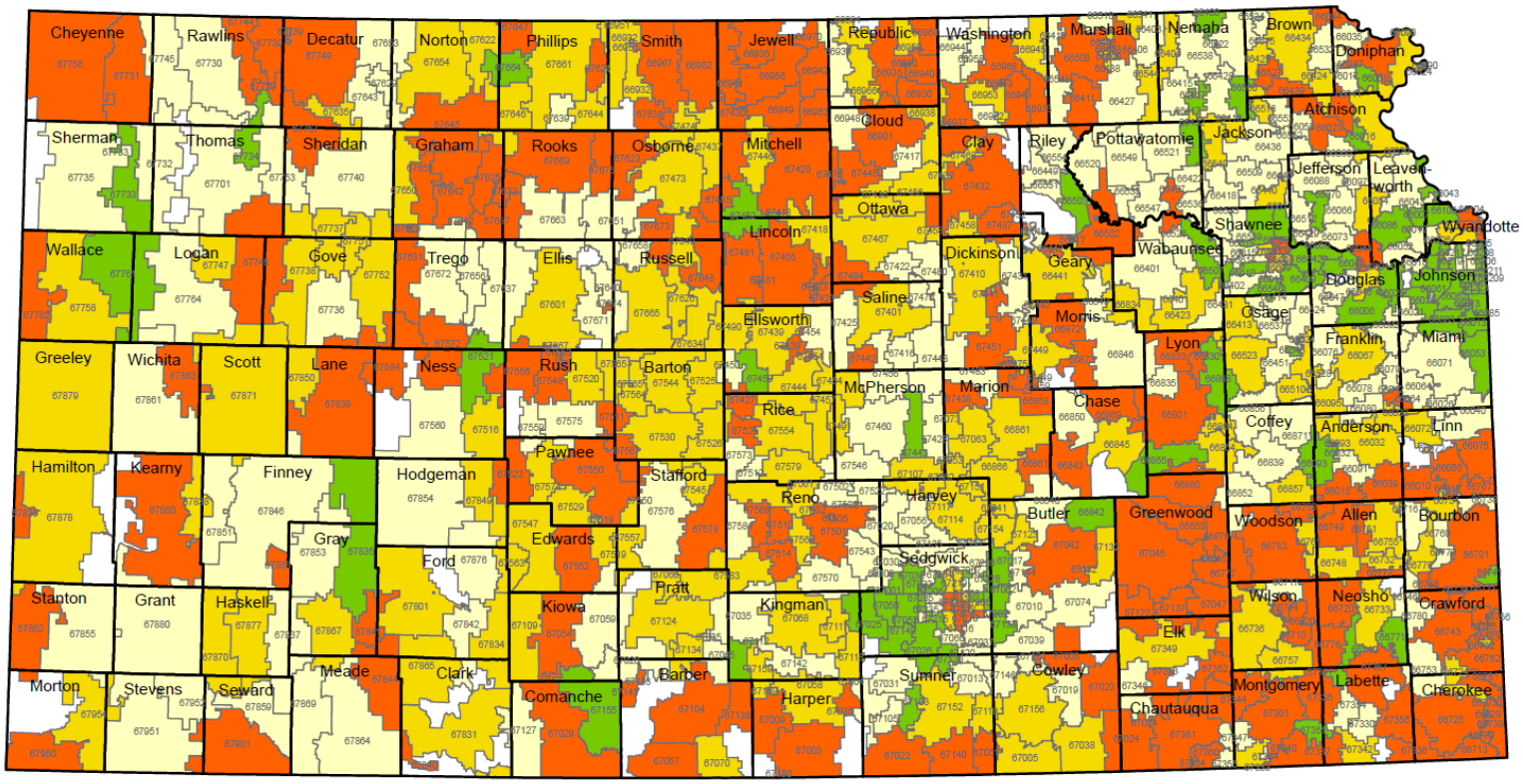
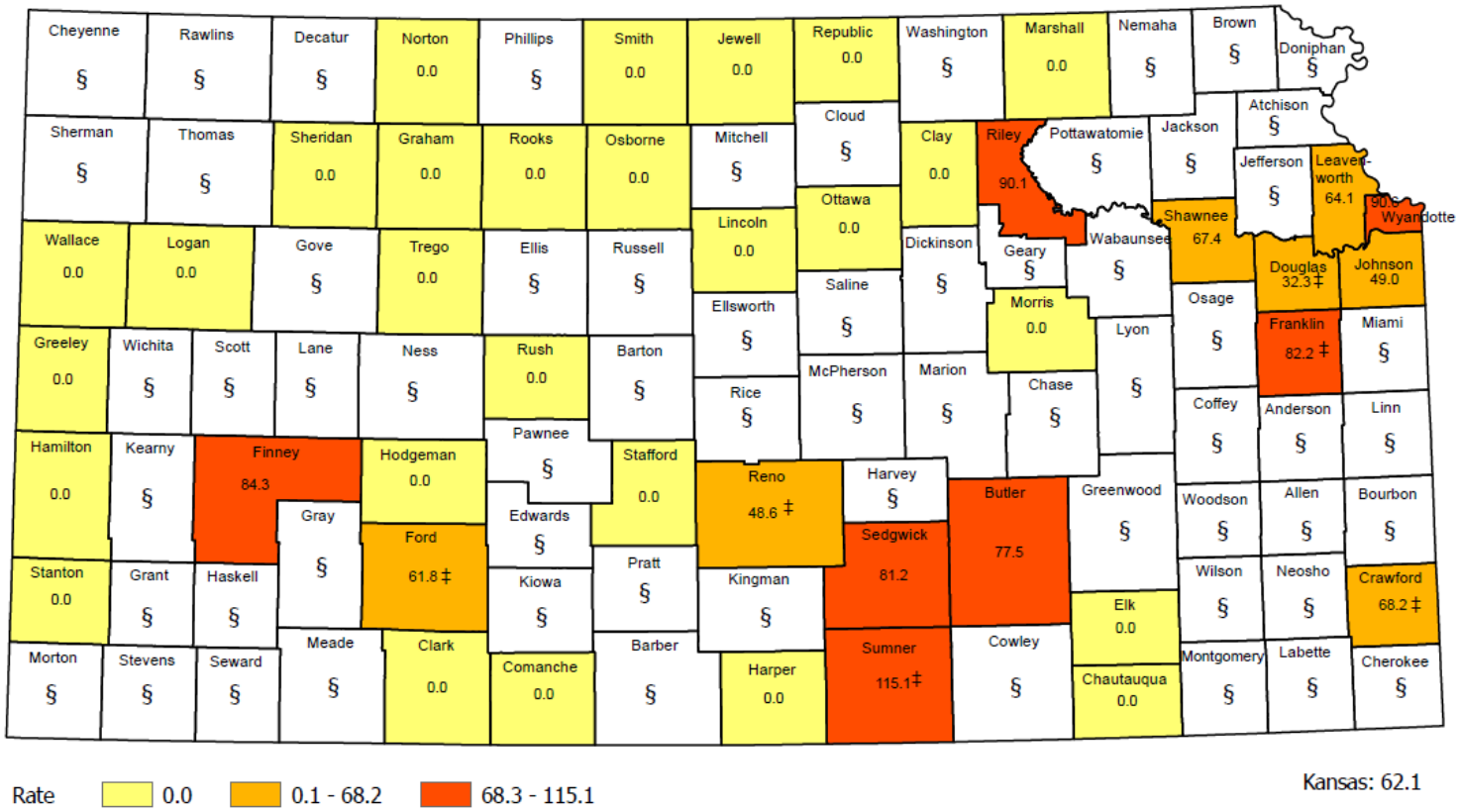


Figure 10.

Rates of severe maternal morbidity were significantly higher in medium metropolitan areas compared with other areas measured.

Severe Maternal Morbidity (SMM) Rates per 10,000 Delivery Hospitalizations, by County of Residence, Kansas 2016-2020

Source: Kansas Department of Health and Environment, Kansas hospital discharge data (resident)



US: 81.0 rates per 100,000 delivery hospitalizations in 2019 (calculated using the available State data and are not nationally weighted). Reference: Maternal and Child Health Bureau. Federally Available Data (FAD) Resource Document. April 1, 2022; Rockville, MD.

‡ The rate is based on fewer than 20 cases, does not meet the requirement for a minimum degree of accuracy, and should be interpreted with caution.
RSE (Relative Standard Error): Defined as the estimate divided by its standard error.
RSE is an indicator for statistical reliability. § Estimates with a RSE greater than 30% are replaced with a § and are suppressed.

Maternal Mortality

KMMRC Determined that 105 Deaths were Pregnancy-Associated Deaths.

A pregnancy-associated death refers to the death of a woman while pregnant or anytime within one year of pregnancy regardless of cause. Of the 132 identified deaths that occurred in Kansas (regardless of residency) in 2016-2020, the KMMRC determined that 105 (79.5 percent) deaths were pregnancy-associated. The other 27 deaths were false positives.

The following are based on the KMMRC reviews and decisions on the 105 pregnancy-associated deaths, which translated to a pregnancy-associated mortality ratio (PAMR) of **56 deaths per every 100,000 live births** that occurred in Kansas. Figure 10 shows trends in PAMRs in Kansas from 2016 to 2020. Although the Kansas PAMRs appeared to be trending upward by 7.1 percent per year (95 percent confidence interval: -14.2, 33.6), the upward trend was not statistically significant (Figure 11).

Please note that on March 11, 2020, the World Health Organization (WHO) declared COVID-19, the disease caused by the SARS-CoV-2, a pandemic. Therefore, the year 2020 includes the first year of the pandemic. No pregnancy-associated deaths/cases of SARS-CoV-2 were reported in 2020 in Kansas.

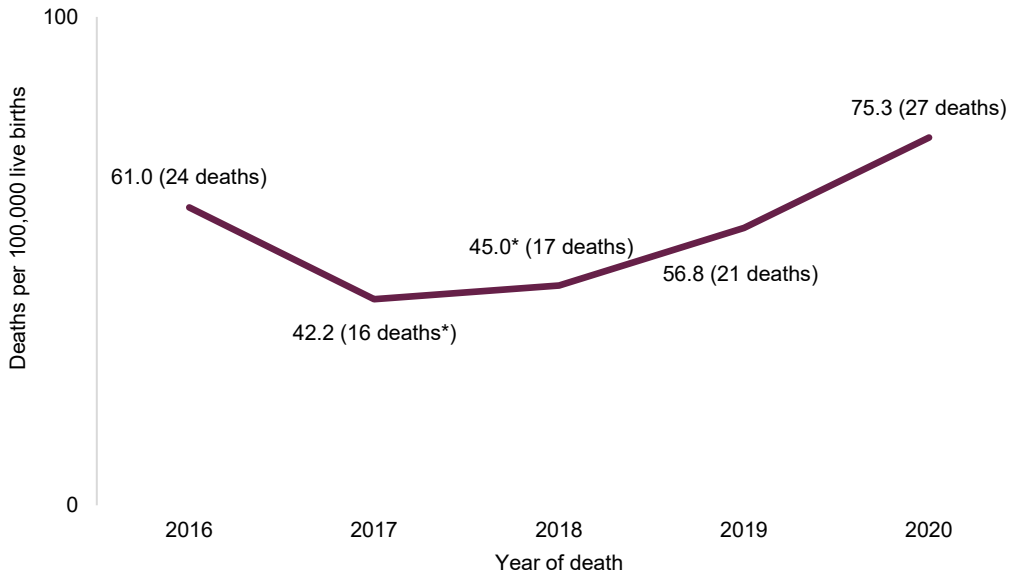
Figure 11.

The number of pregnancy-associated deaths has increased since 2017.

Pregnancy-associated mortality ratios and pregnancy-associated deaths, Kansas, 2016-2020

*Ratios based on fewer than 20 occurrences are statistically unreliable and should be used with caution.

Source: Kansas Maternal Mortality Review Committee; Kansas Department of Health and Environment, Kansas live births data (occurrence)



Of the 105 pregnancy-associated deaths reviewed, the KMMRC determined (Figure 12):

- Twenty-nine deaths (27.6 percent) were pregnancy-related,
- Fifty-five deaths (52.4 percent) were pregnancy-associated, but not-related and
- Twenty-one deaths (20.0 percent) were pregnancy-associated but unable to determine the pregnancy-relatedness.

Figure 12.

The number of pregnancy-related death has steadily increased since 2017.

Pregnancy-Associated Deaths by Pregnancy-Relatedness, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee

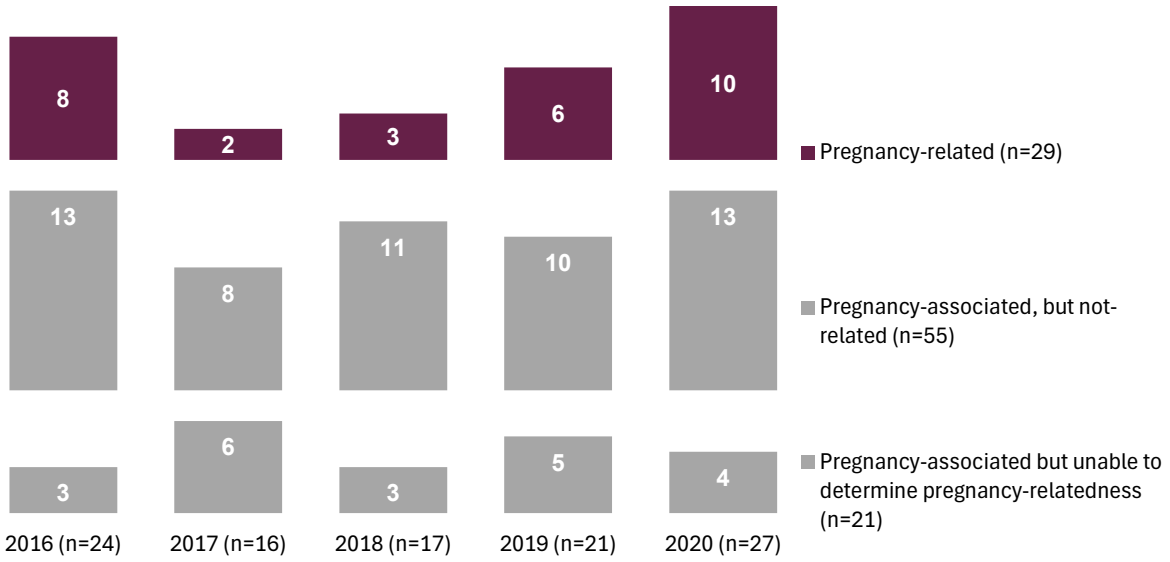


Table 7 describes the demographic characteristics of women who experienced a pregnancy-associated death. The prevalence of pregnancy-associated deaths was highest among women aged 20-34, with a high school education or less, who were non-Hispanic White, who were on Medicaid during pregnancy or for delivery, were never married, who were overweight or obese, who lived in a ZIP Code with the lowest median household income (quartile 1), and who lived in metropolitan counties.

In Table 7, the pregnancy-associated mortality ratio (PAMR) is also shown for different sub-groups of women. The PAMR is more meaningful than case counts when comparing the likelihood of pregnancy-associated death across different groups.[28] The PAMR is calculated by dividing the number of pregnancy-associated deaths by the number of live births for each sub-group, multiplied by 100,000.[29] The PAMR is interpreted as the number of deaths that occurred for every 100,000 live births in a specific group of women.[30] As shown in Table 8,

[28] Illinois Department of Public Health. Illinois Maternal Morbidity and Mortality Report. October 2018. https://dph.illinois.gov/content/dam/soi/en/web/idph/files/publications/publicationsowhmaternalmorbiditymortalityreport112018.pdf.
[29] Ibid.
[30] Ibid.

pregnancy-associated mortality is not equally experienced by all groups of women. There are significant differences in the PAMR for women based on their age, racial and ethnicity, education level, insurance type, marital status, prenatal care, and the location of residence based on the ZIP Code median household income (socioeconomic) groups.

- **Women less than 25 years of age** experienced the highest PAMR and were **nearly twice** as likely to die within a year of pregnancy compared to those ages 25-29.
- **Non-White minority women** were **nearly twice** as likely to die within a year of pregnancy as non-Hispanic White women.
- **Women with a high school education or less** were **nearly three times** as likely to die within one year of pregnancy as women who had more than a high school education.
- **Women on Medicaid** during pregnancy or for delivery were **nearly four times** as likely to die within one year of pregnancy as women with private insurance.
- **Unmarried women** were **nearly four times** as likely to die within one year of pregnancy as married women.
- **Obese women** were **nearly twice** as likely to die within one year of pregnancy as normal-weight women.
- **Women who delayed entry into prenatal care (entering after the first trimester) or received no prenatal care** were **more than twice** as likely to die within one year of pregnancy as women who entered prenatal care during the first trimester.
- **Women who lived in ZIP Codes with the lowest median household income (quartile 1, poorest)** were **more than twice** as likely to die within one year of pregnancy as women who lived in the highest median household income (quartile 4, wealthiest).

It is important to identify the differences in pregnancy-associated deaths. It is important to understand who is most affected by pregnancy-associated death in order to target interventions and resources.[31]

[31] Illinois Maternal Morbidity and Mortality Report, op. cit., p. 26.

Table 7.

Data interpretation example: The row for women with a high school education or less means that 64 pregnancy-associated deaths occurred among women with a high school or less in Kansas from 2016 to 2020. These deaths represented 61.0 percent of all the pregnancy-associated deaths that occurred over that period. Women with a high school education or less in Kansas experienced pregnancy-associated deaths at a ratio of 96.9 deaths per 100,000 live births (i.e., for every 100,000 births among women with a high school or less, 97 women with a high school or less experienced a pregnancy-associated death).

Characteristics of Women Experienced a Pregnancy-Associated Death, Kansas, 2016-2020

Sources: Kansas Maternal Mortality Review Committee; Kansas Department of Health and Environment, Kansas live births data (occurrence)

Demographics	Number	Percent[a] of all pregnancy-associated deaths	Pregnancy-associated mortality ratio		
			Ratio[b]	95 percent conference interval	
All women	105	100.0	55.9	45.2	66.6
Age in years at time of death					
<20	9	8.6	-[c]	-	-
20-24	28	26.7	69.5	46.2	100.4
<25	37	35.2	73.7	51.9	101.6
25-29	25	23.8	42.5	27.5	62.8
30-34	27	25.7	51.7	34.1	75.2
35-39	*13*	12.4	*58.0*[e]	*30.9*	*99.2*
≥40	3	2.9	-	-	-
≥35	*16*	15.2	*60.6*[e]	*34.7*	*98.5*
Race and ethnicity					
Non-Hispanic White	59	56.2	45.3	34.5	58.4
Racial/ethnic minorities	46	43.8	80.1	58.6	106.8
Hispanic[d]	*16*	15.2	*51.1*[e]	*29.2*	*83.0*
Non-Hispanic Black	*19*	18.1	*141.6*[e]	*85.2*	*221.1*
Non-Hispanic, Other Race *American Indian or Alaska Native (3)* *Pacific Islander (1)* *Two or more races or other non-specified race and ethnicity (7)*	*11*	10.5	*86.4*[e]	*43.1*	*154.6*
Education					
High school or less	64	61.0	96.9	74.6	123.8
More than high school	40	38.1	33.1	23.6	45.0
Some college	23	21.9	60.2	38.1	90.3
Associate or bachelor's degree	*13*	12.4	*21.2*[e]	*11.3*	*36.3*
Advanced degree	*4*	*3.8*	-	-	-
Unknown	1	1.0	-	-	-
Health insurance during pregnancy or for delivery					

Medicaid	62	59.0	109.5	84.0	140.4
Private	31	29.5	29.2	19.8	41.4
Uninsured or self-pay	4	3.8	-	-	-
Unknown	8	7.6	-	-	-
Marital status					
Married	33	31.4	27.3	18.8	38.4
Unmarried *Divorced (9)* *Never married (61)*	70	66.7	104.4	81.4	131.9
Unknown	2	1.9	-	-	-
Pre-pregnancy Body mass index (BMI)[f]					
Underweight	3	2.9	-	-	-
Normal weight	29	27.6	38.0	25.4	54.6
Overweight	*17*	16.2	*33.5[e]*	*19.5*	*53.7*
Obese	37	35.2	67.6	47.6	93.1
Unknown	19	18.1	-	-	-
Prenatal care entry					
1st trimester	64	61.0	42.1	32.4	53.7
Late and none	41	39.0	118.0	84.7	160.1
2nd trimester	*17*	16.2	*62.4[e]*	*36.3*	*99.8*
3rd trimester	*5*	4.8	-	-	-
None	*9*	8.6	-	-	-
Unknown	10	9.5	-	-	-
Location of last residence within Kansas (excluding 14 out of state residents)					
Median household income of maternal residential ZIP Code[g]					
Quartile 1 (poorest)	36	39.6	78.7	55.1	109
Quartile 2	23	25.3	54.1	34.3	81.1
Quartile 3	*19*	20.9	*43.7[e]*	*26.3*	*68.2*
Quartile 4 (wealthiest)	*13*	14.3	*31.5[e]*	*16.8*	*53.8*
Urban-rural residence[h]					
Metropolitan	54	59.3	45.7	34.3	59.6
Micropolitan	24	26.4	68.7	44.0	102.3
Rural	*13*	14.3	*63.5[e]*	*33.8*	*108.7*

[a] Percentages may not total 100 due to rounding. Due to rounding some totals may not correspond with the sum of the separate figures.

[b] Number of deaths per 100,000 live births.

[c] Ratios are not reported when number of decedents is <10 or when characteristic response is “unknown”. It is denoted by “-“.

[d] Includes persons of any race.

[e] The ratio is based on fewer than 20 cases, does not meet the requirement for a minimum degree of accuracy, and should be interpreted with caution.

[f] Body mass index (BMI): a key index for relating a person’s body weight to their height. The BMI is a person’s weight in pounds times 703 divided by their height in inches squared. Adult BMI ranges underweight: <18.5, normal weight: 18.5-24.9, overweight: 25.0-29.9, and obese: ≥30.0.

[g] Based on the median household income of the maternal ZIP Code of last residence. Quartiles are defined so that the total Kansas population is evenly distributed. Cut-offs for the quartiles are determined using ZIP Code demographic data obtained from the U.S. Census, American Community Survey, 2016-2020, Table S1903, Median Income in the Past 12 Months (in 2020 inflation-adjusted dollars). Each ZIP Code was classified into quartiles based on median household income of each ZIP Code. These quartiles are the following: quartile 1: $1 to $48,695; quartile 2: $48,696 to $57,025; quartile 3: $57,026 to $76,121; quartile 4: $76,122 or more.

[h] Counties of last residence are classified into three urbanization levels - metropolitan (large fringe, medium, small) counties, micropolitan counties, noncore (rural) counties - using the 2013 National Center for Health Statistics (NCHS) Rural-Urban Classification Scheme for Counties. Large fringe metropolitan is defined as metropolitan areas with at least 1 million residents (Johnson, Leavenworth, Linn, Miami, Wyandotte). Medium metropolitan is defined as metropolitan areas of 250,000-999,999 residents (Butler, Harvey, Kingman, Sedgwick, Sumner). Small metropolitan is defined as metropolitan areas of less than 250,000 residents (Doniphan, Douglas, Jackson, Jefferson, Osage, Pottawatomie, Riley, Shawnee, Wabaunsee). Micropolitan is defined as micropolitan areas of 10,000-49,999 residents (Atchison, Barton, Cowley, Crawford, Ellis, Finney, Ford, Franklin, Geary, Kearny, Labette, Lyon, McPherson, Montgomery, Ottawa, Reno, Saline, Seward). Noncore (rural) is defined as noncore areas of <10,000 residents (remainder of the state).

Of the 105 pregnancy-associated deaths that occurred in Kansas from 2016 to 2020, 55 deaths (52.4 percent) occurred 43 days to one year after the end of pregnancy, 30 (28.6 percent) occurred during pregnancy, and 20 (19.0 percent) occurred within 42 days of the end of pregnancy (Figure 13). These data show that tracking pregnancy-associated deaths to one year postpartum is essential, rather than the traditional measure of the first 42 days, as **more than half (52.4 percent) of all pregnancy-associated deaths occurred after 42 days postpartum**. In Kansas, among non-Hispanic Black women, a greater proportion of pregnancy-associated deaths occurred during pregnancy and within 42 days postpartum (78.9 percent).

In response to the ongoing public health emergency/pandemic, new Kansas mothers' coverage was extended from 60 days to 12 months. Currently, Kansas Medicaid has received the approval to make this extension permanent beginning in 2022. The additional 10 months of coverage for eligible individuals ensures access to quality healthcare for this at-risk population before, during, and after pregnancies, with the goal of reducing preventable pregnancy-associated deaths. Furthermore, this extension is one step to closing the gaps in care and support early identification and intervention during pregnancy.

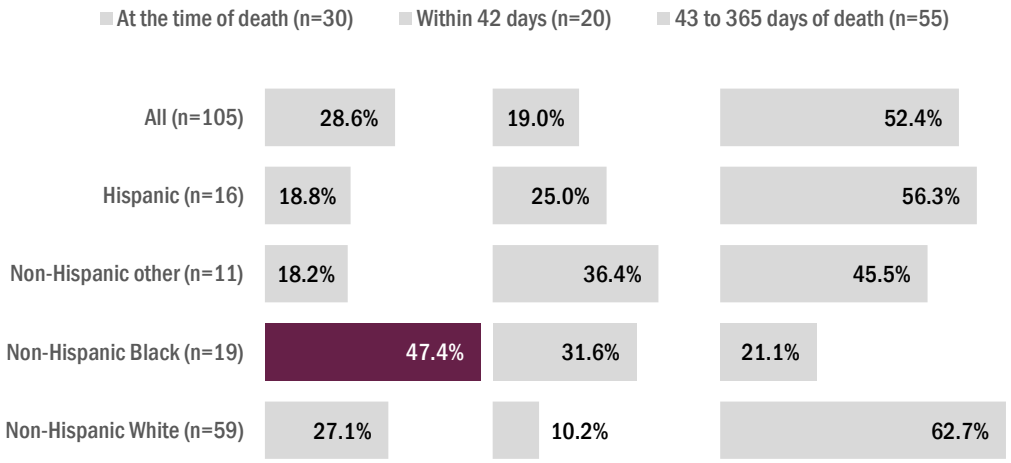
Figure 13.

Non-Hispanic Black mothers were more likely to be pregnant at the time of death among pregnancy-associated deaths.

Timing of Pregnancy-Associated Deaths by Race and Ethnicity, Kansas, 2016-2020

Percentages might not total 100 due to rounding.

Source: Kansas Maternal Mortality Review Committee



Underlying cause refers to the disease or injury that initiated the chain of events leading to death or the circumstances of the accident or violence which produced the fatal injury.[32] The combination of the underlying cause of death determined by the KMMRC and the underlying cause field on the death certificate were used to categorize the type of pregnancy-associated death. For pregnancy-associated deaths that occurred from 2016 to 2020, nearly half (49 deaths, 47.1 percent) were related to medical causes of death such as cardiovascular conditions, embolism, infection, or hypertensive disorders of pregnancy (Figure 14). Nearly one-third (29 deaths, 27.7 percent) were caused by homicide, suicide, mental health conditions, or unintentional poisoning/overdose. Motor vehicle and fire/burn accidents accounted for the remaining deaths (24 deaths, 22.9 percent).

[32] Centers for Disease Control and Prevention. Division of Reproductive Health. Building U.S. Capacity to Review and Prevent Maternal Deaths Program. Maternal Mortality Review Committee Decisions Form v.24. May 8, 2024. https://www.cdc.gov/maternal-mortality/media/pdfs/2024/05/mmria-form-v24-fillable-508.pdf.

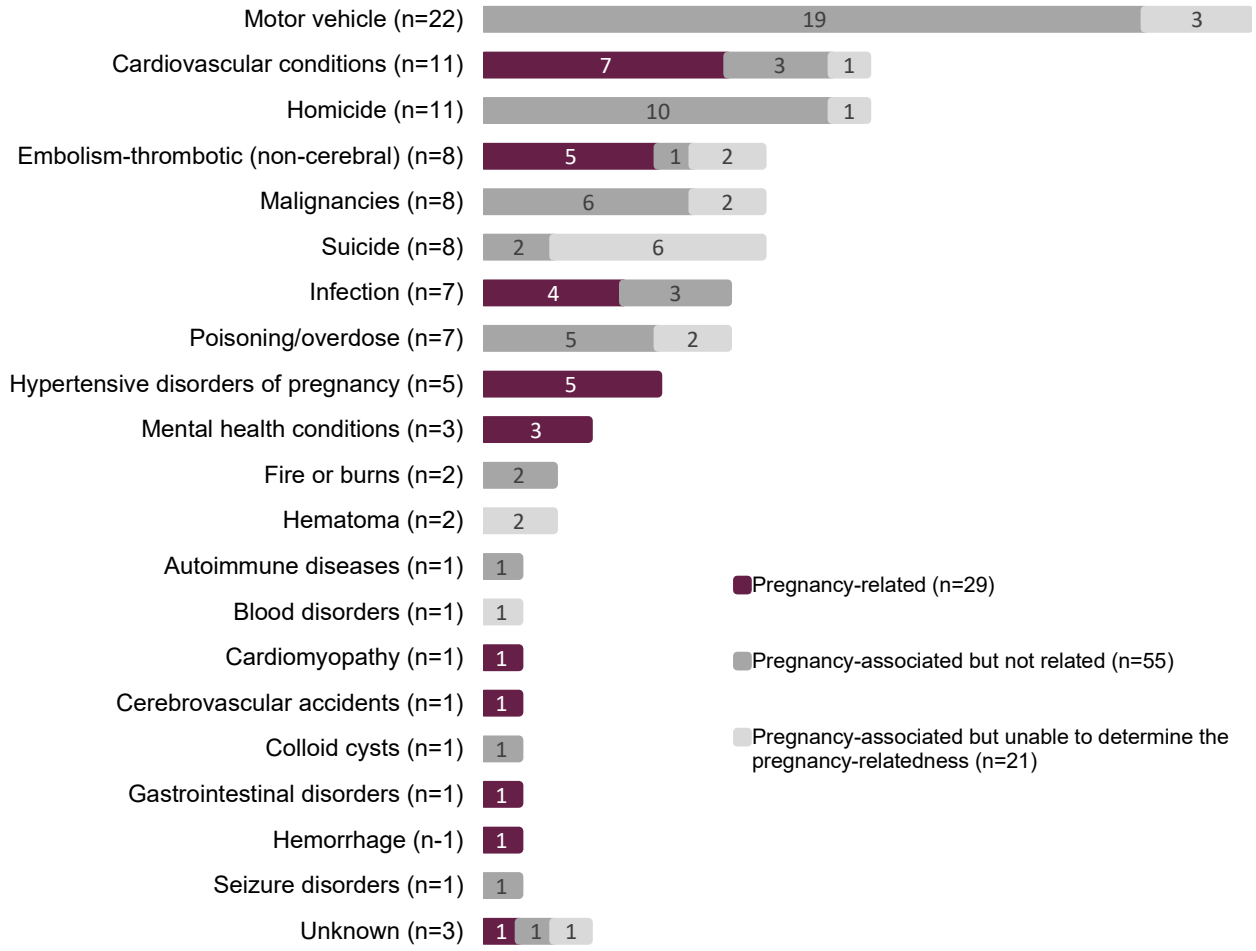
Figure 14.

Nearly half of pregnancy-associated deaths (49 deaths, or 47.1 percent) were due to medical causes.

Number of Underlying Causes of Death for Pregnancy-Associated Deaths by Pregnancy-Relatedness, Kansas, 2016-2020

For Figure 14, the underlying cause of death categories listed below are mutually exclusive – meaning that each case is classified into only one of the groups. In the death that a suicide was completed by intentionally overusing a drug or medication, these cases are included in the "Suicide" category and not the "Poisoning/overdose" category.

Source: Kansas Maternal Mortality Review Committee



Timing of pregnancy-associated deaths varied somewhat by cause (Table 8). Overall, of the 105 pregnancy-associated deaths that occurred in Kansas from 2016 to 2020, more than two-thirds occurred in the postpartum period (75 deaths, 71.4 percent). The leading cause of death for postpartum women was motor vehicle accidents (15 deaths, 20.0 percent), followed by cardiovascular conditions (9 deaths, 12.0 percent), malignancies (8 deaths, 10.7 percent), accidental poisoning/overdose (7 deaths, 9.3 percent), embolism (5 deaths, 6.7 percent), homicide (5 deaths, 6.7 percent), and infection (5 deaths, 6.7%).

Table 8.

More than two-thirds of pregnancy-associated deaths occurred in the postpartum period.

Timing of Pregnancy-Associated Death by Underlying Causes of Death, Kansas, 2016-2020

Percentages might not total 100 due to rounding.

*Postpartum period includes deaths within 42 days plus deaths within 43 to 365 days.

Source: Kansas Maternal Mortality Review Committee

Underlying cause of death	Timing of pregnancy-associated deaths							
	Pregnant		Within 42 days		Within 43 to 365 days		Postpartum period*	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Motor vehicle crash (n=22)	7	31.8	0	0.0	15	68.2	15	68.2
Cardiovascular conditions (n=11)	2	18.2	4	36.4	5	45.5	9	81.8
Homicide (n=11)	6	54.5	1	9.1	4	36.4	5	45.5
Embolism-Thrombotic (non-cerebral) (n=8)	3	37.5	3	37.5	2	25.0	5	62.5
Malignancies (n=8)	0	0.0	0	0.0	8	100.0	8	100.0
Suicide (n=8)	4	50	1	12.5	3	37.5	4	50.0
Infection (n=7)	2	28.6	3	42.9	2	28.6	5	71.4
Poisoning/overdose (n=7)	0	0.0	2	28.6	5	71.4	7	100.0
Hypertensive disorders of pregnancy (n=5)	2	40.0	3	60.0	0	0.0	3	60.0
Mental health conditions (n=3)	1	33.3	0	0.0	2	66.7	2	66.7
Fire or burns (n=2)	0	0.0	0	0.0	2	100	2	100.0
Hematoma (n=2)	1	50	0	0.0	1	50	1	50.0
Autoimmune diseases (n=1)	0	0.0	0	0.0	1	100	1	100.0
Blood disorders (n=1)	0	0.0	1	100	10	0.0	1	100.0
Cardiomyopathy (n=1)	0	0.0	0	0.0	1	100	1	100.0
Cerebrovascular accidents (n=1)	0	0.0	1	100	0	0.0	1	100.0
Colloid cysts/non-malignant tumor (n=1)	0	0.0	0	0.0	1	100	1	100.0
Gastrointestinal Disorders (n=1)	0	0.0	0	0.0	1	100	1	100.0
Hemorrhage (Excludes	0	0.0	1	100	0	0.0	1	100.0

Aneurysms or CVA) (n=1)								
Seizure disorders (n=1)	0	0.0	0	0.0	1	100	1	100.0
Unknown COD (n=3)	2	66.7	0	0.0	1	33.3	1	33.3
Total (n=105)	**30**	**28.6**	**20**	**19.0**	**55**	**52.4**	**75**	**71.4**

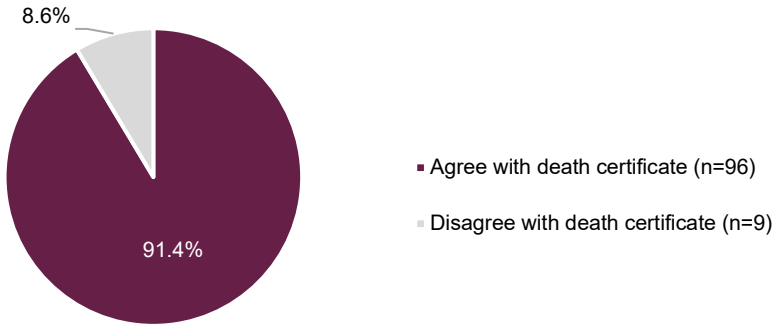
In 91.4 percent (96 deaths) of the pregnancy-associated deaths the KMMRC agreed with the cause of death listed on the death certificate (Figure 15). In many cases the KMMRC was able to identify a more specific underlying cause of death than was listed on the death certificate.

Figure 15.

The KMMRC agreed with the cause of death listed on the death certificate in 91.4% of pregnancy-associated deaths.

Committee Agreement with Cause of Death Listed on Death Certificate, Pregnancy-Associated Deaths, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee



While pregnancy-associated deaths can occur across any racial and ethnic group, in Kansas from 2016-2020, data showed that non-Hispanic Black women and other non-Hispanic minority women were disproportionately impacted (Figures 16 and 17). Figure 16 shows that 18.1 percent of deaths were among non-Hispanic Black women, while making up just 7.1 percent of live births. Additionally, non-Hispanic other minority women represented 10.5 percent of the deaths while making up 6.8 percent of live births.

Figure 16.

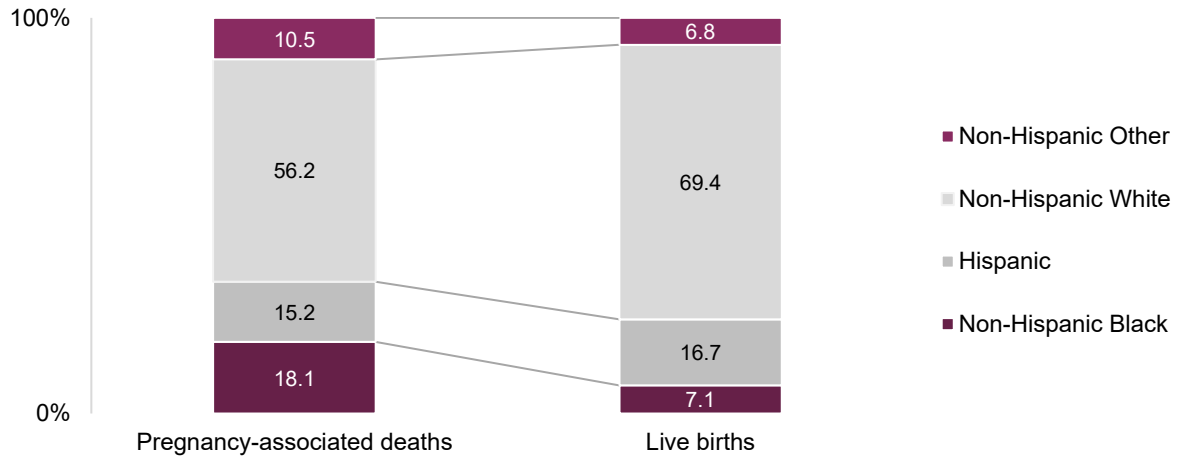
Pregnancy-associated deaths disproportionately affected non-Hispanic Black women and other non-Hispanic minority women.

Data interpretation example: Disproportionality refers to the state of being out of proportion. Non-Hispanic Black women made up 7.1% of live births in Kansas from 2016 to 2020 but accounted for 18.1% of the pregnancy-associated deaths.

Percent of Pregnancy-Associated Deaths and Live Births by Race and Ethnicity, Kansas, 2016-2020

Percentages might not total 100 due to rounding.

Source: Kansas Maternal Mortality Review Committee; Kansas Department of Health and Environment, birth data (occurrence)



- Medical causes were the most common cause of death for all racial and ethnic groups; however, medical deaths were responsible for a larger proportion of pregnancy-associated deaths for non-Hispanic Black (63.2 percent) and Hispanic women (56.3 percent) compared to non-Hispanic white women (40.7 percent).

- Homicides accounted for 15.8 percent of all pregnancy-associated deaths among non-Hispanic Black women and 12.5 percent among Hispanic women. In contrast, homicide accounted for a smaller proportion of pregnancy-associated deaths among non-Hispanic white women (8.5 percent).

- Suicides, including three cases with mental health conditions (one suicide, one probable suicide, and one unknown), accounted for 27.3 percent of all pregnancy-associated deaths among non-Hispanic other women, and 15.8 percent among non-Hispanic Black women. However, suicides caused slightly fewer pregnancy-associated deaths among non-Hispanic white women (8.5 percent) and did not result in any pregnancy-associated deaths among Hispanic women.

- Accidental/unintentional drug poisoning/overdose comprised 10.2 percent of all pregnancy-associated deaths among non-Hispanic white women. In contrast, drug poisoning/overdose did not cause any pregnancy-associated deaths among non-Hispanic Black and Hispanic women.

- Motor vehicle crashes accounted for 25.4 percent, 25.0 percent, 18.2 percent of all pregnancy-associated deaths among non-Hispanic white, Hispanic and non-Hispanic other women, respectively. However, it accounted for smaller proportion pregnancy-associated deaths among non-Hispanic Black women (5.3 percent).

- When considering homicides, suicides (including three mental health conditions), and unintentional poisoning/overdoses combined, they accounted for 45.5 percent of deaths among non-Hispanic Other women, 31.6 percent among non-Hispanic Black women, and 27.1 percent among non-Hispanic white women. However, these causes accounted for only 12.5 percent of deaths among Hispanic women.

It should be noted that due to time and resource restrictions, a comprehensive review of each death is not possible. Furthermore, questions regarding differences in deaths and preventability cannot be identified solely using death certificate data.[33]

The KMMRC also examined the circumstances surrounding pregnancy-associated deaths and assessed the contributions of obesity, discrimination (for deaths reviewed after May 29, 2020), mental health conditions other than substance use disorder, and substance use disorder (SUD) to each death, as indicated by the Maternal Mortality Review Committee Decisions Form (refer to Appendix G). Among the 105 pregnancy-associated deaths, obesity was determined to contribute to 23.8 percent (25 deaths, including three probable contributions), discrimination to 7.4 percent (4 deaths, all probable contributions), mental health conditions other than substance use disorder to 22.9 percent (24 deaths, including eight probable contributions), and substance use disorder to 26.7 percent (28 deaths, including four probable contributions) (Figure 18).

While these four factors did not directly cause maternal mortality, the committee found them to be contributing factors in several maternal deaths. Understanding the complex relationship between these contributing factors and maternal mortality requires further analysis. Obesity can serve as an underlying factor that may lead to death associated with complications from chronic diseases. Discrimination can act as an underlying factor that may result in death, manifested through disparities in care, clinical communication, or shared decision-making.[34] Mental health conditions and/or substance use disorder can serve as underlying factors that may lead to suicide, accidental death, death from accidental drug intoxication, or homicide.[35]

[33] Illinois Maternal Morbidity and Mortality Report, op. cit., p. 26.
[34] Maternal Mortality Review Committee Decisions Form v.24. May 8, 2024, op. cit., p. 31.
[35] Report from nine maternal mortality review committees, op. cit., p. 5.

Figure 17.

Racial and ethnic minorities are disproportionately affected by medical complications, leading to a higher rate of pregnancy-associated deaths.

Underlying Cause of Death for Pregnancy-Associated Deaths by Race and Ethnicity, Kansas, 2016-2020

For Figure 17, the six categories listed below are mutually exclusive - meaning that each case is classified into only one of the six groups. In the death that a suicide was completed by intentionally overusing a drug or medication, these cases are included in the "Suicide" category and not the "Poisoning/overdose" category.

Percentages might not total 100 due to rounding.

Source: Kansas Maternal Mortality Review Committee

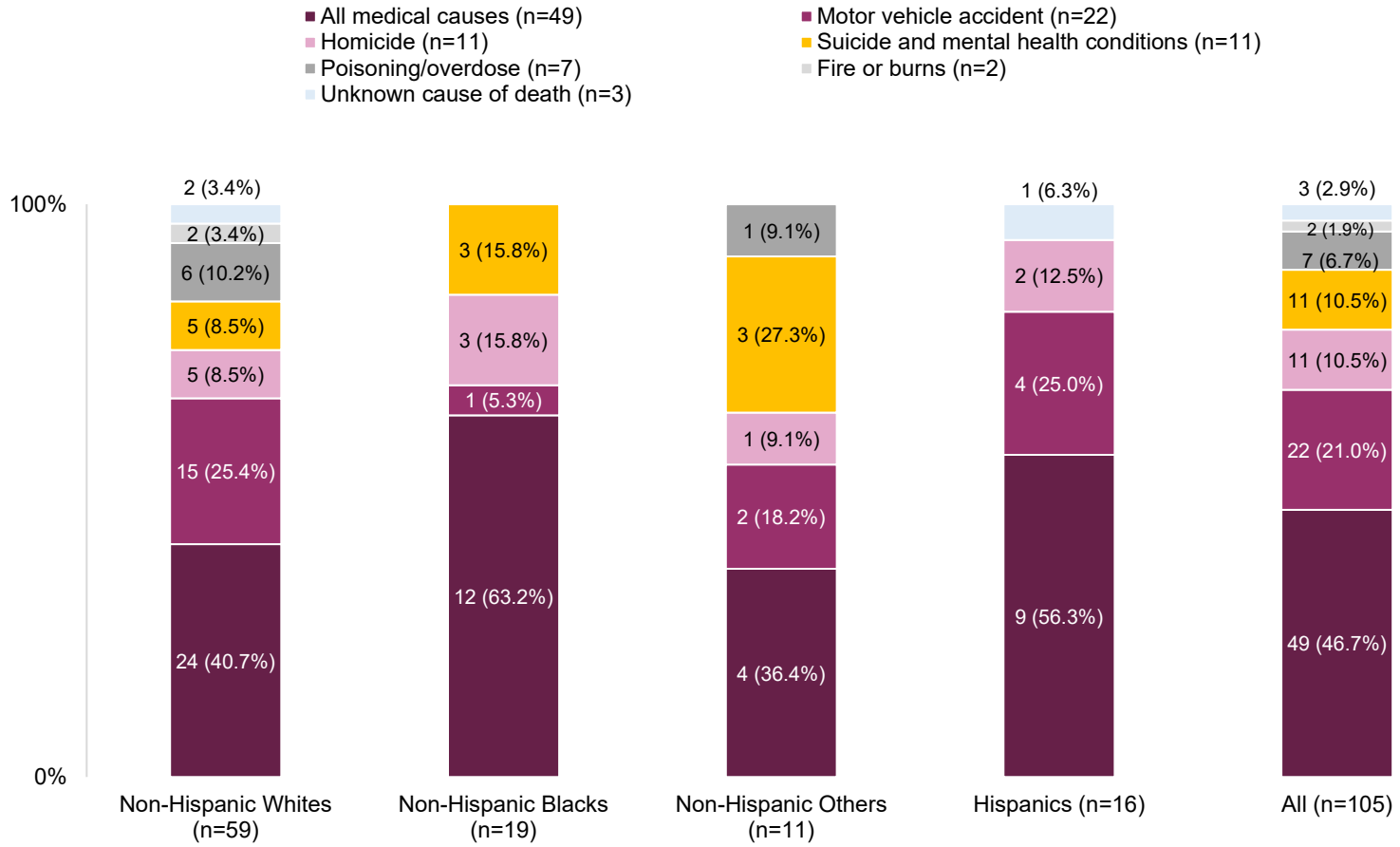


Figure 18.

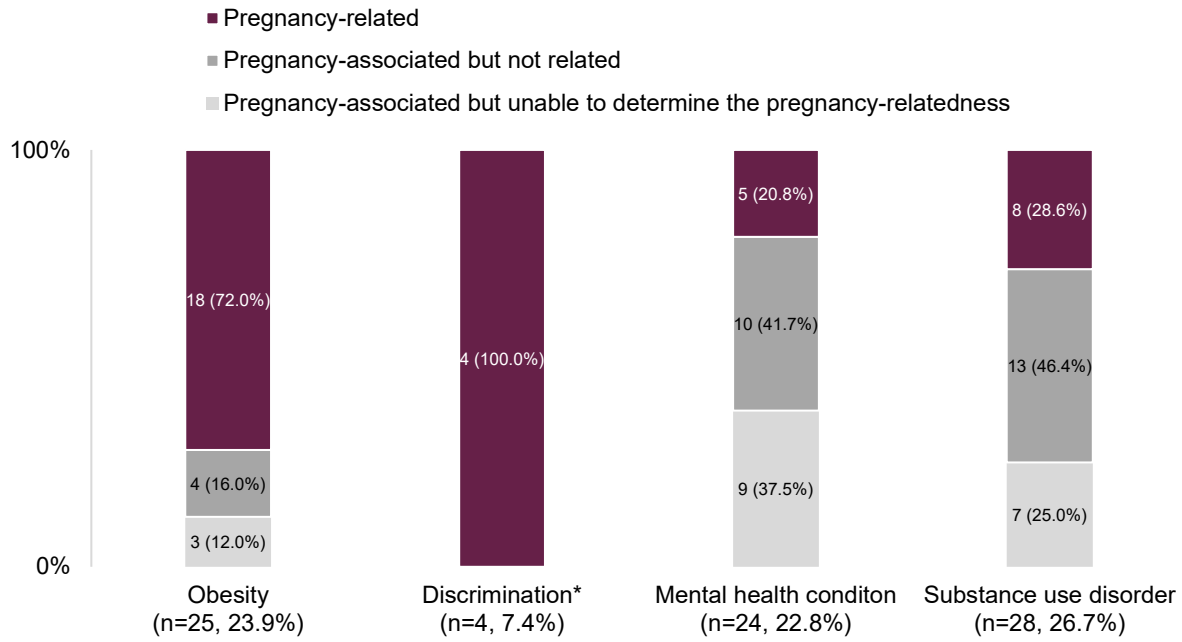
All deaths in which discrimination probably contributed were determined as pregnancy-related.

Factors that Contributed to Pregnancy-Associated Deaths, Kansas, 2016-2020

Percentages might not total 100 due to rounding.

*Subset of all deaths reviewed after May 29, 2020 when this checkbox was added to the committee decisions form.

Source: Kansas Maternal Mortality Review Committee



Regarding pregnancy-associated deaths where discrimination played a role, discrimination is defined as treating someone less or more favorably based on biases, prejudices, and stereotypes associated with their group, class or category. All of the deaths where discrimination* contributed (100.0 percent, 4 deaths) were determined as pregnancy related. Half of these deaths (50.0 percent, 2 deaths) occurred in the late post-partum period, between 43 days to one year after the end of pregnancy. All of the deaths occurred among women receiving Medicaid (100.0 percent, 4 deaths), while three-quarters of these deaths were to non-Hispanic Black women (75.0 percent, 3 deaths), and half were to women with a high school education or less (50.0 percent, 2 deaths) and women who lived in metropolitan areas (50.0 percent, 2 deaths). *Subset of all deaths reviewed after May 29, 2020 when this checkbox was added to the committee decisions form.

Mental health conditions, including postpartum depression, are diagnosed psychiatric disorders experienced by women.[36] Of the pregnancy-associated deaths where mental health conditions contributed, the majority (79.2 percent, 19 deaths) were categorized as pregnancy-associated but not directly related to pregnancy, such as suicides or cases of poisoning/overdose. These deaths predominantly occurred during the late postpartum period (62.5 percent, 15 deaths),

[36] Maternal Mortality Review Committee Decisions Form v.24. May 8, 2024, op. cit., p. 31.

which is between 43 days to one year after the end of pregnancy. Among these deaths, over half were among non-Hispanic White women (54.2 percent, 13 deaths), women with a high school education or less (58.3 percent, 14 deaths), women with Medicaid coverage (66.7 percent, 16 deaths), women who were never married or divorced (83.3 percent, 20 deaths), and women residing in metropolitan areas (59.1 percent, 13 deaths).

Substance use disorder (SUD) is characterized by recurrent use of alcohol and/or illicit/prescription drugs causing clinically and functionally significant impairment, resulting in health problems or disability. The KMMRC determines that SUD contributed to a pregnancy-associated death when the disorder directly compromised the woman's health status (e.g., acute methamphetamine intoxication exacerbated pregnancy-induced hypertension, or women was more vulnerable to infections or medical conditions).[37] SUD accounted for the highest percentage of pregnancy-associated deaths among the four factors examined. SUD contributed to 26.7 percent of all pregnancy-associated deaths, as depicted in Figure 17. Of the SUD contributed pregnancy-associated deaths, the majority (71.4 percent, 20 deaths) were pregnancy-associated, but not directly related to pregnancy, including cases of poisoning/overdose, suicide, cardiovascular conditions, mental health conditions, infection, embolism, fire or burns, or motor vehicle crash. Approximately two-thirds (60.7 percent, 17 deaths) of these deaths occurred in the late post-partum period, 43 days to one year after the end of pregnancy. Most of these deaths were among non-Hispanic white women (60.7 percent, 17 deaths), women with a high school education or less (64.3 percent, 18 deaths), women with Medicaid coverage (78.6 percent, 22 deaths), women who have never been married or divorced (89.3 percent, 25 deaths), and women who lived in metropolitan areas (57.7 percent, 15 deaths).

The manner of death refers to the mechanism or circumstances resulting in death, categorized as natural or unnatural. Unnatural deaths are further classified as accidents, homicides, suicides or undetermined (as shown in Table 10).[38] Table 9 presents the manners of death, as recorded on the death certificate, for all 105 pregnancy-associated deaths. Approximately 60.0 percent (63 deaths) of pregnancy-associated deaths were of an unnatural manner. The KMMRC discussed and determined whether each pregnancy-associated death was a suicide or homicide as specified by the Maternal Mortality Review Committee Decisions Form (see Appendix G). In cases of accidental death, homicide, or suicide, the KMMRC also determined the means of fatal injury as specified by the Maternal Mortality Review Committee Decisions Form (see Appendix G).

[37] Maternal Mortality Review Committee Decisions Form v.24. May 8, 2024, op. cit., p. 31.
[38] A Report on Pregnancy-Associated Deaths in Ohio 2008-2016. The Ohio Department of Health 2019. https://odh.ohio.gov/know-our-programs/pregnancy-associated-mortality-review/Reports/Pregnancy-Associated-Deaths-Ohio-2008-2016.

Table 9.

Two-thirds of pregnancy-associated deaths were due to unnatural causes.

Manner of Death Among Pregnancy-Associated Deaths, Kansas, 2016-2020

Percentages might not total 100 due to rounding.

Source: Kansas Department of Health and Environment, Kansas death data (occurrence)

Manner	Number	Percent
Natural	42	40.0
Homicide	11	10.5
Accident	36	34.3
Suicide	11	10.5
Pending Investigation	2	1.9
Could not be determined	3	2.9
Total	105	100.0

Among the 105 pregnancy-associated deaths, eleven (10.5%) were attributed to substance poisoning/overdose, including two intentional and nine unintentional. The deaths consisted of one pregnancy-related, six not-related, and four cases where pregnancy-relatedness was unable to be determined. The ten poisoning/overdose deaths accounted for 13.2% of the 76 non-pregnancy-related deaths. Among the eleven overdose deaths, two were intentional: one involving mixed drug toxicity (fentanyl, heroin, and methamphetamine) and one due to polypharmacy (diphenhydramine, ephedrine, and loperamide). The remaining nine deaths were unintentional and involved various substances such as alprazolam, buprenorphine, ethanol, clonazepam, oxycodone, heroin, methamphetamine, hydrocodone, morphine, benzodiazepine, Kratom, and tetrahydrocannabinol (THC). The average age at the time of death was 27.9 years, ranging from 21 to 32 years).

A significant majority of substance overdose deaths occurred among women who were non-Hispanic White (9 deaths, 81.8 percent), with one case involving a non-Hispanic Black woman (9.1 percent), and another case involving a non-Hispanic woman of other race (9.1 percent). Among these deaths, Two-thirds of the women had Medicaid insurance *(*7 deaths, 63.6 percent), three had private insurance (27.3 percent), and one was self-pay (9.1 percent). Most overdose deaths were among women who were not married at the time of death (9 deaths, 81.8 percent), with one case of divorced (9.1 percent), and one case of married status (9.1 percent). Approximately a half of the women had a high school education or less (5 deaths, 45.5 percent), four had some college without a degree (36.4 percent), and two had an associate or bachelor's degree (18.2 percent). Nearly two-thirds of the deaths occurred in metropolitan areas (6 deaths, 60.0 percent), with three in a micropolitan areas (30.0 percent) and one in a rural area (10.0 percent). Mental health conditions were a contributing factor in ten out of the eleven overdose deaths (90.9 percent), and all eleven victims had a history of substance use disorder.

All overdose deaths occurred in the postpartum period, with approximately three-quarters of them occurring between 43 to 365 days postpartum (72.7 percent) and three within 42 days postpartum (27.3 percent). The year following childbirth is a critical period for women with

substance use disorder, emphasizing the need for longitudinal support and tailored interventions during the first year postpartum to prevent and reduce overdose events.[39,40] Access to affordable healthcare is particularly important during this period, as many women face challenges such as sleep deprivation and postpartum depression.[41]

Among the 105 pregnancy-associated deaths, eleven (10.5 percent) were determined as suicides. This includes one probable suicide due to mental health conditions and two probable suicide due to poisoning/overdose. Of these suicides, two were pregnancy-related, three were not-related, and six had undetermined pregnancy-relatedness. The most common methods used were hanging/strangulation/suffocation (63.6 percent), followed by poisoning/overdose (27.3%), and firearm (9.1 percent). Five suicides occurred during pregnancy (45.5 percent), five occurred between 43 to 365 days postpartum (45.5 percent), and one occurred within 42 days postpartum (9.1 percent). The average age at the time of death was 26.4 years, ranging from 15 to 34 years. The majority of suicides were among non-Hispanic White women (54.5 percent), with three among non-Hispanic women of other races (27.3 percent), and two involving non-Hispanic Black women (18.2 percent). Most of the victims were unmarried, including six who were never married and three who were divorced (81.8 percent), one was married at the time of death (9.1 percent), and one had an unknown marital status (9.1 percent). Over half of the suicides occurred among women with a high school education or less (54.5 percent), three had an associate or bachelor's degree (27.3 percent), and two some college education without a degree (18.2 percent).

There were 11 homicides among the pregnancy-associated deaths, accounting for 10.5 percent of the total. Among the 11 homicide deaths, ten (90.9 percent) were not related to pregnancy, and one case had undetermined pregnancy-relatedness (9.1 percent). Firearms were used in all homicide deaths reviewed**.** The average age at the time of death was 24.5 years, ranging from 19 to 33 years. Five of the homicides were among non-Hispanic White women (45.5 percent), while three were among non-Hispanic Black women (27.3 percent), two were among Hispanic women (18.2 percent), and one involved a non-Hispanic woman of another race (9.1 percent). Six of the 11 homicides occurred during pregnancy (54.5 percent), four occurred between 43 to 365 days postpartum (36.4 percent) and one occurred within 42 days postpartum (9.1 percent). The relationship of the perpetrator to the decedent was known for eight of 11 homicides. In cases where the relationship was known, the perpetrator was most often a current or former intimate partner (4 deaths, 36.4 percent), followed by an acquaintance (2 deaths, 18.2 percent) and stranger (2 deaths, 18.2 percent). The majority of the homicide victims were never married (10 deaths, 90.9 percent) with one case involving a married woman (9.1 percent). The majority were to women with a high school education or less (7 deaths, 63.6 percent), and most lived in metropolitan areas (8 deaths, 72.7 percent).

[39] Schiff DM, Nielsen T, Terplan M, et al. Fatal and Nonfatal Overdose Among Pregnant and Postpartum Women in Massachusetts. Obstet Gynecol. 2018;132(2):466-474. doi:10.1097/AOG.0000000000002734. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6060005/.
[40] ASTHO*Brief*. Preventing Fatal Overdoses in Postpartum Populations. April 2020. https://www.astho.org/ASTHOBriefs/Preventing-Fatal-Overdoses-in-Postpartum-Populations/.
[41] Ibid.

Data to Action: As of October 2019, a total of 37 pregnancy-associated deaths had been reviewed by the KMMRC. Ten (36%) of the 28 pregnancy-associated, but not-related deaths were the result of a motor vehicle crash. Frequently, the **women were not wearing seat belts and were ejected from the vehicle.** Deaths occurred during pregnancy and the postpartum period. An action alert discussing proper seat belt use during and after pregnancy was created and shared. The action alert can be found at: kmmrc.org/resources/action-alerts/.

Motor vehicle crashes were the leading cause of pregnancy-associated deaths in Kansas from 2016 to 2020. One in five pregnancy-associated deaths resulted from motor vehicle crashes (22 deaths, 21.0 percent), all of which were non-pregnancy-related. Among the 76 non-pregnancy-related deaths, motor vehicle crashes accounted for 28.9 percent of the cases, with 19 not-related cases and three cases where pregnancy-relatedness could not be determined. Two-thirds occurred between 43 to 365 days postpartum (15 deaths, 68.2 percent), and the remaining seven deaths occurred during pregnancy (31.8 percent). The average age at the time of death was 25.1 years, ranging from 17 to 37 years, with one-third aged 25-29 (8 deaths, 36.4 percent). Approximately, two-thirds were among non-Hispanic White women (15 deaths, 68.2 percent), four involved Hispanic women (18.2 percent), two women of non-Hispanic other races (9.1 percent) and one involved a non-Hispanic Black woman (4.5 percent). Two-thirds of all motor vehicle crash deaths occurred among women who had a high school education or less (15 deaths, 68.2 percent), four with some college and no degree (18.2 percent), and three with an associate or bachelor's degree (13.6 percent). Two-thirds occurred among women who were Medicaid insured (15 deaths, 68.2 percent), five had private insurance (22.7 percent) and one was self-pay (4.5 percent), while one had an unknown insurance status (4.5 percent). The majority of the victims were unmarried, including fourteen who were never married and three who were divorced (77.3 percent), with five cases involving married women (22.7 percent).

Note: In November 2019, based on the 2016-2017 KMMRC findings and recommendations, an action alert on motor vehicle safety for mothers and babies was created and disseminated in both English and Spanish. The action alert can be found at: kmmrc.org/resources/action-alerts/.

It is critical that information from multiple sources is utilized to better understand pregnancy-associated deaths. These sources can include but are not limited to; medical/health systems, law enforcement, behavioral health providers, and social service agencies.[42] These records can be difficult to obtain due to:

- Lack of information (e.g., lack of completion and documentation of screenings and referrals) or data sharing agreements and processes in place across and within these systems (e.g., Medical record sharing across health networks can be limited).

[42] Louisiana pregnancy-associated mortality review, 2017 report. Louisiana pregnancy-associated mortality review, 2017 report. July 2020. https://ldh.la.gov/assets/oph/familyhealth/bfh-boards-comms/Pregnancy_Associated_Mortality_Review/2017_PAMR_Report_FINAL.pdf.

- Legal restrictions and policies that regulate what information agencies can share (e.g., It is difficult to obtain records related to a death that is part of an ongoing criminal investigation).
- Reluctance or hesitation to share copies of records obtained from external agencies.
- Staff turnover which hinders collaboration and information sharing between and across agencies or systems.

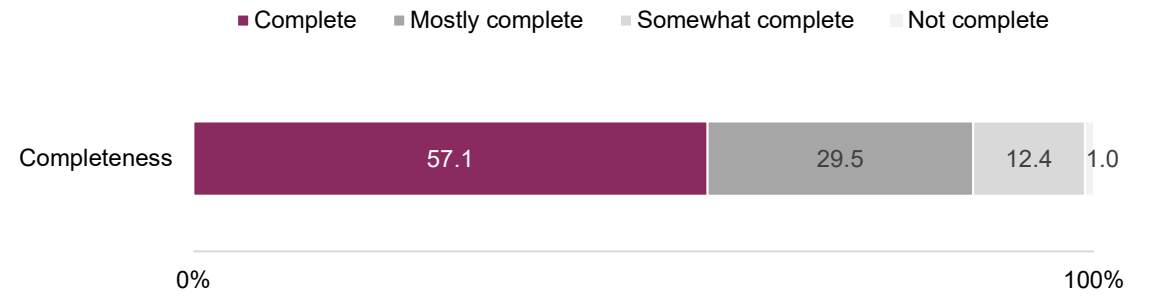
More complete records increase the likelihood of determining preventability in pregnancy-associated deaths. Approximately **90 percent** (91) of 105 deaths were determined by the KMMRC to have either “complete” or “mostly complete” records available for review (Figure 19). Approximately 12.4 percent (13 deaths) were identified as having “somewhat complete”, while 1.0 percent (one death) were categorized as “not complete”. Not complete indicates that information crucial to the review of the case was not available to the KMMRC (see Appendix G for full definitions of complete, mostly complete, somewhat complete, and not complete).

Figure 19.

Approximately 90 percent were determined to have either “complete” or “mostly complete” records available for review.

Completeness of Records for Review for Pregnancy-Associated Deaths, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee



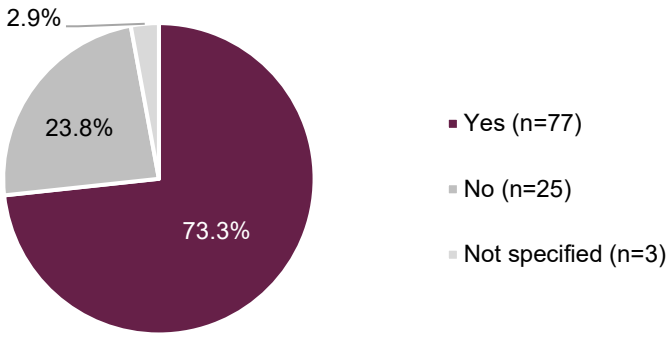
Autopsies are an important tool utilized to help establish cause of death. Without an autopsy or a post-mortem examination, it is difficult to ascertain the immediate and underlying cause(s) of death in certain scenarios. According to data from Kansas death certificates, autopsies were performed on 73.3 percent (77) of the 105 pregnancy-associated deaths in Kansas from 2016 to 2020. (Figure 19).

Figure 20.

Autopsies were performed on three-quarters of pregnancy-associated deaths.

Autopsies Performed on Pregnancy-Associated Deaths, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee; Kansas death certificate data



KMMRC Determined that 29 Deaths were Pregnancy-Related.

There are six key decisions listed below that KMMRC makes for each death reviewed. While all six questions are essential, the last four questions highlight the unique and critical role of KMMRC for the pregnancy-related deaths: preventability, contributing factors, recommendations for improvement, and measurement of potential for impact.[43] The analyses for the pregnancy-related deaths included in this report cover all six questions.

1. Was the death pregnancy-related?
2. What was the underlying cause of death?
3. Was the death preventable?
4. What were the factors that contributed to the death?
5. What are the recommendations and actions that address those contributing factors?
6. What is the expected impact of those actions if implemented?

[43] Report from nine maternal mortality review committee, op. cit., p. 5.

Question 1: Was the death pregnancy-related?

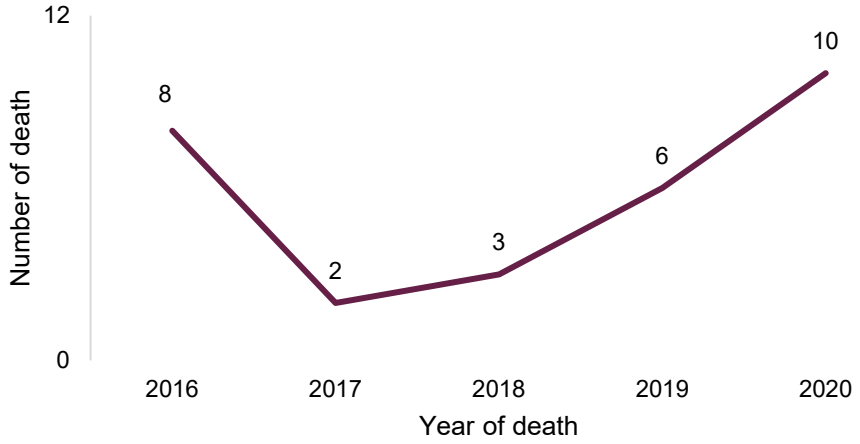
A pregnancy-related death refers to the death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.[44] From 2016 to 2020, the annual number of pregnancy-related deaths determined by KMMRC in Kansas were fewer than 20 (Figure 21). Hence, data for all five years were combined for subsequent analyses.

Figure 21.

Joinpoint trend analysis of the three-year rolling average rates showed that the observed upward trend was not statistically significant.

Number of Pregnancy-Related Deaths, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee



From 2016 to 2020, a little over one in four pregnancy-associated deaths of women during or within one year of pregnancy were determined to be pregnancy-related (29 deaths, 27.6 percent). This translates to a pregnancy-related mortality ratio (PRMR) of 15 deaths per every 100,000 live births that occurred in the state. Analyzing the three-year rolling average, the PRMRs exhibited an apparent upward trend. This trend corresponded to an annual percent change (APC) of 25.5 percent. However, it is important to note that the observed upward trend was not statistically significant. Two-thirds of pregnancy-related deaths occurred during the postpartum period (19 deaths, 65.5 percent). Nearly half of deaths occurred within 42 days of the end of pregnancy (13 deaths, 44.8 percent), ten occurred during pregnancy (34.5 percent) and six occurred 43 days to one year after the end of pregnancy (20.7 percent) (Figure 22).

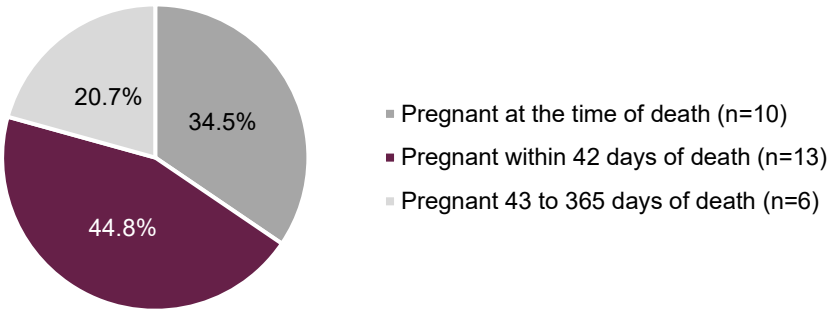
[44] Maternal Mortality Review Committee Decisions Form v.24. May 8, 2024, op. cit., p. 31.

Figure 22.

Two-thirds of pregnancy-related deaths occurred during the postpartum period.

Timing of Pregnancy-Related Death, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee



Timing of pregnancy-related deaths varied by race and ethnicity (Table 10). However, for all racial and ethnic women, a relatively large share of pregnancy-related deaths in Kansas occurred in the postpartum period.

Table 10.

For all racial and ethnic groups, a relatively large share of pregnancy-related deaths occurred during the postpartum period.

Timing of Pregnancy-Related Death by Race and Ethnicity, Kansas, 2016-2020

Percentages might not total 100 due to rounding.

*Postpartum period includes deaths within 42 days plus deaths within 43 to 365 days.

Source: Kansas Maternal Mortality Review Committee

Race and Ethnicity	Timing of pregnancy-related death							
	Pregnant		Within 42 days		Within 43 to 365 days		Postpartum period*	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Non-Hispanic White (n=11)	5	45.5	4	36.4	2	18.2	6	54.5
Non-Hispanic Black (n=9)	4	44.4	4	44.4	1	11.1	5	55.6
Non-Hispanic other (n=4)	1	25.0	2	50.0	1	25.0	3	75.0
Hispanic (n=5)	0	0.0	3	60.0	2	40.0	5	100.0
Total (n=29)	**10**	**34.5**	**13**	**44.8**	**6**	**20.7**	**19**	**65.5**

Question 2. What was the underlying cause of death?

Underlying causes of pregnancy-related deaths were found to be primarily related to medical conditions such as embolism-thrombotic (non-cerebral), hypertensive disorders of pregnancy, infection or those exacerbated by pregnancy (i.e., pre-existing cardiovascular conditions). There were three cases attributed to mental health conditions (one suicide, one probable suicide, and one accidental overdose) that were determined to be pregnancy-related. The number of cases in Kansas is too small to determine trends for specific causes of pregnancy-related death. The pregnancy-related deaths were caused by cardiovascular conditions (seven deaths, 24.1 percent), embolism-thrombotic (non-cerebral) (five deaths, 17.2 percent), hypertensive disorders of pregnancy (five deaths, 17.2 percent), infection (four deaths, 13.8 percent), mental health conditions (three deaths, 10.3 percent), cardiomyopathy (one death, 3.4 percent), cerebrovascular accidents not secondary to hypertensive disorders of pregnancy (one death, 3.4 percent), gastrointestinal disorders (one death, 3.4 percent), hemorrhage (excludes aneurysms or cerebrovascular accident) (one death, 3.4 percent), and unknown cause of death (one death, 3.4 percent).

Distributions of timing of pregnancy-related deaths varied somewhat by cause of death (Table 12). Deaths caused by cardiovascular conditions, non-cerebral embolism-thrombotic events, hypertensive disorders of pregnancy, and infections most commonly occurred during pregnancy and within 42 days postpartum. Deaths caused by mental health conditions, cardiomyopathy, and gastrointestinal disorders occurred 43-365 days postpartum. Deaths caused by cerebrovascular accidents and hemorrhage occurred within 42 days postpartum.

Table 11.

Distributions of timing of pregnancy-related deaths varied by cause of death.

Timing of Pregnancy-Related Death by Underlying Causes of Death, Kansas, 2016-2020
CVA: cerebrovascular accident; COD: cause of death
Percentages may not total 100 due to rounding.
*Postpartum period includes deaths within 42 days plus deaths within 43 to 365 days.
Source: Kansas Maternal Mortality Review Committee

Underlying cause of death	Timing of pregnancy-related deaths							
	Pregnant		Within 42 days		Within 43 to 365 days		Postpartum period*	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Cardiovascular conditions (n=7)	2	28.6	4	57.1	1	14.3	5	71.4
Embolism-thrombotic (non-cerebral) (n=5)	3	60.0	2	40.0	0	0.0	2	40.0
Hypertensive disorders of pregnancy (n=5)	2	40.0	3	60.0	0	0.0	3	60.0
Infection (n=4)	1	25.0	2	50.0	1	25.0	3	75.0
Mental health conditions (n=3)	1	33.3	0	0.0	2	66.7	2	66.7
Cardiomyopathy (n=1)	0	0.0	0	0.0	1	100.0	1	100.0
Cerebrovascular accidents (n=1)	0	0.0	1	100	0	0.0	1	100.0
Gastrointestinal Disorders (n=1)	0	0.0	0	0.0	1	100	1	100.0
Hemorrhage (excludes aneurysms or CVA) (n=1)	0	0.0	1	100	0	0.0	1	100.0
Unknown COD (n=1)	1	100.0	0	0.0	0	0.0	0	0.0
Total (n=29)	**10**	**34.5**	**13**	**44.8**	**6**	**20.7**	**19**	**65.5**

The distribution of underlying causes of death of pregnancy-related death varied by race and ethnicity; however, the low numbers of death prevent us from drawing strong conclusions (Figure 23). Due to the small number of deaths in most groups, PRMRs are not calculated. Out of the total pregnancy-related deaths, 11 occurred in non-Hispanic White women (37.9%), 9 non-Hispanic Black women (31.0 percent), five in Hispanic women (17.2 percent), and four involved non-Hispanic women of other races (13.8 percent). It is noteworthy that the proportion of deaths among **non-Hispanic Black women (31.0 percent), Hispanic women (17.2 percent), and non-Hispanic women of other races (13.8 percent) far exceeded their**

representation in the overall population of women giving birth in Kansas (7.1 percent, 16.7 percent, and 6.8 percent, respectively; refer to Figure 16).

Figure 23.

The distribution of underlying causes of death of pregnancy-related death varied by race and ethnicity. The proportion of pregnancy-related deaths among racial and ethnic minorities far exceeded their representation in the overall population of women giving birth in Kansas.

Number of Underlying Causes of Pregnancy-Related Death by Race and Ethnicity, Kansas, 2016-2020
Source: Kansas Maternal Mortality Review Committee

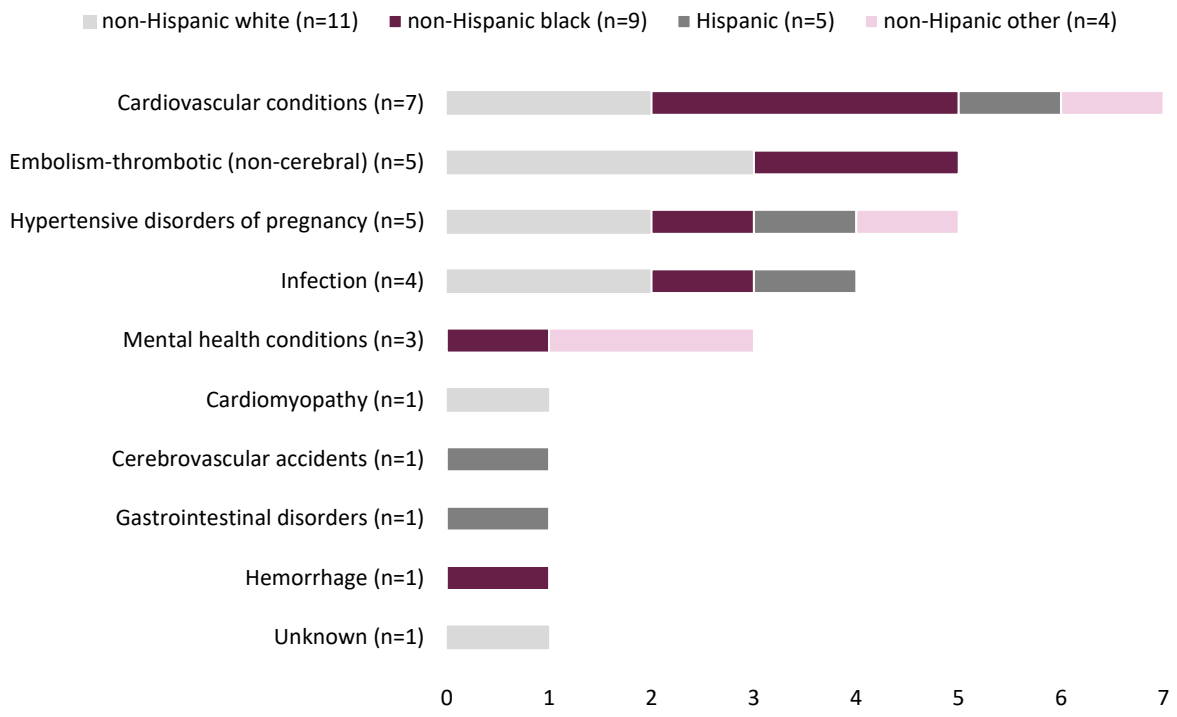


Table 12 provides an overview of the demographic characteristics of women who experienced a pregnancy-related death. The table includes the number of deaths within each demographic group and the PRMRs when the number of decedents exceeds 10. It's important to note that ratios based on fewer than 20 deaths should be interpreted cautiously. The majority of pregnancy-related deaths occurred among women aged 25-39. These women had a high school education or lower educational attainment. Additionally, the majority of the deceased women belonged to racial/ethnic minority groups. Overweight or obese women were also disproportionately affected by pregnancy-related deaths. Furthermore, the deaths primarily occurred in metropolitan counties. It is worth noting that there is a positive association between a higher Body Mass Index (BMI) and an increased likelihood of pregnancy-related death in Kansas during the period from 2016 to 2020.

Table 12.

Data interpretation example: The row for women who were overweight or obese, based on the ratio of weight to height known as the body mass index (BMI), means that 22 pregnancy-related deaths occurred among women who were overweight or obese in Kansas from 2016 to 2020. These deaths represented 75.9% of all the pregnancy-related deaths that occurred over that period. Women who were overweight or obese in Kansas experienced pregnancy-related deaths at a ratio of 20.9 deaths per 100,000 live births (i.e., for every 100,000 births among women who were overweight or obese, approximately 21 women who were overweight or obese experienced a pregnancy-related death).

Characteristics of Women Experienced a Pregnancy-Related Death, Kansas, 2016-2020

Sources: Kansas Maternal Mortality Review Committee; Kansas Department of Health and Environment, Kansas live births data (occurrence)

Demographics	Number	Percent[a] of all pregnancy-related deaths	Pregnancy-related mortality ratio		
			Ratio[b]	95 percent conference interval	
All women	29	100.0	15.4	10.3	22.2
Age in years at time of death					
<20	0	0.0	0.0	0	37.3
20-24	2	6.9	-[c]	-	-
25-29	7	24.1	-	-	-
30-34	9	31.0	-	-	-
35-39	8	27.6	-	-	-
≥40	3	10.3	-	-	-
Race and ethnicity					
Non-Hispanic White	*11*	37.9	*8.4*[e]	*4.2*	*15.1*
Racial/ethnic minorities	*18*	62.1	*31.3*[e]	*18.6*	*49.5*
Hispanic[d]	5	17.2	-	-	-
Non-Hispanic Black	9	31.0	-	-	-
Non-Hispanic, other races *American Indian or Alaska Native (1)* *Pacific Islander (1)* *Two or more races or other non-specified race and ethnicity (2)*	4	13.8	-	-	-
Education					
High school or less	*16*	55.2	*24.2*[e]	*13.9*	*39.4*
More than high school	*12*	41.4	*9.9*[e]	*5.1*	*17.3*
Some college	3	10.3	-	-	-
Associate or bachelor's degree	6	20.7	-	-	-

Advanced degree	3	10.3	-	-	-
Unknown	1	3.4	-	-	-
Health insurance during pregnancy or for delivery					
Medicaid	*16*	55.2	*28.3*[e]	*16.2*	*45.9*
Private	*11*	37.9	*10.4*[e]	*5.2*	*18.5*
Uninsured or self-pay	1	3.4	-	-	-
Unknown	1	3.4	-	-	-
Marital status					
Married	*14*	48.3	*11.6*[e]	*6.3*	*19.4*
Unmarried *Divorced (5)* *Never married (9)*	*14*	48.3	*20.9*[e]	*11.4*	*35*
Unknown	1	3.4	-	-	-
Pre-pregnancy body mass index (BMI)[f]					
Underweight	1	3.4	-	-	-
Normal weight	4	13.8	-	-	-
Overweight or obese	22	75.9	20.9	13.1	31.6
Overweight	7	24.1	-	-	-
Obese	*15*	51.7	*27.4*[e]	*15.3*	*45.2*
Unknown	2	6.9	-	-	-
Prenatal care entry					
1st trimester	*18*	62.1	*11.8*[e]	*7.0*	*18.7*
Late and none	*10*	34.5	*28.8*[e]	*13.8*	*52.9*
2nd trimester	5	17.2	-	-	-
3rd trimester	2	6.9	-	-	-
None	3	10.3	-	-	-
Unknown	1	3.4	-	-	-
Location of last residence within Kansas (excluding 3 out of state resident)					
Median household income of maternal residential ZIP Code[g]					
Quartile 1 (poorest)	8	33.3	-	-	-
Quartile 2	7	29.2	-	-	-
Quartile 3	5	20.8	-	-	-
Quartile 4 (wealthiest)	4	16.7	-	-	-
Urban-rural residence[h]					
Metropolitan	*16*	64.0	*13.5*[e]	*7.7*	*22.0*
Micropolitan	7	28.0	-	-	-
Rural	3	12.0	-	-	-

[a] Percentages might not total 100 percent due to rounding. Due to rounding some totals may not correspond with the sum of the separate figures.
[b] Number of deaths per 100,000 live births.
[c] Ratios are not reported when number of decedents is <10 or when characteristic response is “unknown”. It is denoted by “-“.
[d] Includes persons of any race.

[e] The ratio is based on fewer than 20 cases, does not meet the requirement for a minimum degree of accuracy, and should be interpreted with caution. *Italicized.*
[f] Body mass index (BMI): a key index for relating a person's body weight to their height. The BMI is a person's weight in pounds times 703 divided by their height in inches squared. Adult BMI ranges underweight: <18.5, normal weight: 18.5-24.9, overweight: 25.0-29.9, and obese: >30.0.
[g] Based on the median household income of the maternal ZIP Code of last residence. Quartiles are defined so that the total Kansas population is evenly distributed. Cut-offs for the quartiles are determined using ZIP Code demographic data obtained from the U.S. Census, American Community Survey, 2016-2020, Table S1903, Median Income in the Past 12 Months (in 2020 inflation-adjusted dollars). Each ZIP Code was classified into quartiles based on median household income of each ZIP Code. These quartiles are the following: quartile 1: $1 to $48,695; quartile 2: $48,696 to $57,025; quartile 3: $57,026 to $76,121; quartile 4: $76,122 or more.
[h] Counties of last residence are classified into three urbanization levels - metropolitan (large fringe, medium, small) counties, micropolitan counties, noncore (rural) counties - using the 2013 National Center for Health Statistics (NCHS) Rural-Urban Classification Scheme for Counties. Large fringe metropolitan is defined as metropolitan areas with at least 1 million residents (Johnson, Leavenworth, Linn, Miami, Wyandotte). Medium metropolitan is defined as metropolitan areas of 250,000-999,999 residents (Butler, Harvey, Kingman, Sedgwick, Sumner). Small metropolitan is defined as metropolitan areas of less than 250,000 residents (Doniphan, Douglas, Jackson, Jefferson, Osage, Pottawatomie, Riley, Shawnee, Wabaunsee). Micropolitan is defined as micropolitan areas of 10,000-49,999 residents (Atchison, Barton, Cowley, Crawford, Ellis, Finney, Ford, Franklin, Geary, Kearny, Labette, Lyon, McPherson, Montgomery, Ottawa, Reno, Saline, Seward). Noncore (rural) is defined as noncore areas of <10,000 residents (remainder of the state).

Question 3. Was the death preventable?

A pregnancy-related death is classified as preventable if the committee determines that there was a possibility of avoiding the death through reasonable changes to factors such as patient, family, provider, facility, system and/or community (see Appendix G).[45] Figure 24 provides an overview of the preventability of pregnancy-related deaths based on the underlying cause of death. Out of the total 29 deaths, 23 could have been prevented, accounting for 79.3 percent of the cases. Among the preventable deaths, 13 had a good chance of being averted (44.8 percent), while 10 had some chance of being averted (34.5 percent). On the other hand, six deaths were considered unpreventable.

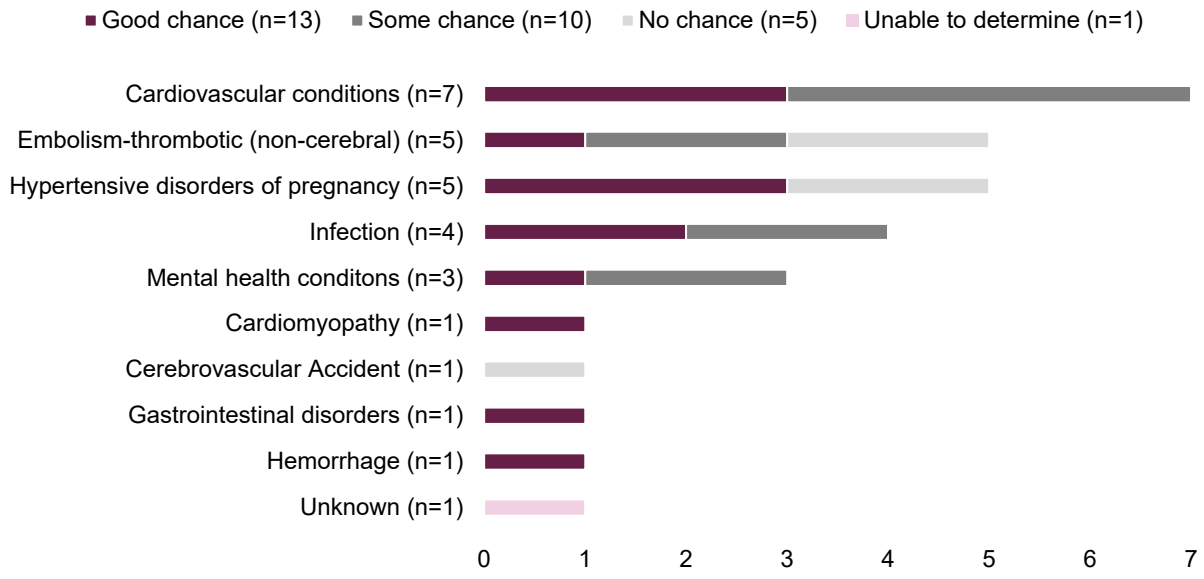
[45] Maternal Mortality Review Committee Decisions Form v.24. May 8, 2024, op. cit., p. 31.

Figure 24.

Four out of five pregnancy-related deaths were determined to be preventable.

Pregnancy-Related Preventability by Underlying Cause of Death, Kansas, 2016-2020

Sources: Kansas Maternal Mortality Review Committee



Question 4. What were the factors that contributed to the death?

Committee determinations on circumstances surrounding death were based on the information provided in the Maternal Mortality Review Committee Decisions Form, outlined in Appendix G. Their findings revealed significant factors contributing to these tragic outcomes. Among the identified circumstances, obesity* emerged as a major contributor in 18 deaths, with one case deemed as probably contributing to the death. This accounts for approximately 62.1 percent of the total deaths. Substance use disorder was implicated in eight deaths, representing 27.6 percent of the cases. Mental health conditions were also found to be associated with five deaths, contributing to around 17.2 percent of the total. Additionally, discrimination** played a role in four deaths, with all four cases likely influenced by discriminatory factors. This corresponds to approximately 23.5 percent of the deaths. It is important to note that these circumstances surrounding death are not mutually exclusive, meaning that multiple factors could have played a role in an individual case. Figure 25 visually displays the preventability of pregnancy-related deaths based on the identified circumstances surrounding death, highlighting the urgent need for targeted interventions and strategies to address these underlying factors and prevent future loss of life.

*This captures whether obesity contributed to the death, not whether the woman was obese / obesity was present, based on the ratio of weight to height known as the body mass index (BMI).

**Subset of all deaths reviewed after May 29, 2020, when this checkbox was added to the Maternal Mortality Review Committee Decisions Form.

Figure 25.

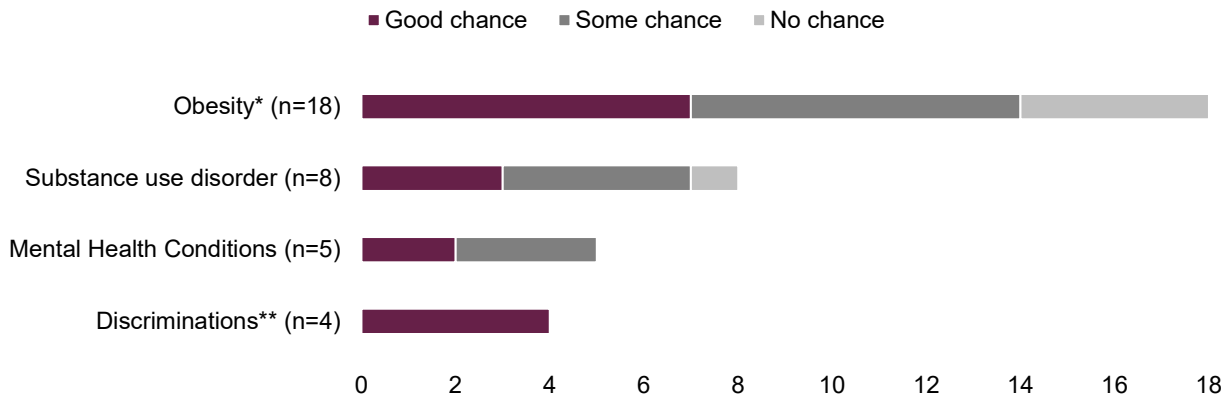
All deaths in which discrimination probably contributed were determined to have a good chance of being preventable.

Pregnancy-Related Preventability by Circumstances Surrounding Death, Kansas, 2016-2020

* Includes “one probably contributed”; This captures whether obesity contributed to the death, not whether the woman was obese / obesity was present, based on the ratio of weight to height known as the body mass index (BMI).

** Includes “all four probably contributed”; subset of all deaths reviewed after May 29, 2020 when this checkbox was added to the committee decisions form.

Sources: Kansas Maternal Mortality Review Committee



The KMMRC agreed with the underlying cause of death listed on the death certificate in 79.3 percent (23 deaths) of the pregnancy-related deaths (Figure 26). Discrepancies between the KMMRC’s findings and the death certificate were more pronounced for pregnancy-related deaths compared to pregnancy-associated deaths (96 deaths, 91.4 percent), as previously noted on page 34 (Figure 15).

Figure 26.

KMMRC agreed with the cause of death listed on the death certificate in four out of five pregnancy-related deaths.

Committee Agreement with Cause of Death Listed on Death Certificate, Pregnancy-Related Deaths, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee

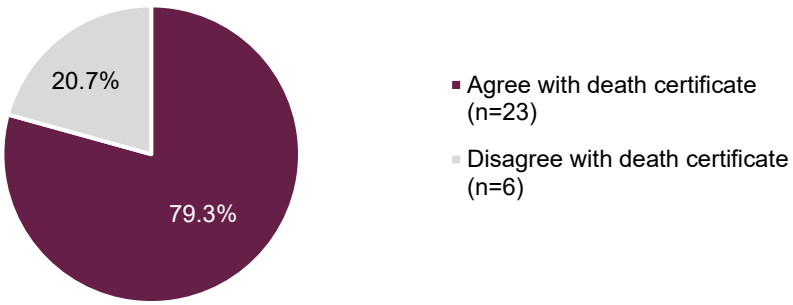


Table 13 presents the manners of death as reported on the death certificate for all 29 pregnancy-related deaths. The data indicates that the majority of these deaths (75.9 percent) were classified as natural. Accidents accounted for 13.8 percent of the cases, while suicides were responsible for 6.9 percent of the deaths. A smaller proportion of deaths 3.4 percent were pending investigation.

Table 13.

One in four pregnancy-related deaths was due to unnatural causes.

Manner of Death Among Pregnancy- Related Deaths, Kansas, 2016-2020

Source: Kansas Department of Health and Environment, Kansas death data (occurrence)

Manner	Number	Percent
Natural	22	75.9
Accident	4	13.8
Suicide	2	6.9
Pending investigation	1	3.4
Total	**29**	**100.0**

The KMMRC thoroughly examined the 23 preventable deaths depicted in Figure 27 and identified the factors contributing to each death. These factors were then categorized into five levels: patient/family, provider, facility, system, and community. It is important to note that preventable pregnancy-related deaths were complex events with multiple contributing factors across various levels. These contributing factors played a crucial role in guiding discussions and recommendations made by the KMMRC to eliminate preventable pregnancy-related deaths.

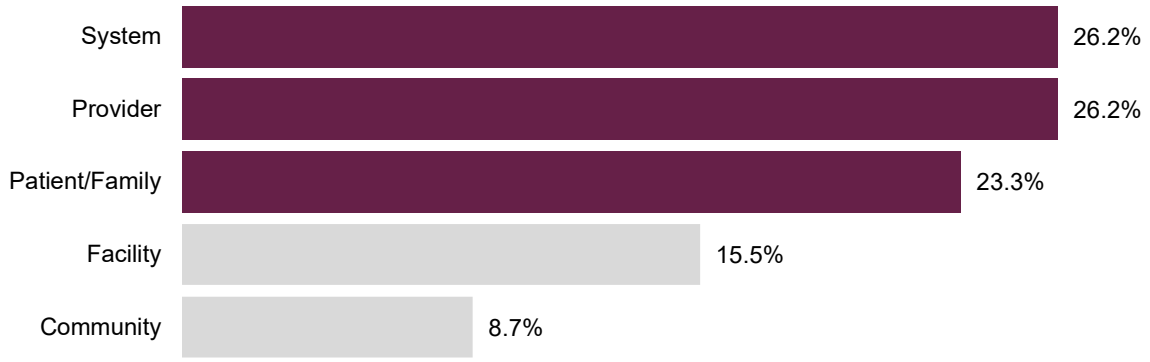
In total, the KMMRC identified 103 contributing factors related to the patient/family, health care providers, facilities/hospitals where woman sought care, systems that influence the lifestyle, care, and health services for woman, or community/neighborhood were identified by KMMRC to preventable pregnancy-related deaths. On average, four contributing factors were identified for every preventable pregnancy-related death. Figure 27 illustrates the distribution of contributing factors by level among these deaths. Among the levels, the largest proportion of contributing factors were at the provider, system, and patient/family levels, accounting for 26.2 percent, 26.2 percent, and 23.3 percent, respectively. In contract, the facility and community levels had the smallest proportions of factors identified, representing 15.5 percent and 8.7 percent, respectively. Although provider, system, and patient/family factors were the most common, it is important to acknowledge they were often dependent on facility and community level factors. These findings highlight the interplay and interdependence of factors across different levels in contributing to preventable pregnancy-related deaths.

Figure 27.

The largest proportion of contributing factors were at the provider, system, and patient/family levels.

Distribution of Levels of Contributing Factors Among Preventable Pregnancy-Related Deaths, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee



KMMRC utilized the Maternal Mortality Review Committee Decisions Form (refer to Appendix G) to identify contributing factors to pregnancy-related deaths. Contributing factors are not mutually exclusive - a death may have more than one of the following factors listed below.

Figure 28.

Overall (103): The proportion, expressed as a percentage, of each **contributing factor** was:

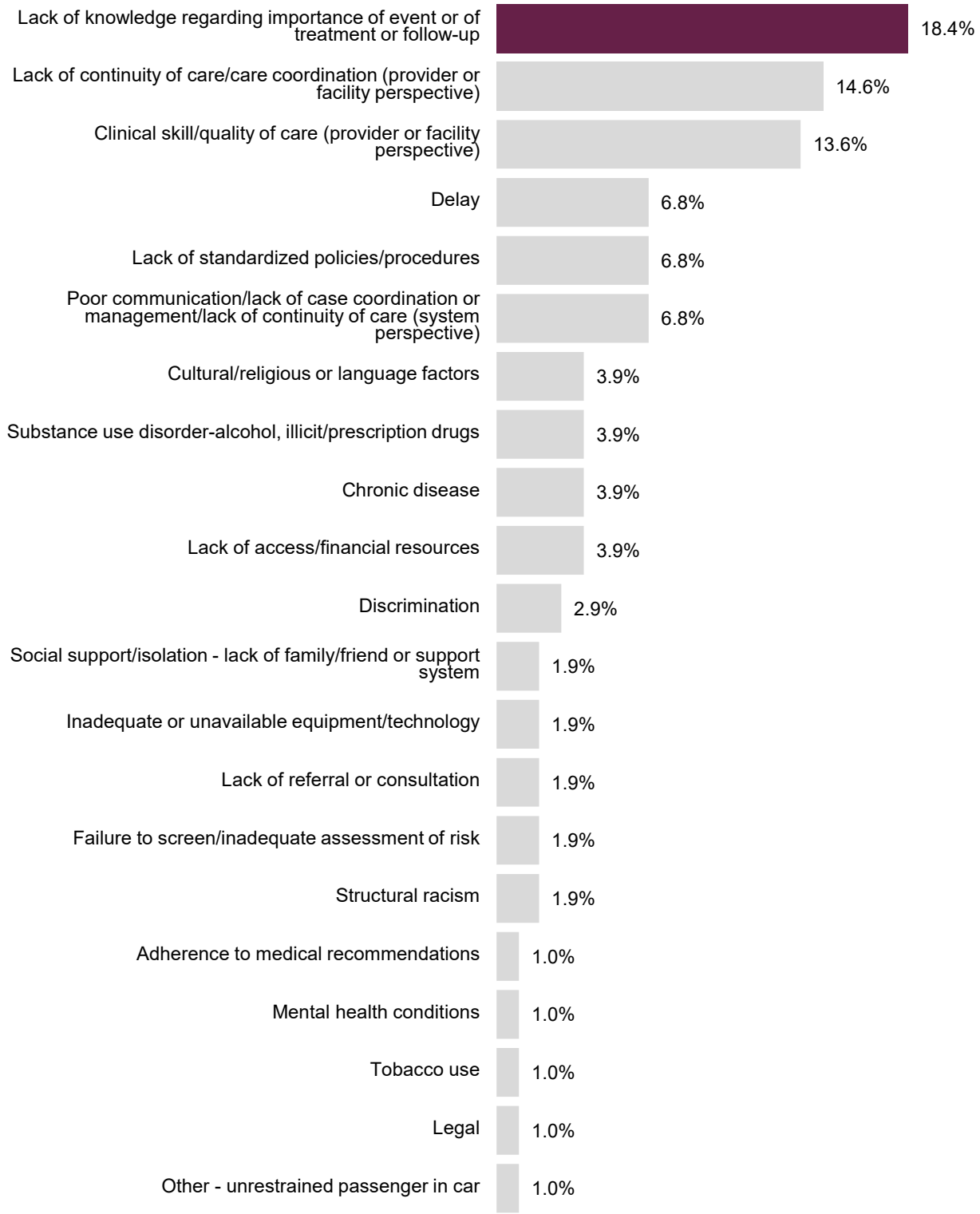


Figure 29.

Patient/Family (24): the proportion of each **contributing factor** was:

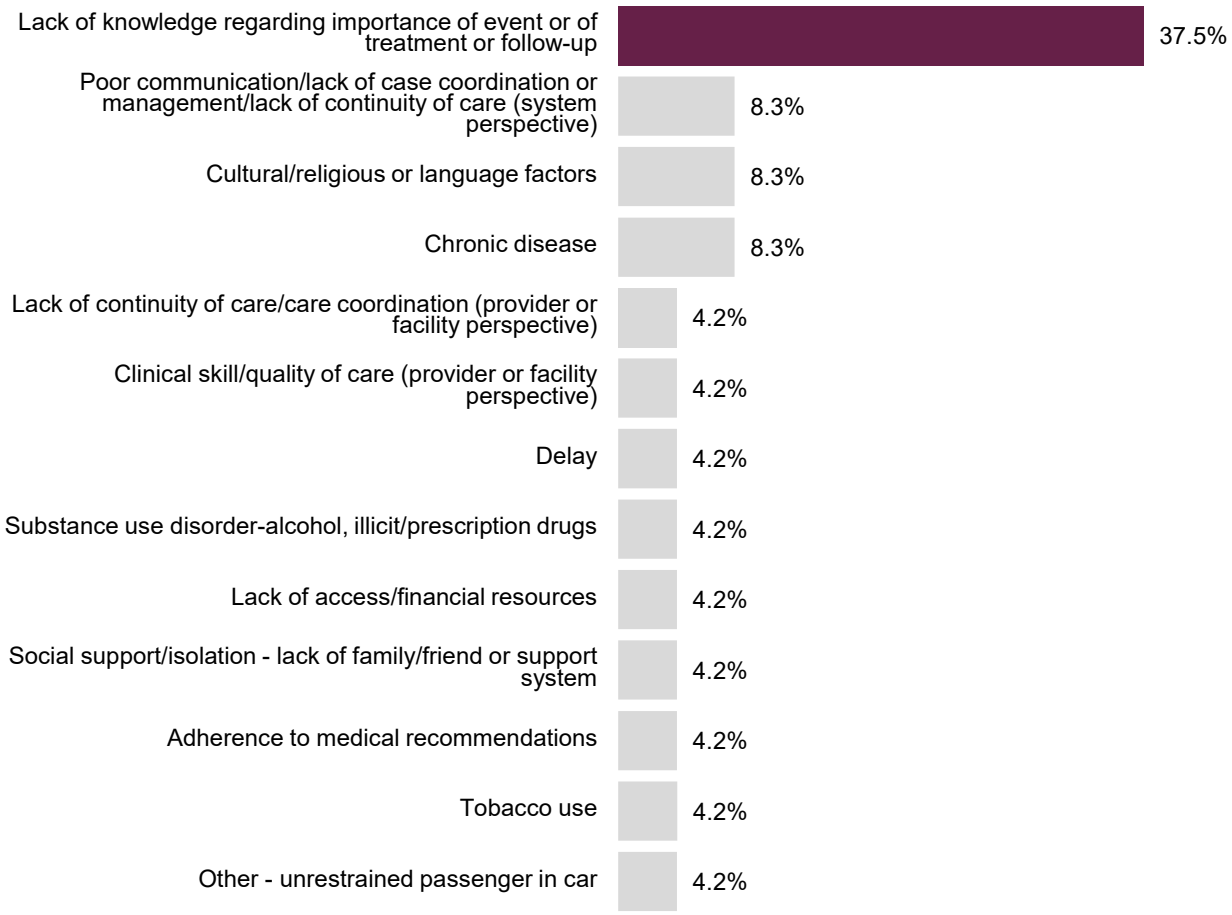


Figure 30.

Provider (27): the proportion of each **contributing factor** was:

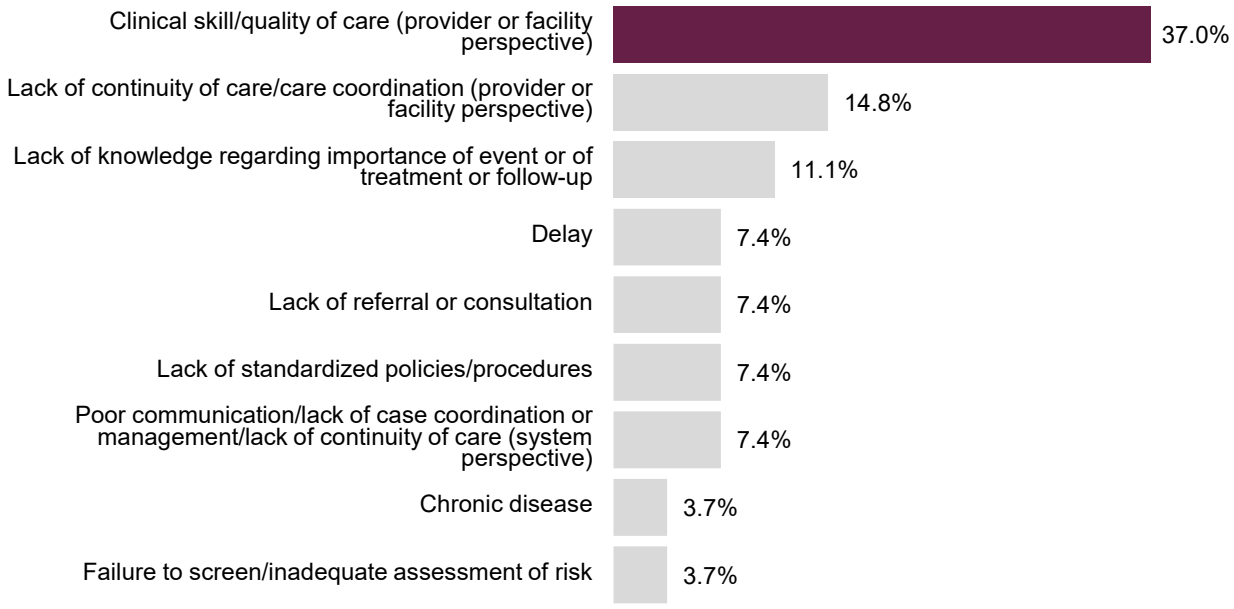


Figure31.

Facility (16): the proportion of each **contributing factor** was:

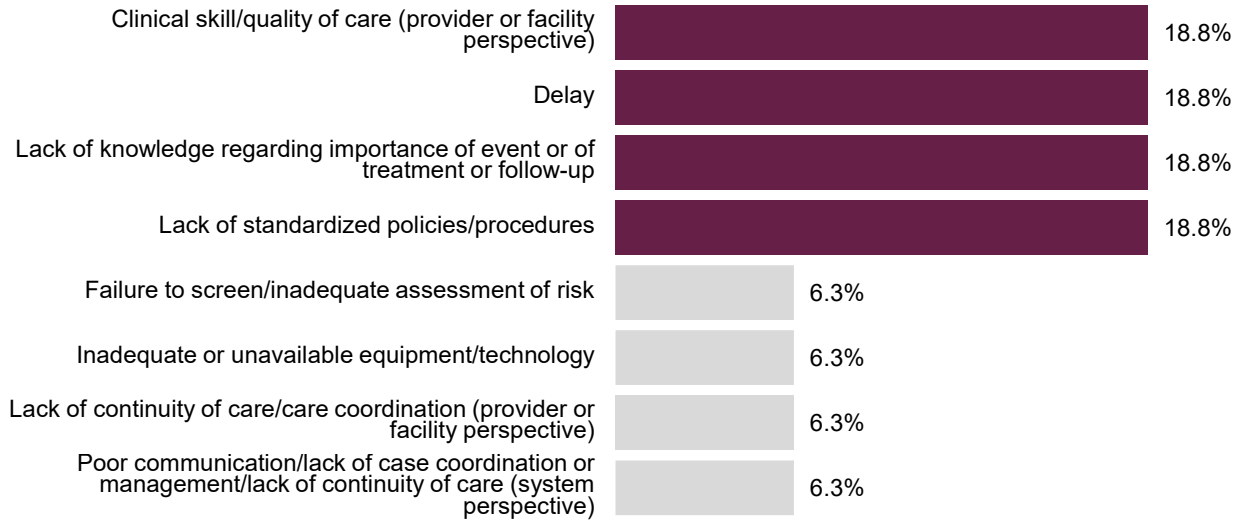


Figure 32.

System (27): the proportion of each **contributing factor** was:

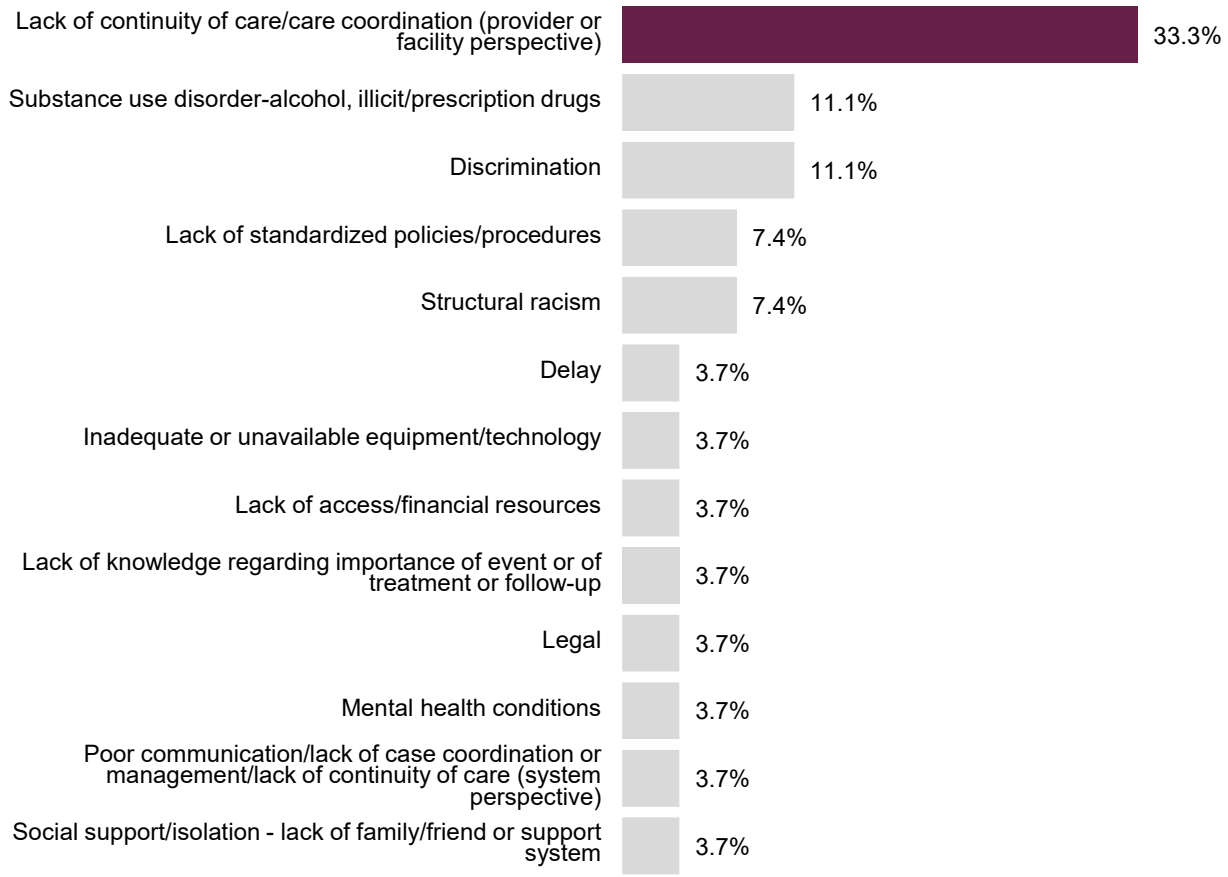
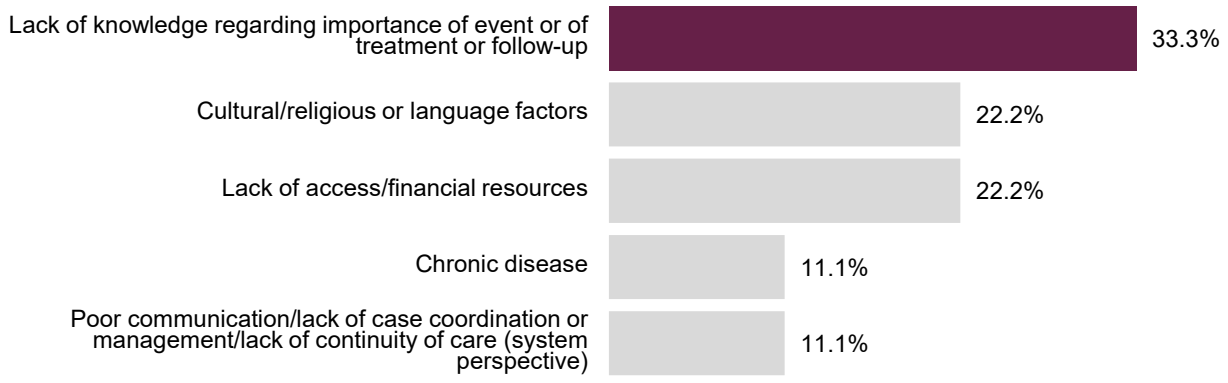


Figure 33.

Community (9): the proportion of each **contributing factor** was:



Question 5. What are the recommendations and actions that address those contributing factors?

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

- **Patient education** and **empowerment**
- **Screen**, **brief intervention,** and **referral to treatment (SBIRT)** for:
    - Comorbidities and chronic illness
    - Intimate partner violence (IPV)
    - Pregnancy intention
    - Mental health conditions (including postpartum anxiety and depression)
    - Substance use disorder – alcohol, illicit, or prescription drugs
    - Social determinants of health
- **Improved communication** and **multi-disciplinary collaboration** between providers, including referrals.

The recommendations below are displayed by level assigned by the committee and relate to the patient/family, health care providers, facilities/hospitals, systems of care, or community.

- **Patient/Family Level**
    - **Patient Education and Empowerment**
        - Informing on the risks related to childbearing in advanced maternal age.
        - Encouraging patient self-advocacy in healthcare.
        - Educating patients in general care.
        - Promoting access to healthcare services for patient and their support systems.
        - Facilitating the availability of translators for effective communication.
        - Empowering/educating women on the importance of knowing and disclosing all her medical history to all of her providers.
        - Educating patients with chronic illnesses on the importance of follow up with specialists and compliance with treatment plans/visits.
        - The patient understands the importance of smoking cessation prior to pregnancy.
        - Proper discharge instructions should be given to the patient upon discharge and the provider should ensure that the patient understands the instructions.
        - Providers to educate patients on management of hypertension using ACOG recommendations.
        - The provider should educate patients on importance of tobacco cessation.
        - The provider should educate the patient on importance of mental health treatment.
        - The provider should educate patients on importance of substance abuse treatment.

        - Improved communication from the provider with family/caregivers who are not physically present through the utilization of alternate strategies such as telecommunication, virtual platforms, etc.
        - Standardized discharge education that is individualized and patient driven to patients and support person(s).
        - Standardized discharge summary for every patient.
        - Provider to educate to all patients about risks of obesity, especially during pregnancy and promote a healthy lifestyle.

    - **Family Planning Education**
        - Preconception counseling; optimizing health prior to conception.
        - Provide family planning education.
        - Screening for pregnancy intention with One Key Question .
        - Inter-agency communication and coordination: Education and increased access to Long-Acting Reversible Contraception and other highly effective contraception methods.

- **Provider Level**
    - **Provider Education**
        - Assurance of adequate anti-coagulation.
        - Educate providers approximately barriers patients may have and community resources available to which they can refer patient or family
        - Knowledge or clinical skills gap.
        - Encourage or educate coordination of care of between physicians across specialties as well as full documentation of care.
        - Ensure standard of care is being followed and documented appropriately; peer review for maternal deaths be done at local/regional level.
        - Pregnancy intention screening, preconception counseling and reproductive health education as part of a comprehensive well woman exam.
        - Comprehensive screening for mental health, substance use (including tobacco and alcohol), social determinants of health, and intimate partner violence as part of a comprehensive well woman exam.
        - Awareness of policies and best practices for those at high risk (such as morbid obesity); close monitoring for post-birth warning signs that would prevent early discharge.
        - Facilities should educate all their providers on recognition of emergent conditions in pregnancy.
        - Providers should be educated on isoniazid treatment and monitoring of liver function tests for tuberculosis treatment.
        - The provider should have familiarity with best practice and/or algorithm for chemoprophylaxis for deep vein thrombosis and pulmonary embolism (PE) prevention.

        - Facilities to educate providers on appropriate and timely escalation of care, whether within same facility or to an outside facility.
        - Facility to educate providers on signs and symptoms of sepsis to ensure that all providers understand recognition of sepsis criteria.
        - Educate providers, including Indian Health Services providers, on availability of domestic violence and sexual violence advocacy services including how to find those resources.

    - **More Consistent Use of Screening Tools, Including Intimate Partner Violence and Substance Use Disorder**
        - Comprehensive screening at the onset and throughout prenatal care for tobacco, alcohol and other substance use.
        - Comprehensive screening at the onset and throughout prenatal care for social determinants of health and other social service connections.
        - Comprehensive screening at the onset and throughout prenatal care for intimate partner violence (IPV) and ensure referrals for services.
        - At every encounter, providers should screen for and refer patients, as appropriate, for mental health treatment and collaborate with the mental health facility to ensure that the patient followed through on any appointments/treatments.
        - Educate provider to thoroughly review all medical and behavioral health history with the patient, screen for mental health conditions at every visit, including screening for suicidal ideation.

    - **Thorough and Accurate Documentation**
        - Documentation of follow up that recommendation of a specialist was acknowledged and advised to the patient, in addition to the patient's response to the recommendation.
        - The provider should complete careful and thorough documentation of the encounter(s) with specific discharge instructions included at each encounter.

- **Facility Level**
    - **Use of Referrals**
        - Use of timely and appropriate referrals to higher level of care; consultation with Maternal Fetal Medicine or other subspecialists.

    - **Communication and Collaboration between Health Care Providers**
        - Provide patient with community resources. Ensure that policies and procedures on discharge planning are in place. Ensure a high level of cultural humility, such as providing interpreters. Use a validated external peer review process.

- Ensure collaboration between specialists/sub-specialists involved in patient care obstetrics (pregnancy) remain involved inpatient care in critical care areas.
- Ensure obstetrics providers are present at emergency room visits involving pregnant women.
- Encourage physicians and facilities to not rely solely on electronic health record (EHR) for communication between providers.

- **Enhanced Protocols**
  - Deep vein thrombosis (DVT)/venous thromboembolism (VTE) prophylaxis protocols.
  - Clarify mental health laws governing patients at risk.
  - Improved follow up for preeclampsia; Education for all levels of providers/community on management of hypertension.
  - Ensure policies are in place for those at high risk (such as morbid obesity) to monitor post-birth warning signs closely and prevent early discharge.
  - Facilities should update their policies and procedures to align with ACOG recommendations, as well as educate providers to effectively manage patients with hypertension.
  - The facility should have an evidence-based policy and procedure in place to monitor infection post premature rupture of membranes (PROM) and educate the providers on the Policy and Procedure (P&P).
  - The facility should have a policy and procedure for best practice/algorithm for chemo-prophylaxis for DVT and pulmonary embolism (PE) prevention, as well as educate providers on the P&P.
  - The providers should escalate the care or the care facility of patients when status of a patient cannot be determined, and appropriate care initiated. The facility should have a P&P in place to establish the protocol when determining to transfer a patient and educate the providers on the P&P.
  - Facilities should institute policies and procedures for tuberculosis treatment, including around isoniazid (INH) treatment and monitoring of liver function tests (LFTs).
  - Facilities to implement policies and procedures as well as educate providers on appropriate method to timely transfer patients.
  - Policies and Procedures in place to instruct providers to complete and document full condition assessment to include vitals at each clinic visit.
  - Review and revision of hospital policy and procedure for management of postpartum hemorrhage - to include timely Obstetrical (OB) notification and re-education of providers.
  - The facility should have the DVT/PE protocol built into EHR to ensure usage and easy access for providers.

        - Facilities should implement policies for pharmacy to search in K-TRACS (Kansas prescription drug monitoring program) and to communicate, timely, with prescribing physician with concerns.
        - Facilities update policies and educate providers on appropriate pain management consults.

- **System Level**
    - **Seatbelt Action Alert**
        - Seatbelt-use alert.

    - **Alliance for Innovation on Maternal Health (AIM) Bundle Enrollment**
        - Apply to become an AIM state.
        - Hypertension Bundle.
        - Roll out AIM hypertension in pregnancy bundles.
        - Implementation of the AIM bundle, Maternal hemorrhage, across the state through the KPQC.

    - **Improve Access to Care**
        - Ensure access to early postpartum care and the transition from postpartum to preventative well woman care.
        - Public service announcements (PSAs) or other education campaigns by insurance, public health or other community organizations educating women on how to be an advocate for their own health.

    - **Community Health Workers/Integration of Care**
        - Provide holistic care coordination/family navigator throughout course of care.
        - Offer home health care and/or home visiting services and other social services/social work follow up.
        - Care Coordination or Navigators at the Managed Care Organization (MCO) level and community support services to assess where patient is at, what they understand, and any needs. Access to Universal Community Health Workers (CHWs) for all expectant families
        - Patient's care is integrated with mental health and social support services to help aid in compliance of care and identify needs to address barriers (i.e., childcare, transportation, etc.).
        - Care coordination or community health worker to help mother navigate the health care system and aid in access to transportation, and evaluation of social determinants of health.
        - Care coordination to ensure patients are connected to needed behavioral health resources and treatment.
        - Care coordination to ensure patients are knowledgeable and connected to domestic violence and sexual assault resources.

        - Community support through care coordination, navigators and/or CHWs. organizational training on implicit bias.
        - Provide improved coordinated case management between payors/providers/patient for those pregnancy persons that are obese and/or have comorbidities.

    - **State Legislative Action**
        - The State should mandate initial and regular systemic and racist bias training for all providers in the state, regardless of region/area.
        - The state should extend Medicaid during the postpartum period and/or expand Medicaid coverage/access.

    - **Standardized Protocols**
        - All emergency departments (EDs) and Urgent care centers have obstetric emergency protocols (using a bundle and/or algorithm) through a statewide initiative.
        - All EHRs should have the DVT/PE protocol built into EHR to ensure usage and easy access for providers.
        - All facilities/hospitals in the state should implement internal evaluations of racial experience of their patients/customers (Dr. Karen Scott has developed a paper/evaluation).
        - All providers and facilities should make follow-up appointments as well as have a mechanism to track follow through of appointments/referrals.
        - Healthcare and payer systems should enhance components of coordination within the healthcare system to better identify high risk individuals and support their unique needs.
        - Required, ongoing implicit bias and anti-racism training at all practices and facilities for all levels.
        - System requires and provides education for emergency room (ER) providers on circumstances to refer to patients to social worker when they present with little or no prenatal care but present with obstetrical complaints.
        - Systems should implement comprehensive opioid programs, that include facilities and systems educating providers on responsible narcotic prescription.

- **Community Level**
    - **Community Engagement and Education**
        - Empowering communities to help control trajectory of healthcare system and access to healthcare (includes PSAs and IPV prevention).
        - Community education on access and cultural humility, including implicit and explicit bias and anti-racism education.

- PSAs or other education campaigns by local/state public health or other community organizations on chronic health conditions such as obesity and how to improve health.
- Community and system to provide support to obese and high-risk pregnant patients during pregnancy and postpartum through community health workers, dieticians, home visiting, etc.

Question 6. What is the expected impact of those actions if implemented?

Based on the Report from Nine Maternal Mortality Review Committees[46], there are two ways the KMMRC captures information related to the potential level of impact their recommendations would have if implemented, in the Maternal Mortality Review Committee Decisions Form (see Appendix G). First, the KMMRC assigns a specific type of prevention to each recommendation. They determine whether, if implemented, the action would result in what is known in public health literature as primary prevention (actions that prevent the contributing factor before it occurs), secondary prevention (actions that reduce the impact of a contributing factor once it has occurred), or tertiary prevention (actions that reduce the impact or progression of what has become an ongoing contributing factor). Recommendations that support primary prevention may be prioritized over those that support secondary or tertiary prevention. Second, each specific committee recommendation is assigned an expected level of impact if the recommendation was implemented, ranging from small to giant (as specified by the Maternal Mortality Review Committee Decisions Form - see Appendix G).

For the recommendations of the KMMRC, 45.7 percent were identified as primary type of prevention, 38.8 percent as secondary, and 15.5 percent as tertiary. There were 116 responses from the KMMRC for the type of prevention for 2016-2020 (Figure 34).

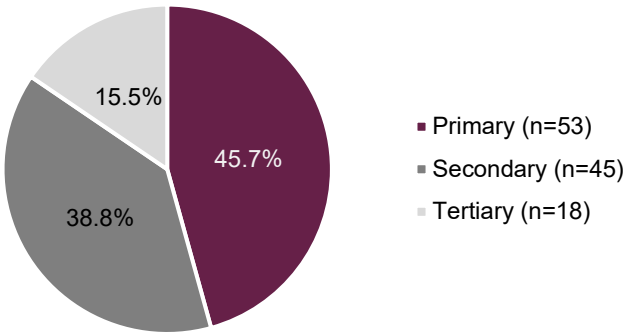
[46] Report from nine maternal mortality review committees, op. cit., p. 5.

Figure 34.

Nearly half were identified as the primary type of prevention.

Type of Prevention for Recommendations for Pregnancy-Related Deaths, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee



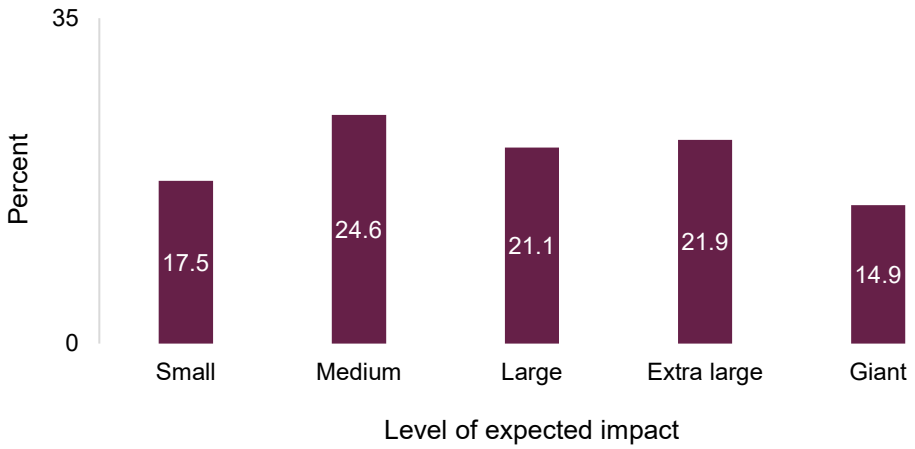
The level of impact if the recommendation was implemented was estimated to be large, extra-large, or giant for 57.9 percent of recommendations. The level of expected impact was either small or medium for 42.1 percent of recommendations (Figure 35).

Figure 35.

Two-thirds of recommendations were estimated to have a large, extra-large, or giant impact if implemented.

Expected Impact of Actions if Implemented for Pregnancy-Related Deaths, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee



The expected level of impact varies on the theme of the recommendations. Table 14 highlights this variation, indicating the anticipated impact for each recommendation theme. For instance, recommendations related to enhanced protocols, thorough and accurate documentation are expected have a small to medium impact. On the other hand, combined recommendations focused on more consistent use of screening tools, including intimate partner violence and substance use disorder, as well as patient education and empowerment, are anticipated to have

a large to giant impact. Furthermore, combined recommendations that promote communication and collaboration between healthcare providers, community health workers/integration of care, family planning education, improving access to care, seatbelt action alert systems, and use of referrals are likely to have a larger impact in terms of prevention efforts.

Table 14.

The expected level of impact varies on the theme of the recommendations.

Recommendation Themes for Action and Expected Potential for Impact if Implemented for Pregnancy-Related Deaths, Kansas, 2016-2020

Source: Kansas Maternal Mortality Review Committee

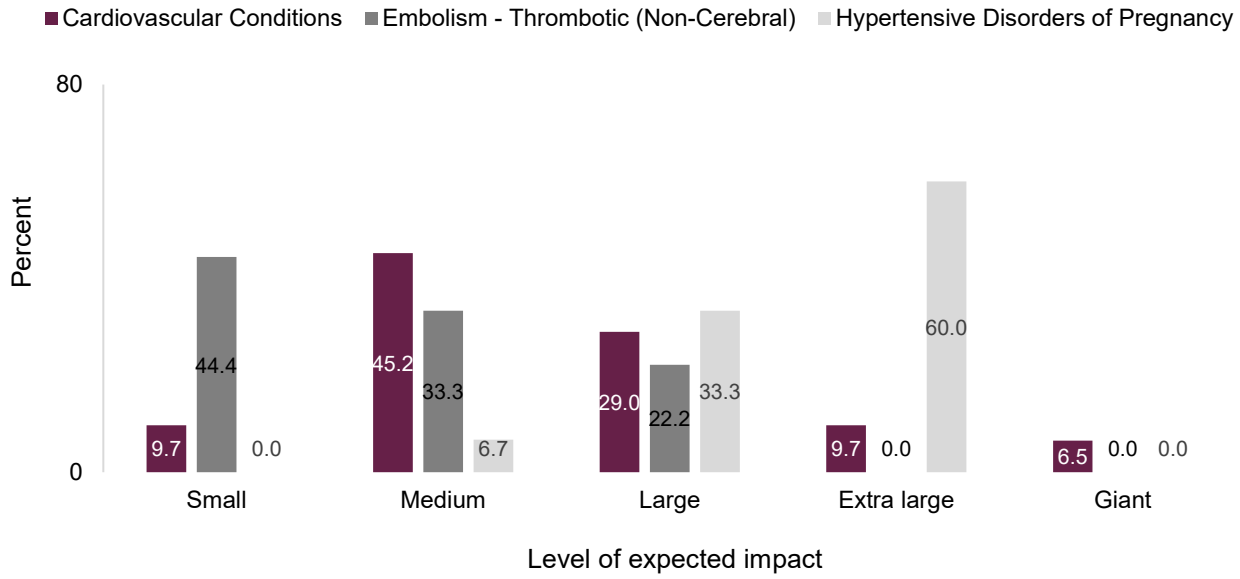
Recommendation	Impact level (%)	
	Small to Medium	Large to Giant
Alliance for Innovation on Maternal Health (AIM) bundle enrollment	0.0	100.0
Communication and collaboration between health care providers	16.7	83.3
Community health workers/integration of care	36.4	63.6
Enhanced protocols	81.0	19.0
Family planning education	0.0	100.0
Improve access to care	0.0	100.0
More consistent use of screening tools, including intimate partner violence and substance use disorder	100.0	0.0
Patient education and empowerment	52.6	47.4
Provider education	41.2	58.8
Seatbelt action alert	0.0	100.0
Thorough and accurate documentation	100.0	0.0
Use of referrals	0.0	100.0

The expected level of impact for recommendations varies depending on cause of death, as shown in Figure 36. Recommendations with medium and large potential impacts constitute nearly two-thirds of the recommendations for the three leading causes of pregnancy-related death. When assessing both the recommendations and their level of impact, it is observed that family planning education, patient education and empowerment, and community engagement and education are the themes that hold significant potential for preventing future deaths related to cardiovascular conditions. On the other hand, themes such as provider education (addressing knowledge and clinical skills gap) and enhancing communication and collaboration between healthcare providers are identified as having the potential to make a significant impact on preventing future deaths due to embolism-thrombotic (non-cerebral) and hypertensive disorders of pregnancy.

Figure 36.

Recommendations with medium and large potential impacts account for nearly two-thirds of the recommendations for the three leading causes of pregnancy-related death.

Expected Impact of Actions if Implemented for Pregnancy-Related Deaths, Kansas, 2016-2020
Source: Kansas Maternal Mortality Review Committee



Conclusion

Reducing maternal mortality in Kansas requires collective effort from all members of the community. The responsibility of this important work extends beyond healthcare providers and policymakers. As neighbors, family, friends, and co-workers of pregnant individuals, we all have a role to play in supporting them during this crucial time. This involvement can take various forms, such as educating ourselves about maternal warning signs, offering emotional support to a new mother, and fostering strong community and social connections. By actively engaging in supporting pregnant and postpartum women, we can address the needs and recommendations outlined by the committee.

Furthermore, we urge the healthcare community and allied partners to thoroughly review the data and recommendations presented in this report. It is essential for each organization or facility to identify areas where they can implement training, policy revisions, and process changes to enhance health outcomes for women and families. Learn more about available resources or become a part of the Kansas Perinatal Quality Collaboratives Fourth Trimester Initiative.

Appendix A. KMMRC Members Review of 2016-2020 Cases

- **Erin Bider, MD** Perinatal Psychiatrist, Maternal Mental Health Program Director, University of Kansas Health System
- **Karen Braman, RPh MS** Senior Vice President of Healthcare Strategy and Policy, Kansas Hospital Association
- **Ellie Brent, MPH** Maternal and Child Health Director, Kansas/Missouri March of Dimes (Past Member)
- **Katherine Campbell, BSN RN** Nurture KC
- **Tara Chettiar, MD FACOG** Obstetrics and Gynecology Saint Luke's Women's Health South
- **Mariah Chrans, IBCLC, PhD** Director of Cradle Kansas City - an initiative of the Community Health Council of Wyandotte County (Current Co-Chair)
- **Andrea Clark** Problem Gambling/Substance Use Disorder Coordinator, Kansas Department for Aging and Disability Services (Past Member)
- **Stephanie Clark** Patient Advocate, Momma's Voices
- **Deidre DeGrado, CPM** Wichita Birth Assistance
- **Mary Sunshine-Delgado, MSN APRN** Maternal Health Program Manager, United Health Care
- **Kim Dishman** Clinical Education Specialist, Saint Luke's Northland Hospital (Past Member)
- **Bethany Enoch, MD FAAFP** Medical Director of Pittsburg Extended Rural Clerkship Experience, KUMC & Family Medicine Physician, Community Health Center of Southeast Kansas
- **Donna Eubanks SGT** Topeka Police Department (Past Member)
- **Bree Fallon, MSN RNC-OB C-EFM** AWHONN Kansas Section Chair, HROB Transport/Fetal Health RN, Children's Mercy Hospital
- **Terrie Garrison, RN BSN** Deputy Director, Unified Government of Wyandotte County/Kansas City, Kansas (Past Member)
- **Charles Gibbs, MD** Clinical Associate Professor and Maternal Fetal Medicine Division Director, Maternal-Fetal Medicine, Center for Advanced Fetal Care, University of Kansas Medical Center (Past Chair/Member)
- **Lisa Goins, RN** Policy Analyst, KDHE-Division of Health Care Finance (Past Member)
- **Donna Gorman, MS LCMFT LCAC** Clinical Coordinator, Women's Recovery Center & Options Adult Services - DCCCA, Inc.
- **Sarah Hachmeister** Director of Advocacy, Kansas Coalition Against Sexual & Domestic Violence
- **Melissa Hague, MD** Clinical Associate Professor, University of Kansas School of Medicine - Wichita; Heartland Women's Group (Past Chair/Member)
- **Jeri Harvey, RN BSN** Stormont Vail Hospital
- **Caroline Hastings, LMSW** Kansas Department for Children & Families (Past Member)

- **Renee Hulett, RN MSN MHA** Director of Maternal Child Services & Behavioral Health Services, St. Catherine Hospital - Centura Health
- **Alicia Johnson-Turner** Special Assistant to the Secretary, Kansas Department for Children and Families (Past Member)
- **Candace Johnson, LMSW** Director of Reintegration, Saint Francis Ministries
- **Erin Johnson** Overland Park Police Department, Criminal Investigations Division - Special Victims Unit (Past Member)
- **Michael Kennedy, MD** McCann Professor for Rural Health and Associate Dean for Rural Health Education, Assistant Dean for Student Affairs and Director of Major Society Learning Community, Professor of Family Medicine, University of Kansas School of Medicine (Past Member)
- **Kelli Krase, MD** OB/GYN, University of Kansas Medical Center
- **Melinda Lavon, PhD IBCLC** Bloom Midwifery and Lactation Services
- **Elizabeth Lewis, MPA MSN WHNP-BC BSN RN** Director Maternal Infant Health, March of Dimes
- **Lori Marshall, LSCSW** Association of Community Mental Health Centers of Kansas, Inc. (Past Member)
- **Robert S. F. McKay, MD** Professor and Chair, Department of Anesthesiology, University of Kansas School of Medicine – Wichita (Past Member)
- **Randall Morgan, MD** Obstetrics & Gynecology, Associates in Women's Health, PA (Current Co-Chair)
- **Sue Murnane, LMSW** Youth Behavioral Health Services Manager, Association of CMHC's of Kansas
- **Jennifer Preston, LMSW PPS** Family Services/State Plan Administrator, Kansas Department of Children and Families
- **Kathy Ray, MSW** Former Director of Advocacy, Education & Rural Projects, Kansas Coalition Against Sexual & Domestic Violence (Past Member)
- **Heather Scruton, MBA MSN** Assistant Director, Transport and EMS Relations - Critical Care Transport, Children's Mercy Hospital
- **Lisa Shoop, BSN RN** Public Service Executive, Kansas Department of Health & Environment, Division of Health Care Finance
- **Sharla Smith, PhD MPH** Assistant Professor, University of Kansas Medical Center, Department of Preventative Medicine and Public Health
- **Deborah Stern, RN Esq** Senior Vice President of Clinical Services and General Counsel, Kansas Hospital Association (Past Member)
- **Terrah Stroda, CNM** Flint Hills Obstetrician-Gynecologist, Junction City
- **Grace Xu, MD** Assistant Professor, Department of Anesthesiology, University of Kansas Medical Center
- **John Yeast, MD MSPH** Professor, Department of Obstetrics and Gynecology, Maternal Fetal Medicine, University of Missouri - Kansas City School of Medicine
- **Diana Zumbrunn** Patient/Consumer (Past Member)

KMMRC - KDHE Leadership & Staff

- **Farah Ahmed, MPH PhD** Environmental Health Officer & State Epidemiologist, Bureau of Epidemiology and Public Health Informatics
- **Drew Duncan, MA** Screening and Surveillance Section Chief, Bureau of Family Health
- **Ashley Goss, MBA** Deputy Secretary for Public Health
- **Nadyne Hagmeier** Abstractor for Maternal Mortality Review Committee, KFMC Health Improvement Partners
- **Kay Haug** Director and State Registrar, Bureau of Epidemiology and Public Health Informatics
- **Jamie Kim, MPH** Maternal and Child Health Epidemiologist, Bureau of Family Health
- **Jennifer Marsh** Children & Families Section Director, Bureau of Family Health (Past)
- **Jill Nelson, BMus** Health Planning Consultant Maternal & Perinatal Initiatives KMMRC & KPQC Coordinator, Bureau of Family Health
- **Rachel Sisson, MS** Director of Bureau of Family Health (Past)
- **Kasey Sorell, MBA BSN RN CPC** KMMRC & KPQC Coordinator, Bureau of Family Health (Past)
- **Stephanie Wolf, RN BSN** Perinatal & Infant Clinical Health Consultant, Bureau of Family Health

Appendix B. KMMRC Recommendations to Action

Patient/Family Level

Recommendation Category: Patient Education and Empowerment

KMMRC Recommendations	Data to Action	New Activities or Initiatives based on the KMMRC Recommendations
• Empower patient self-advocacy • Empowering/educating patient and support system to access care • Empowering/educating women on the importance of knowing and disclosing all her medical history to all her providers. • Education for patients with chronic illnesses to follow up with specialists and compliance with treatment plans/visits	Kansas Maternal Warning Signs Initiative - includes Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) / POST-BIRTH Warning Signs (PBWS), Centers for Disease Control and Prevention (CDC) Hear Her Campaign and other materials - Kansas Perinatal Quality Collaborative (KPQC) Fourth Trimester Initiative (FTI), Kansas Perinatal Community Collaboratives (KPCCs) and Kansas Department of Health and Environment (KDHE) funded home visiting programs (Maternal and Child Health (MCH), Pregnancy Maintenance Initiative (PMI), Teen Pregnancy Targeted Case Management (TPTCM), Maternal, Infant, and Early Childhood Home Visiting (MIECHV)). Starting in 2021, staff at all participating FTI sites, Title V, MICEHV, TPTCM, PMI grantees and KPCCs have been trained using AWHONN's POST-BIRTH Warning Signs training curriculum. In total, 800 FTI birth facility staff have been trained; and over 200 staff from 48 local community agencies have completed the AWHONN POST-BIRTH training. AWHONN POST-BIRTH training will be extended to all Title X	Phase 2 of the Kansas Maternal Warning Signs Initiative started in August 2022 - Targeting WIC, Title X Family Planning and Community Health Workers (CHW); will continue to promote with phase 1 implementation sites to include new staff and additional partners. By January 2023, enhanced "High Risk Pregnancy Reports" will be available to Kansas Perinatal Community Collaborative (KPCC) sites, identifying particular risk factors related to previous birth histories, chronic health conditions, and conditions/complications of pregnancy (including mental health and substance use). Local KPCC staff will be trained on use of these reports for identifying individuals needing care coordination / case management type services throughout pregnancy and postpartum period.

	Family Planning and Special Supplemental Nutrition Program for Women, Infants and Children (WIC) grantees in the fall of 2022. Additionally, the Maternal Warning Signs Initiative Patient Education guide, including the CDC Hear Her Campaign materials, and Save Your Life magnets were developed and provided to all FTI, Title V, MICEHV, TPTCM/PMI, and KPCC sites (www.kdhe.ks.gov/1847/Provider-Resources). Maternal Warning Signs Initiative materials will be provided to Title X Family Planning and WIC grantees in the fall of 2022. Patient education has been embedded in the Becoming a Mom (BaM) prenatal education sessions, home visiting, clinical settings and in-patient birth facilities at all staff-trained locations. Additionally, programs/clinics have been encouraged to train emergency department/room and first responders in their community.	
Providers to educate patients on management of hypertension using the recommendations issued by the American College of Obstetricians & Gynecology (ACOG).		Perinatal Hypertension Patient Education Guide (Cuff Project): A pilot Cuff Project will be implemented in the Summer of 2023 through the Becoming a Mom (BaM) prenatal education program in the KPCC communities. The Maternal Warning Signs Initiative materials will be expanded to include Patient Education Teaching Guides for Blood Pressure Monitoring (includes call to action of home blood pressure monitoring, preeclampsia and postpartum preeclampsia overview, guidance on self-measured blood pressure cuff selection, validated cuff

		selection, the Preeclampsia Foundation's Check-Know-Share handout, Preeclampsia Foundation's Blood Pressure Monitoring Instructions and Log, and the March of Dimes' Health Action Sheet on Low-Dose Aspirin). Home visitors and KPCC sites will provide identified individuals diagnosed, or at high risk of developing preeclampsia, with a gift card to purchase an automated blood pressure monitor, as well as the Patient Education resources. The Perinatal Hypertension Patient Education guides will be provided to all Title V, Title X, TPTCM, PMI, MICEHV, WIC, and CHW programs; and to facilities enrolled in FTI, to be included as an extension of the Maternal Warning Signs Initiative.
• The provider should educate patients on importance of tobacco cessation. • The provider should educate the patient on importance of mental health treatment. • The provider should educate patients on importance of substance use treatment • Provider to educate to all patients about risks of obesity, especially during pregnancy and promote a healthy lifestyle.	Patient education is also provided through Kansas Perinatal Community Collaborative (KPCC) sites and home visiting programs.	In May of 2022, KDHE hosted a training for all Maternal and Child Health, Home Visiting and Family Planning local grantees on tools for screening and referrals related to tobacco cessation during the perinatal period. In addition, the KanQuit line, which provides incentives for pregnant women, has been promoted throughout the public health workforce via handbook guidance and additional training resources.
• Standardized discharge education that is individualized and patient driven to patients and support person(s).	Through the Fourth Trimester Initiative (FTI), providers are receiving education on discharge education to provide their patients as well as resources to standardize the discharge plan with all patients (using "Mom Cards" that have all of the birth information and discharge instructions for mom to show to her providers).	

	Note: ACOG nationally has not determined what a “universal discharge plan” should include. This is one component of the FTI that we haven’t gained much traction around as we wait for more information from ACOG.	

Recommendation Category: Family Planning Education

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
• Preconception counseling; optimizing health prior to conception • Provide family planning education	In December of 2020 KDHE launched the Well Woman Toolkits for providers and communities. These resource guides provide an overview on how to provide comprehensive well-woman care, including screening and education related to overall health and pregnancy intention screening.	KDHE health consultants are collaborating with the Title X, Family Planning staff to develop a pregnancy intention resource guide which would be available via the KDHE integration toolkits website.
• Screening for pregnancy intention with One Key Question (OKQ)	One Key Question® webinars/education to providers in 2020 Kansas MCH implemented OKQ in 2018 through a partnership with the national team, Power to Decide. Kansas MCH invited representatives from Power to Decide to present three in-person trainings across the state. The MCH Team has implemented OKQ and over 100 professionals were trained in February and March 2020, including local MCH, Family Planning, Home Visiting, and WIC staff. In addition, staff from other community organizations (e.g., faith based) attended. These trainings were followed by two open consultation calls (June and July 2020) facilitated by Power to Decide in which newly trained staff had an opportunity to get all their implementation questions answered	The Reproductive Life Plan workbook, My Life, My Goals: Family Planning Life Plan is available on the KDHE website and has been promoted to public and private health providers across the state.

	and discuss best practices and challenges in asking the OKQ. The One Key Question algorithm has been incorporated into the patient data management system used by all state Title V and Title X grantees. In 2021, KDHE released the reproductive life plan, My Life, My Goals: Family Planning Life Plan. This workbook was developed through a partnership between KDHE, Vibrant Health, The unified Government of Wyandotte County Public Health Department and the March of Dimes. Review, feedback and editing was provided by the Cradle Kansas City Community Action Board. The workbook was piloted and tested by community members in Wyandotte County.	
• Inter-agency communication and coordination: Education and increased access to Long-Acting Reversible Contraception (LARC) and other highly effective contraception methods	KDHE developed an online toolkit focused on Long Acting Reversible Contraception (LARC) for providers across the state. This toolkit is intended to be utilized by Kansas Title V and Title X programs and shared with local partnering providers in an effort to develop adequate systems of care. The toolkit contains resources related to coding and billing, community collaboration, addressing LARC myths, among other resources (www.kdhe.ks.gov/500/Long-Acting-Reversible-Contraceptive)	KDHE continues to educate and share resources related to LARC to Family Planning grantees. As part of the FTI postpartum model of care all participating birth facilities will include reproductive life planning as part of their discharge education; and will schedule a postpartum appointment for the birthing person prior to discharge from the FTI facility. FTI facilities will work collaboratively with community partners to connect postpartum persons to local community resources that provide low or no cost reproductive life planning services- including LARC devices (Title X Family Planning programs, safety net clinics, local providers, etc.). Additionally, all Emergency Departments in FTI enrolled facilities will incorporate a screening question

		for current or future pregnancies in each triage encounter of female patients of childbearing age

Provider Level

Recommendation Category: Provider Education

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
• Assurance of adequate anti-coagulation		
• Educate providers about barriers patients may have and community resources available to which they can refer patient / family		Through the KPQC's Fourth Trimester Initiative, providers are being trained to screen all patients for social determinants of health. Technical assistance will also be provided to each participating provider to develop a resource guide for their communities for easy referral to resources. Education for warm hand-offs
• Knowledge / clinical skills gap		
• Encourage / educate coordination of care of between physicians across specialties as well as full documentation of care		FTI will educate and provide TA to participating sites to develop and implement policies for coordination of care between specialties.
• Ensure standard of care is being followed and documented appropriately; peer review for maternal deaths be done at local/regional level		
• Pregnancy intention screening, preconception counseling and reproductive health education as part of a comprehensive well woman exam	In December of 2020 KDHE launched the Well Woman Toolkits for providers and communities. These resource guides provide an overview on how to provide comprehensive well-woman care, including screening and education related to overall health and pregnancy intention screening.	In 2023 these toolkits will be revised with updated guidance and resources.

• Comprehensive screening for mental health, substance use (including tobacco and alcohol), social determinants of health, and intimate partner violence as part of a comprehensive well woman exam.		FTI, MAVIS, KCC: The KPQC's FTI, MAVIS project, and KCC are working together to educate providers on comprehensive screening for mental health, substance use, IPV, and social determinants of health (SDOH) during every visit.
• Awareness of policies and best practices for those at high risk (such as morbid obesity); close monitoring for post-birth warning signs that would prevent early discharge	FTI (PBWS) - see above about AWHONN POST-BIRTH Warning Signs	
• Facilities should educate all their providers on recognition of emergent conditions in pregnancy.		FTI is working to provide PBWS training to all Emergency Room staff.
• Providers should be educated on isoniazid (INH) treatment and monitoring of liver function tests (LFTs) for tuberculosis treatment.		
• The provider should have familiarity with best practice and/or algorithm for chemo-prophylaxis for deep vein thrombosis (DVT) and pulmonary embolism (PE) prevention.		
• Facilities to educate providers on appropriate and timely escalation of care, whether within same facility or to an outside facility.		
• Facility to educate providers on signs and symptoms of sepsis to ensure that all providers understand recognition of sepsis criteria.		
• Educate providers, including IHS providers, on availability of domestic violence and sexual violence advocacy		FTI, MAVIS - see above post on comprehensive screening and include that technical assistance will be provided to

services including how to find those resources.		identify resources in the community and make connections for warm handoffs of women needing the services.

Recommendation Category: More consistent use of screening tools, including intimate partner violence and substance use disorder

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
• Comprehensive screening at the onset and throughout prenatal care for tobacco, alcohol and other substance use	KCC - Continued promotion on universal perinatal substance use screening recommendations. Provides training and program/clinic specific technical assistance on substance use screening implementation, screening tools, clinic policy, workflow, interventions based on screening results, and care coordination/referrals for further assessment/to treatment, when indicated. Promotion of the Perinatal Provider Consultation Line, a free resource for all Kansas providers.	BaM sites are and will continue to screen as a required part of program implementation; also working on established protocols with partnering providers as part of the KPCC model. Guidance has been created for validated screening tools for each of the identified area and made available to public health grantees via the electronic patient health record system, DAISEY (KDHE's Data Application and Integration Solutions for the Early Years).
• Comprehensive screening at the onset and throughout prenatal care for social determinants of health and other social service connections		Recommended screening for SDOH will be integrated into BaM/KPCC in Jan 2023. The American Academy of Family Physicians SDOH screening tool has been added to the DAISEY system with accompanying guidance for all Maternal and Child Health and Family Planning providers.
• Comprehensive screening at the onset and throughout prenatal care for intimate partner violence and ensure referrals for services		MAVIS/FTI - KDHE and the KPQC have partnered with Kansas Coalition Against Sexual and Domestic Violence (KCSDV) to develop and disseminate training to providers across the state for comprehensive screening

		and referral for services for intimate partner violence. As a part of this training, direct technical assistance will be provided to providers and facilities to implement effective policies to ensure all women are screened and referred for appropriate services adequately.
• At every encounter, providers should screen for and refer patients, as appropriate, for mental health treatment and collaborate with the mental health facility to ensure that the patient followed through on any appointments/treatments.	Kansas Connecting Communities (KCC) - Continued promotion on universal perinatal substance use screening recommendations. Provides training and program/clinic specific technical assistance on substance use screening implementation, screening tools, clinic policy, workflow, interventions based on screening results, and care coordination/referrals for further assessment/to treatment, when indicated. Promotion of the Perinatal Provider Consultation Line, a free resource for all Kansas providers.	KCC is developing a video training series to demonstrate introduction of a perinatal mental and substance use screen, how to response to a low, moderate, and high-risk mental health and substance use screening result, and how to respond when a patient/client refuses a screening. 7 of the 10 videos have been filmed; projected publishing date is September 2022.
	BaM/KPCC sites have integrated (several years ago) Edinburgh Postnatal Depression Scale (EPDS) during sessions 2, 6 and at postpartum follow-up (birth outcome completion); a EPDS Report is used in DAISEY to identify high risk individuals based on a positive screen, and a plan of action tool is also utilized in DAISEY to track referral and follow up. This has all been integrated across KDHE MCH programming (home visiting, PMI, TPTCM) as well.	
• Educate provider to thoroughly review all medical and behavioral health history with the patient, screen for mental health	KCC - Continued promotion on universal perinatal substance use screening recommendations. Provides training and program/clinic specific technical assistance on	

conditions at every visit, including screening for suicidal ideation.	substance use screening implementation, screening tools, clinic policy, workflow, interventions based on screening results, and care coordination/referrals for further assessment/to treatment, when indicated. Promotion of the Perinatal Provider Consultation Line, a free resource for all Kansas providers. Also, promotion of the Behavioral Health Screening Guidance developed for Aide To Local programs/DAISEY users.	

Recommendation Category: Thorough and Accurate Documentation

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
• Documentation of follow up that recommendation of a specialist was acknowledged and advised to the patient, in addition to the patient's response to the recommendation.		
• The provider should complete careful and thorough documentation of the encounter(s) with specific discharge instructions included at each encounter.		Through the FTI, providers are being educated on discharge education to provide their patients as well as resources to standardize the discharge plan with all patients (using "Mom Cards" that have all of the birth information and discharge instructions for mom to show to her providers).

Facility Level

Recommendation Category: Use of Referrals

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
• Use of timely and appropriate referrals to higher level of care; consultation with Maternal Fetal Medicine or other subspecialists		

Recommendation Category: Communication and Collaboration Between Health Care Providers

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
• Provide patient with community resources. Ensure that policies and procedures on discharge planning are in place. Ensure a high level of cultural humility, such as providing interpreters. Use a validated external peer review process		
• Ensure collaboration between specialists/sub-specialists involved in patient care obstetrics (pregnancy) remain involved inpatient care in critical care areas		
• Ensure obstetrics providers are present at emergency room visits involving pregnant women		
• Encourage physicians and facilities to not rely solely on EHR for communication between providers		

• Provide patient with community resources. Ensure that policies and procedures on discharge planning are in place. Ensure a high level of cultural humility, such as providing interpreters. Use a validated external peer review process		Based off KMMRC recommendations for improved care coordination and linkage to services for perinatal persons, especially during the postpartum period, the KPQC and KDHE Title V is working with statewide Community Health Worker programs to align and promote this model, as well as integrate into FTI participating facilities through pilot projects in Fall 2023. In addition, Title V is helping to align and integrate CHW programs, MCH Universal Home Visiting programs and FTI facilities within KPCC identified communities. This work will continue through FY24.

Recommendation Category: Enhanced Protocols

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
Deep vein thrombosis (DVT)/venous thromboembolism (VTE) prophylaxis protocols		
Clarify mental health laws governing patients at risk		
Improved follow up for preeclampsia; Education for all levels of providers/community on management of hypertension	Preeclampsia awareness flyer /action alert - A Preeclampsia Awareness Day/Month Action Alert and social media graphics and messaging was disseminated to all Aid to Local grantee programs and state partners in May of 2021. The Action Alert includes state PRAMS data, provider and patient education, resources, and social media graphics/messaging to raise awareness and education about the risks of preeclampsia.	See Cuff Project content above on page 79, “Category: Patient and/or Family, Recommendation category: Patient education and empowerment”.

Ensure policies are in place for those at high risk (such as morbid obesity) to monitor post-birth warning signs closely to prevent early discharge		
Facilities to update their policies and procedures to align with ACOG recommendations, as well as educate providers to properly manage pts with hypertension.		
The facility should have an evidence-based policy and procedure in place to monitor infection post premature ROM, and educate the providers on the P&P.		
The facility should have a policy and procedure for best practice/algorithm for chemo-prophylaxis for DVT and PE prevention, as well as educate providers on the P&P.		
The providers should escalate the care or the care facility of patients when status of a patient cannot be determined, and appropriate care initiated. The facility should have a P&P in place to establish the protocol when determining to transfer a patient and educate the providers on the P&P.		
Facilities should institute policies and procedures for tuberculosis treatment, including around INH treatment and monitoring of liver function tests (LFTs).		
Facilities to implement policies and procedures as well as educate providers on appropriate method to timely transfer patients.		

Policies and Procedures in place to instruct providers to complete and document full condition assessment to include vitals at each clinic visit.		
Review and revision of hospital policy and procedure for management of postpartum hemorrhage - to include timely Obstetrics (OB) notification and re-education of providers.		
The facility should have the DVT/PE protocol built into EHR to ensure usage and easy access for providers.		
Facilities should implement policies for pharmacy to search in KTRACS and to communicate, timely, with prescribing physician with concerns.		
Facilities update policies and educate providers on appropriate pain management consults.		

System Level

Recommendation Category: Seatbelt Action Alert

KMMRC Recommendations	Data to Action	New activities or initiatives based on the KMMRC recommendations
Seatbelt use alert	As of October 2019, a total of 37 pregnancy-associated deaths had been reviewed by the KMMRC. 10 (36%) of the 28 pregnancy-associated, but not-related deaths were the result of a motor vehicle crash. Frequently, the women were not wearing seat belts and were ejected from the vehicle. Deaths occurred during pregnancy and the postpartum period. An action alert discussing proper seat belt use during and after pregnancy was created	

	and disseminated. The action alert can be found at: kmmrc.org/resources/action-alerts/.	

Recommendation Category: Alliance for Innovation on Maternal Health (AIM) Bundle Enrollment

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
Apply to become an AIM state	When deciding on the AIM bundle that fit our State's needs best, KDHE worked in coordination with the KMMRC and KPQC to review the data and recommendations from the KMMRC. Most of the pregnancy-related deaths had recommendations involving better communication and collaboration between providers, timely referrals to specialty physicians as well as community providers, and screening for behavioral health conditions, social determinants of health, and pregnancy intentions. The AIM bundle Postpartum Discharge Transition was chosen based on these recommendations because it addresses the majority of our recommendations. Kansas officially became an AIM enrolled state in October 2021.	
Hypertension Bundle		
Roll out AIM hypertension in pregnancy bundles		
Implementation of the AIM bundle, Maternal hemorrhage, across the state through the KPQC.		

Recommendation Category: Improve Access to Care

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
Ensure access to early postpartum care and the transition from postpartum to preventative well woman care		
Public service announcements (PSAs) or other education campaigns by insurance, public health or other community organizations educating women on how to be an advocate for their own health		

Recommendation Category: Community Health Workers/Integration of Care

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
Provide holistic care coordination/family navigator throughout course of care		
Offer home health care and/or home visiting services and other social services/social work follow up		
• Care Coordination or Navigators at the MCO level and community support services to assess where patient is at, what they understand, and any needs. Access to Universal CHWs for all expectant families		KDHE MCH is working with CHW partners in Kansas to align and promote this model, as well as integrate into FTIs through pilot projects Fall 2023 (someone else might want to speak to this more). Additionally, KDHE MCH is helping to align and integrate CHW partners, existing Universal Home Visiting programs, and KPCCs in participating FTI

• Patient's care is integrated with MH and social support services to help aid in compliance of care and identify needs to address barriers (i.e., childcare, transportation, etc.) • Care coordination or community health worker to help mother navigate the health care system and aid in access to transportation, and evaluation of social determinants of health • Care coordination to ensure patients are connected to needed behavioral health resources and treatment • Care coordination to ensure patients are knowledgeable and connected to domestic violence and sexual assault resources.		communities. Also building out online infrastructure to support growth of KPCC model (which includes care coordination and navigation services).
Community support through care coordination, navigators and/or CHWs. organizational training on implicit bias.		
Provide improved coordinated case management between payors/providers/patient for those pregnancy persons that are obese and/or have comorbidities.		

Recommendation Category: State Legislative Action

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
The State should mandate initial and regular systemic and racist bias training for all providers in the state, regardless of region/area.		
The state should extend Medicaid during the postpartum period and/or expand Medicaid coverage/access.	Starting in 2022, Kansas Medicaid has extended eligibility for pregnant women from 60 days to 12 months postpartum.	

Recommendation Category: Standardized Protocols

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
All EDs and Urgent care centers have obstetric emergency protocols (using a bundle and/or algorithm) through a statewide initiative		
All EHRs should have the DVT/PE protocol built into EHR to ensure usage and easy access for providers.		
All facilities/hospitals in the state should implement internal evaluations of racial experience of their patients/customers (Dr. Karen Scott has developed a paper/evaluation).		The KPQC FTI in participating with the Kansas Birth Equity Network (KBEN) implemented birth equity training in all participating hospitals and birth centers in 2022. With this training, technical assistance will be provided to make appropriate changes or additions of policies to ensure discrimination and racism is being addressed adequately, including regular training of all staff.

All providers and facilities should make follow-up appts as well as have a mechanism to track follow through of appointments/referrals.		
Healthcare and payer systems should enhance components of coordination within the healthcare system to better identify high risk individuals and support their unique needs.		
Required, ongoing implicit bias and anti-racism training at all practices and facilities for all levels.		See above on KBEN.
System requires and provides education for ER providers on circumstances to refer to patients to SW when they present with little or no prenatal care but present with obstetrical complaints.		
Systems should implement comprehensive opioid programs, that include facilities and systems educating providers on responsible narcotic prescription.		

Community Level

Recommendation Category: Community Engagement and Education

KMMRC Recommendation	Data to Action	New activities or initiatives based on the KMMRC recommendations
• Empowering communities to help control trajectory of healthcare system and access to healthcare (includes PSAs and IPV prevention)		Through the MAVIS project, PSAs and education to community providers will be completed regarding intimate partner violence screening and prevention.
• Community education on access and cultural humility, including implicit and explicit bias and anti-racism education		KDHE plans to extend the KBEN training to all FTI staff and local public health partners in last quarter of 2023/first half of 2024.
• PSAs or other education campaigns by local/state public health or other community organizations on chronic health conditions such as obesity and how to improve health		
• Community and system to provide support to obese and high-risk pregnant patients during pregnancy and postpartum through community health workers, dieticians, home visiting, etc.		KDHE will be developing resources that will be made available to public and private perinatal health providers related to resources that can be shared with patients on Medicaid while pregnant who will now have access to health care 12 months postpartum.

Appendix C. Key Definitions[47,48]

The following definitions are used throughout this report.

Pregnancy-associated death. The death of a woman while pregnant or anytime within one year of pregnancy regardless of cause.

- **Pregnancy-related death.** The death of a woman during pregnancy or within one year of the end 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.

- **Pregnancy-associated, but not-related death.** The death of a woman during pregnancy or within one year of the end of pregnancy from a cause that is not related to pregnancy.

- **Pregnancy-associated but unable to determine pregnancy relatedness.** The death of a woman while pregnant or within one year of pregnancy, due to a cause that could not be determined to be pregnancy-related or not pregnancy-related.

Not pregnancy-related or -associated death (i.e., false positive). Woman was not pregnant within one year of her death.

Pregnancy-associated mortality ratio (PAMR). The number of pregnancy-associated deaths per 100,000 live births.

Pregnancy-related mortality ratio (PRMR). The number of pregnancy-related deaths per 100,000 live births.

Pregnancy-associated, but not-related, mortality ratio. The number of pregnancy-associated deaths, that were not pregnancy-related, per 100,000 live births.

Chance to alter outcome. The review committee determination if there was no chance, some chance, or a good chance "of the death being averted by one or more reasonable changes to patient, family, community, provider, and/or systems factors."

Preventability. A death was considered preventable if the committee determines that there was at least some chance of the death being averted by one or more reasonable changes to patient, family, provider, facility, system and/or community factors.

Contributing factor. Factors identified by the review committee that contributed to the death. These are steps along the way that, if altered, may have prevented the woman's death. The

[47] A Report on Pregnancy-Associated Deaths in Ohio 2008-2016, op. cit., p. 39.
[48] Maternal Mortality Review Committee Decisions Form v.24. May 8, 2024, op. cit., p. 31.

factors may be related to the patient, health care providers, facilities/hospitals where the woman sought care, or to the systems that influence the lifestyle, care, and health services for the woman.

Contributing factor descriptions:

- **Lack of access/financial resources.** Systemic barriers (e.g., lack or loss of healthcare insurance or other financial duress, as opposed to noncompliance), impacted their ability to care for themself (e.g., did not seek services because unable to miss work or afford postpartum visits after insurance expired). Other barriers to accessing care: insurance non-eligibility, provider shortage in their geographical area, and lack of public transportation.

- **Adherence to medical recommendations.** The provider or patient did not follow protocol or failed to comply with standard procedures (i.e., non-adherence to prescribed medications).

- **Failure to screen/inadequate assessment of risk.** Factors placing the individual at risk for a poor clinical outcome recognized, and they were not transferred/transported to a provider able to give a higher level of care.

- **Chronic disease.** Occurrence of one or more significant pre-existing medical conditions (e.g., obesity, cardiovascular disease, or diabetes).

- **Clinical skill/quality of care (provider or facility perspective).** Personnel were not appropriately skilled for the situation or did not exercise clinical judgment consistent with current standards of care (e.g., error in the preparation or administration of medication or unavailability of translation services).

- **Poor communication/lack of case coordination or management/ lack of continuity of care (system perspective).** Care was fragmented (i.e., uncoordinated or not comprehensive) among or between healthcare facilities or units, (e.g., records not available between inpatient and outpatient or among units within the hospital, such as Emergency Department and Labor and Delivery).

- **Lack of continuity of care (provider or facility perspective).** Care providers did not have access to individual's complete records or did not communicate their status sufficiently. Lack of continuity can be between prenatal, labor and delivery, and postpartum providers.

- **Cultural/religious, or language factors**. The provider or patient demonstrated that any of these factors was either a barrier to care due to lack of understanding or led to refusal of therapy due to beliefs (or belief systems).

- **Delay.** The provider or patient was delayed in referring or accessing care, treatment, or follow-up care/action.

- **Discrimination.** Treating someone less or more favorably based on the group, class or category they belong to resulting from biases, prejudices, and stereotyping. It can manifest as differences in care, clinical communication and shared decision-making. (Smedley et al, 2003 and Dr. Rachel Hardeman)

- **Environmental factors.** Factors related to weather or social environment.

- **Inadequate or unavailable equipment/technology.** Equipment was missing, unavailable, or not functional, (e.g., absence of blood tubing connector).

- **Interpersonal racism**. Discriminatory interactions between individuals based on differential assumptions approximately the abilities, motives, and intentions of others and resulting in differential actions toward others based on their race. It can be conscious as well as unconscious, and it includes acts of commission and acts of omission. It manifests as lack of respect, suspicion, devaluation, scapegoating, and dehumanization. (Jones, CP, 2000 and Dr. Cornelia Graves).

- **Knowledge - lack of knowledge regarding importance of event or of treatment or follow-up.** The provider or patient did not receive adequate education or lacked knowledge or understanding regarding the significance of a health event (e.g., shortness of breath as a trigger to seek immediate care) or lacked understanding approximately the need for treatment/follow-up after evaluation for a health event (e.g., needed to keep appointment for psychiatric referral after an ED visit for exacerbation of depression).

- **Inadequate law enforcement response**. Law enforcement response was not in a timely manner or was not appropriate or thorough in scope.

- **Legal**. Legal considerations that impacted outcome.

- **Mental health conditions**. The patient had a documented diagnosis of a psychiatric disorder. This includes postpartum depression. If a formal diagnosis is not available, refer to your review committee subject matter experts (e.g., psychiatrist, psychologist, licensed counselor) to determine whether the criteria for a diagnosis of met based on the available information.

- **Inadequate community outreach/resources**. Lack of coordination between healthcare system and other outside agencies/organizations in the geographic/cultural area that work with maternal health issues.

- **Lack of standardized policies/procedures**. The facility lacked basic policies or infrastructure germane to the individual's needs (e.g., response to high blood pressure, or a lack of or outdated policy or protocol).

- **Lack of referral or consultation.** Specialists were not consulted or did not provide care; referrals to specialists were not made.

- **Social support/isolation - lack of family/friend or support system.** Social support from family, partner, or friends was lacking, inadequate, and/or dysfunctional.

- **Structural racism**. The systems of power based on historical injustices and contemporary social factors that systematically disadvantage people of color and advantage White people through inequities in housing, education, employment, earnings, benefits, credit, media, health care, criminal justice, etc. – (Adapted from Bailey ZD. Lancet. 2017 and Dr. Carla Ortique).

- **Substance use disorder - alcohol, illicit/prescription drugs.** Substance use disorder is characterized by recurrent use of alcohol and/or drugs causing clinically and functionally significant impairment, such as health problems or disability. The committee may determine that substance use disorder contributed to the death when the disorder directly compromised their health status (e.g., acute methamphetamine intoxication exacerbated pregnancy- induced hypertension, or they were more vulnerable to infections or medical conditions).

- **Tobacco use.** The patient's use of tobacco directly compromised the patient's health status (e.g., long-term smoking led to underlying chronic lung disease).

- **Trauma.** The individual experienced trauma: i.e., loss of child (death or loss of custody), rape, molestation, or one or more of the following: sexual exploitation during childhood plus persuasion, inducement, or coercion of a child to engage in sexually explicit conduct; or other physical or emotional abuse other than that related to sexual abuse during childhood.

- **Unstable housing.** Individual lived "on the street," in a homeless shelter, or in transitional or temporary circumstances with family or friends.

- **Violence and intimate partner violence (IPV)**. Physical or emotional abuse perpetrated by current or former intimate partner, family member, friend, acquaintance, or stranger.

- **Other.** Contributing factor not otherwise mentioned.

Levels:

- **Patient/Family.** An individual before, during or after a pregnancy, and their family, internal or external to the household, with influence on the individual.

- **Provider.** An individual with training and expertise who provides care, treatment, and/or advice.

- **Facility.** A physical location where direct care is provided – ranges from small clinics and urgent care centers to hospitals with trauma centers.

- **System.** Interacting entities that support services before, during, or after a pregnancy – ranges from healthcare systems and payors to public services and programs.

- **Community.** A grouping based on a shared sense of place or identity – ranges from physical neighborhoods to a community based on common interests and shared circumstances.

Prevention type:

- **Primary.** Prevents the contributing factor before it ever occurs.

- **Secondary.** Reduces the impact of the contributing factor once it has occurred (i.e., treatment).

- **Tertiary.** Reduces the impact or progression of what has become an ongoing contributing factor (i.e., management of complications).

Expected impact:

- **Small.** Education/counseling (e.g., community- and/or provider- based health promotion and education activities).

- **Medium.** Clinical intervention and coordination of care across continuum of well-woman visits (e.g., protocols, prescriptions).

- **Large.** Long-lasting protective intervention (e.g., improve readiness, recognition and response to obstetric emergencies or long-term interventions such as long-acting reversible contraceptives (LARCs)).

- **Extra Large.** Change in context (e.g., promote environments that support healthy living/ensure available and accessible services).

- **Giant.** Address social determinants of health (e.g., poverty, inequality, etc.).

Appendix D. Pregnancy-Associated Case Identification and Verification

The CDC recommendations for pregnancy-associated death identification consist of selecting death records for linkage for women ages 10-60 years and residents (regardless of where the death occurred); linking births and fetal deaths occurring during the year prior to women's death, two calendar years of birth and fetal death record data; literal cause of death fields containing pregnancy-related terms (amniotic, chorioamnionitis, eclampsia, ectopic, intrauterine fetal demise, peripartum, peripartum cardiomyopathy, placental, postpartum, pregnancy, pregnant, uterine hemorrhage, and uterine rupture); ICD-10 codes (A34 and O00-O99.9); pregnancy checkbox indicating pregnant at the time of death, not pregnant but pregnant within 42 days of death, and not pregnant but pregnant 43 days to 1 year before death; and other data sources (e.g., hospital and emergency department records, obituaries, social media, media and news reports, certifier confirmation, autopsy reports).

Kansas selects death records of women ages 10-60 years for linkage with live birth and fetal death records. Kansas currently reviews deaths that occurred in Kansas regardless of whether the person was a Kansas resident. In addition to linkage, Kansas uses ICD-10 codes and the pregnancy checkbox. Currently, the Kansas name comparison code is exact, without using any approximate methods. Both and last name are compared. Kansas does not search literal cause of death fields.

If the abstractor determines a woman was not actually pregnant, even if the checkbox indicates pregnancy, the record is returned to OVS for verification that it's a false-positive. If confirmed by Office of Vital Statistics (OVS) that it is a false-positive, the abstractor notes that in Maternal Mortality Review Information Application (MMRIA)* and the project coordinator informs the Kansas Maternal Mortality Review Committee (KMMRC).

*MMRIA is a comprehensive database provided by CDC to all state maternal mortality review committees. It is designed to facilitate/support a common language for review committees and standardized documentation of committee decisions.

Kansas is actively exploring the use hospital discharge data for case identification or abstraction, aiming to link de-identified hospital discharge data to enhance the review process. The Kansas MMRC project director, abstractor and MCH epidemiologist have access to Medicaid data to support case identification and abstraction as well as access to two health information exchanges, the Kansas Health Information Network and the Lewis and Clark Information Exchange. These resources are utilized to identify additional cases and gather records to ensure comprehensive case abstraction.

A strong collaborative relationship exists between us, KMMRC leadership and OVS, fostering a robust data sharing environment. There has been development of important data sharing practices and the ability for KMMRC staff, including the abstractor, to be notified of deaths in real time (at the time they are registered). As of February 2019, OVS provides BFH a monthly

electronic list (e-list) of pregnancy-associated mortality, resulting from linking live births and fetal deaths, which is the first linkage of case identification. Currently the e-list contains 2022 plus 2023 year to date registered deaths. The e-list contains the following variables/fields:

- Pregnancy-associated deaths: optical key number (unique id), date of registration, date of death, last name, maiden name, given name, date of birth, state (residence), state (death occurred, i.e., Kansas), pregnancy status, age (years), immediate cause of death (verbatim), underlying cause of death (verbatim), immediate cause of death (ICD-10), underlying cause of death in cause categories 1-20 (ICD-10).
- Live births and fetal deaths: optical key number (unique id), infant date of birth, plurality, birth order (if not a single birth).

If a certifier has not indicated a record is complete, it is considered pending. In this stage, there is typically no reference to maternal death, except for a checkbox that may be left blank for cause of death and manner of death. Once the cause of death has been entered, the record is automatically sent to the National Center for Health Statistics (NCHS) for coding, upon which they are returned. Kansas OVS takes the coded records and ensures that the ones they are passing to the Kansas MMRC leadership are appropriate to share (based on statutes and interpretation of the Inter-Jurisdictional Exchange (IJE) agreement). Once deaths are identified by OVS through the linkage, copies of death certificates and matching birth or fetal death certificates are provided to the project director for record abstractions. The abstractor is responsible for entering the certificates and case information into MMRIA. The abstractor works closely with the Kansas Violent Death Reporting System (VDRS) staff to identify and verify deaths occurring during the prenatal and postpartum periods. This extra step ensures all deaths are captured and verified across both programs.

Kansas has a plan to increase identification of additional pregnancy-associated deaths in the future. Death certificates that do not link through OVS will be linked with hospital discharge data that have ICD-10 codes of A34, or O00-O99 for a second linkage. Furthermore, a third linkage with Medicaid data is being explored to identify an even greater number of additional pregnancy-associated deaths. Once the three linkages are complete, the number of pregnancy-associated deaths identified through the first linkage, the number of additional pregnancy-associated deaths identified through the second linkage, and the number of yet additional pregnancy-associated deaths identified through the third linkage will be determined. The types of deaths added by the additional linkages will also be explored as well as any challenges encountered accessing the various datasets. Cases that are identified that happened less than one year after pregnancy do not go to the KMMRC for full review, however, any additional cases identified through the new linkages that did in fact occur less than 1 year after pregnancy would be summarized for the KMMRC in order to learn if they were due to direct obstetric causes. This linked data also allows for the exploration of identifying delivery hospitalizations with severe maternal morbidity (SMM) and tracking of SMM among pregnancy-associated deaths.

Case Abstraction and Review

Kansas has established a contract with a qualified MMR abstractor since May 2018 to handle record collection, abstraction, data entry into MMRIA, and summarization of case information during committee review meetings. Data entry for the first death cohort (2016) began in June 2018, followed by the entry of all 2017 cohort data. Once OVS completes their data searches, the potential cases are reviewed by the abstractor, KMMRC project coordinator and MCH epidemiologist to document any potential false positives or seek clarifying information from OVS prior to conducting comprehensive abstraction that may not be warranted. Death certificates are delivered to BFH along with all linked birth certificates and fetal death certificates. The abstractor enters data from the death certificates and linked live birth or fetal death certificates from OVS into MMRIA.

The abstractor is responsible for manually entering vital records into MMRIA at the present time. It is during this manual data entry process that the abstractor identifies initial sources of data to be abstracted, which may include the coroner or medical examiner reports for the appropriate jurisdiction, medical records (inpatient and outpatient), medical transport or investigating agencies as appropriate based on type or location of death, and other pertinent reports. The abstractor locates addresses to then prepare and send letters of request for relevant records with appropriate identifiers. Respondents may submit documents via the File Transfer Protocol (FTP) server.

The abstracted data is entered into MMRIA and may prompt a second round of requests to individuals or agencies referenced for further information. This data provides the basis for the abstractor to construct case narratives synthesizing salient information for review. Committee members have access to de-identified data in MMRIA and receive a list of cases prior to each meeting, allowing them to familiarize themselves with case narratives in advance.

The KMMRC was initially aimed to meet four times per year to establish structure and process. Kansas began reviewing 2016 cases in November 2018, with the first meeting focusing on orientation and forms which lead to completing six cases during that meeting. At the second meeting in March 2019, 10 cases were completed which left 10 remaining to be reviewed. Two additional meetings were held in June and August 2019 to complete 2016 cases and start 2017 cases. The committee met in October 2019 and March 2020 (virtual) to review 2017 cases and begin 2018 case review. Yet again, in July 2020, the KMMRC met virtually to complete the few remaining 2018 case reviews and began 2019 case review. During each review meeting, the abstractor presents each case for discussion and review. An effort is made to limit discussion to 15-20 minutes per case. In coordination with every review meeting, meeting with the KMMRC leadership (Project Director, Abstractor, Title V/BFH Director, KMMRC Chair and Co-Chair, and MCH Epidemiologist) is held to review the meeting materials and upcoming cases, as well as a debrief of previous meetings.

The Data

Kansas has been diligent in its efforts to align KMMRC to the best practices promoted by CDC as outlined on the Review to Action website. To ensure compliance with successful practices, a site visit with the CDC was conducted before the inaugural KMMRC meeting. The KMMRC promptly adopted all Review to Action recommendations and guidelines, along with using the Review to Action forms upon initiation. The MMRIA system has been integral to the KMMRC process, with information entered directly into MMRIA during the KMMRC case review meetings. During the meetings, the MMRIA Committee Decisions form is displayed on a screen visible to all participants, facilitating discussions and ensuring transparency. The recorder tracks discussion points, committee decisions, capturing comprehensive and accurate information. Once consensus is reached, the committee moves on to the next case. To maintain the validity of decisions, a designated KDHE staff member documents the decisions on a shared document, while the abstractor takes notes on the discussion and decisions.

As an additional measure, the abstractor, project director, and KDHE staff member review the documentation and address any discrepancies within two weeks after each meeting. The project director then enters data from the Committee Decision Form into the relevant fields in MMRIA for each case. Then findings are summarized and reviewed at the beginning of subsequent meetings, providing the committee members an additional opportunity to verify the accuracy of the information.

Appendix E. Diagnosis and Procedure Codes Used to Define 20 Indicators of Severe Maternal Morbidity and Corresponding ICD-10-CM/PCS Codes During Delivery Hospitalization as Specified by the Centers for Disease Control and Prevention.[49,50,51,52]

Severe maternal morbidity indicator	Diagnosis or procedure	ICD-10-CM/PCS code
1. Acute myocardial infarction	DX	I21.xx, I22.x
2. Aneurysm*	DX	I71.xx; I79.0
3. Acute renal failure	DX	N17.x, O90.4
4. Adult respiratory distress syndrome	DX	J80, J95.1, J95.2, J95.3, J95.82x, J96.0x, J96.2x, J96.9x, R06.03, R09.2
5. Amniotic fluid embolism	DX	O88.112, O88.113, O88.119, O88.12, O88.13
6. Cardiac arrest/ventricular fibrillation	DX	I46.x, I49.0x
7. Conversion of cardiac rhythm	PR	5A12012, 5A2204Z
8. Disseminated intravascular coagulation	DX	D65, D68.8, D68.9, O45.002, O45.003, O45.009, O45.012, O45.013, O45.019, O45.022, O45.023, O45.029, O45.092, O45.093, O45.099, O46.002, O46.003, O46.009, O46.012, O46.013, O46.019, O46.022, O46.023, O46.029, O46.092, O46.093, O46.099, O67.0, O72.3
9. Eclampsia	DX	O15.x
10. Heart failure/arrest during surgery or procedure	DX	I97.120, I97.121, I97.130, I97.131, I97.710, I97.711
11. Puerperal cerebrovascular disorders	DX	A81.2, G45.x, G46.x, G93.49, H34.0x, I60.xx, I61.xx, I62.xx, I63.00, I63.01x, I63.1xx, I63.2xx, I63.3xx, I63.4xx, I63.5xx, I63.6, I63.8x, I63.9, I65.xx, I66.xx, I67.xx, I68.xx, O22.50, O22.52, O22.53, I97.810, I97.811, I97.820, I97.821, O87.3
12. Pulmonary edema / Acute heart failure	DX	I50.1, I50.20, I50.21, I50.23, I50.30, I50.31, I50.33, I50.40, I50.41, I50.43, I50.810, I50.811, I50.813, I50.814, I50.82, I50.83, I50.84, I50.89, I50.9, J81.0
13. Severe anesthesia complications	DX	O29.112–O29.119, O29.122–O29.129, O29.192–O29.199, O29.212–O29.219, O29.292–O29.299, O74.0, O74.1, O74.2, O74.3, O89.0x, O89.1, O89.2, T88.2XXA, T88.3XXA
14. Sepsis	DX	A32.7, A40.x, A41.x, I76, O85, O86.04, R65.20, R65.21, T81.12XA, T81.44XA
15. Shock	DX	O75.1, R57.x, T78.2XXA, T81.10XA, T81.11XA,

[49] Fingar, Hambrick, Heslin and Moore, op. cit., p. 10.
[50] CDC. Severe Morbidity Indicators and Corresponding ICD-10-CM/PCS Codes during Delivery Hospitalizations, op. cit., p. 9.
[51] Maternal and Child Health Bureau. Federally Available Data (FAD) Resource Document, op. cit., 9.
[52] Council on Patient Safety in Women's Health Care. https://safehealthcareforeverywoman.org/. https://saferbirth.org/wp-content/uploads/AIM-SMM-Code-List_04042023.xlsx.

		T81.19XA, T88.6XXA
16. Sickle cell disease with crisis	DX	D57.00, D57.01, D57.02, D57.211, D57.212, D57.219, D57.411, D57.412, D57.419, D57.811, D57.812, D57.819
17. Air and thrombotic embolism	DX	I26.x, O88.012–O88.03, O88.212–O88.23, O88.312–O88.33, O88.812–O88.83, T80.0XXA
18. Hysterectomy	PR	0UT90ZL, 0UT90ZZ, 0UT97ZL, 0UT97ZZ
19. Temporary tracheostomy*	PR	0B110F4, 0B113F4, 0B114F4
20. Ventilation	PR	5A1935Z, 5A1945Z, 5A1955Z

Abbreviations: ICD-10-CM/PCS, International Classification of Diseases, tenth Revision, Clinical Modification/Procedure Coding System

For all pregnancy related codes O00-O9A: Are only applicable to maternity patients aged 12-55 years inclusive; Use a code under Z3A (Z3A.20-Z3A.42) to document the exact week during the pregnancy; *Due to rare prevalences, the following indicators are combined for reporting purposes: 1) Acute myocardial infarction and aneurysm; 2) cardiac arrest/ventricular fibrillation and conversion of cardiac rhythm; and 3) temporary tracheostomy and ventilation. Blood products transfusion was excluded in the analysis due to known coding issues in ICD-10-CM (i.e., which decreased significantly overall with the transition from ICD-9-CM to ICD-10-CM/PCS coding and may not always indicate severe morbidity in the absence of other codes).

Appendix F. Enhanced Delivery Hospitalization Identification Method [53,54,55]

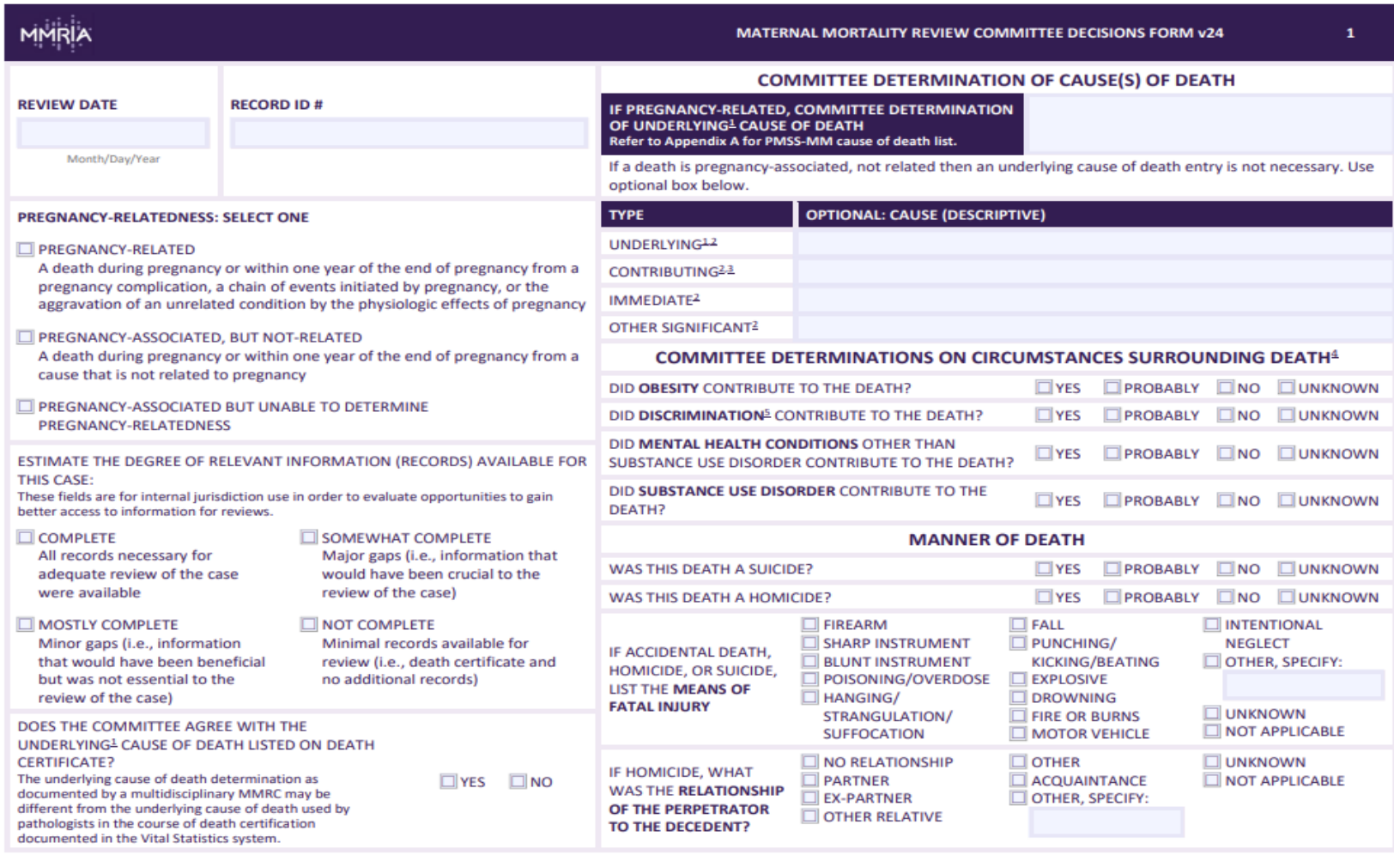
Description	Codes
Outcome of delivery diagnosis	Z37x (short form code for live birth; includes Z37.0 through Z37.9)
Normal delivery diagnosis	O75.82 (onset (spontaneous) of labor after 37 completed weeks of gestation but before 39 completed weeks of gestation, with delivery by (planned) cesarean section) O80 (encounter for full-term uncomplicated delivery) O82 (encounter for cesarean delivery without indication)
DRG delivery codes	MS-DRG = 765 (cesarean section with CC/MCC) MS-DRG = 766 (cesarean section without CC/MCC) MS-DRG = 767 (vaginal delivery with sterilization and/or D&C) MS-DRG = 768 (vaginal delivery with OR procedure(s) except sterilization and/or D&C) MS-DRG = 774 (vaginal delivery with complicating diagnoses) MS-DRG = 775 (vaginal delivery without complicating diagnoses) MS-DRG = 783 (cesarean section with sterilization with MCC) MS-DRG = 784 (cesarean section with sterilization with CC) MS-DRG = 785 (cesarean section without CC/MCC) MS-DRG = 786 (cesarean section without sterilization with MCC) MS-DRG = 787 (cesarean section without sterilization with CC) MS-DRG = 788 (cesarean section without sterilization without CC/MCC) MS-DRG = 796 (vaginal delivery with sterilization and/or D&C with MCC) MS-DRG = 797 (vaginal delivery with sterilization and/or D&C with CC) MS-DRG = 798 (vaginal delivery with sterilization and/or D&C without CC/MCC) MS-DRG = 805 (vaginal delivery without sterilization and/or D&C with MCC) MS-DRG = 806 (vaginal delivery without sterilization and/or D&C with CC) MS-DRG = 807 (vaginal delivery without sterilization and/or D&C with CC/MCC)
Selected delivery related procedures	10D00Z0-10D00Z2 (extraction of products of conception, open approach, includes classical, low cervical, and extraperitoneal) 10D07Z3-0D07Z8 (extraction of products of conception via natural or artificial opening) 10E0XZZ (delivery of products of conception, external approach)

[53] Fingar, Hambrick, Heslin and Moore, op. cit., p. 10.
[54] Maternal and Child Health Bureau. Federally Available Data (FAD) Resource Document, op. cit., 9.
[55] Council on Patient Safety in Women's Health Care. Op. cit., p. 131.

	O00.x (ectopic pregnancy) O01.x (hydatidiform mole) O02.x (other abnormal products of conception) O03.x (spontaneous abortion) O04.x (complications following (induced) termination of pregnancy) O07.x (failed attempted termination of pregnancy) O08.x (complications following ectopic and molar pregnancy)
Exclusions	Any procedure starting with ‘10A0’ (Abortion of products of conception) 10A00ZZ 10A03ZZ 10A04ZZ 10A07Z6 10A07ZW 10A07ZX 10A07ZZ 10A08ZZ

Abbreviations: ICD-10-CM, International Classification of Diseases, tenth Revision, Clinical Modification; DRG, diagnosis-related group; MS-DRG, Medicare severity diagnosis-related group; CC, complicating or comorbid condition; MCC, major complicating or comorbid condition; D&C, dilation and curettage

Appendix G. Maternal Mortality Review Committee Decisions Form, v.24[56]



MMRIA

MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v24 1

REVIEW DATE

Month/Day/Year

RECORD ID #

PREGNANCY-RELATEDNESS: SELECT ONE

☐ PREGNANCY-RELATED
A death during pregnancy or within one year of the end 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

☐ PREGNANCY-ASSOCIATED, BUT NOT-RELATED
A death during pregnancy or within one year of the end of pregnancy from a cause that is not related to pregnancy

☐ PREGNANCY-ASSOCIATED BUT UNABLE TO DETERMINE PREGNANCY-RELATEDNESS

ESTIMATE THE DEGREE OF RELEVANT INFORMATION (RECORDS) AVAILABLE FOR THIS CASE:
These fields are for internal jurisdiction use in order to evaluate opportunities to gain better access to information for reviews.

☐ COMPLETE
All records necessary for adequate review of the case were available

☐ SOMEWHAT COMPLETE
Major gaps (i.e., information that would have been crucial to the review of the case)

☐ MOSTLY COMPLETE
Minor gaps (i.e., information that would have been beneficial but was not essential to the review of the case)

☐ NOT COMPLETE
Minimal records available for review (i.e., death certificate and no additional records)

DOES THE COMMITTEE AGREE WITH THE UNDERLYING[1] CAUSE OF DEATH LISTED ON DEATH CERTIFICATE?
The underlying cause of death determination as documented by a multidisciplinary MMRC may be different from the underlying cause of death used by pathologists in the course of death certification documented in the Vital Statistics system.
☐ YES ☐ NO

COMMITTEE DETERMINATION OF CAUSE(S) OF DEATH

IF PREGNANCY-RELATED, COMMITTEE DETERMINATION OF UNDERLYING[1] CAUSE OF DEATH
Refer to Appendix A for PMSS-MM cause of death list.

If a death is pregnancy-associated, not related then an underlying cause of death entry is not necessary. Use optional box below.

TYPE	OPTIONAL: CAUSE (DESCRIPTIVE)
UNDERLYING[1,2]	
CONTRIBUTING[2,3]	
IMMEDIATE[2]	
OTHER SIGNIFICANT[2]	

COMMITTEE DETERMINATIONS ON CIRCUMSTANCES SURROUNDING DEATH[4]

DID **OBESITY** CONTRIBUTE TO THE DEATH?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN
DID **DISCRIMINATION**[5] CONTRIBUTE TO THE DEATH?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN
DID **MENTAL HEALTH CONDITIONS** OTHER THAN SUBSTANCE USE DISORDER CONTRIBUTE TO THE DEATH?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN
DID **SUBSTANCE USE DISORDER** CONTRIBUTE TO THE DEATH?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN

MANNER OF DEATH

WAS THIS DEATH A SUICIDE?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN
WAS THIS DEATH A HOMICIDE?	☐ YES	☐ PROBABLY	☐ NO	☐ UNKNOWN

IF ACCIDENTAL DEATH, HOMICIDE, OR SUICIDE, LIST THE **MEANS OF FATAL INJURY**

☐ FIREARM
☐ SHARP INSTRUMENT
☐ BLUNT INSTRUMENT
☐ POISONING/OVERDOSE
☐ HANGING/ STRANGULATION/ SUFFOCATION
☐ FALL
☐ PUNCHING/ KICKING/BEATING
☐ EXPLOSIVE
☐ DROWNING
☐ FIRE OR BURNS
☐ MOTOR VEHICLE
☐ INTENTIONAL NEGLECT
☐ OTHER, SPECIFY:
☐ UNKNOWN
☐ NOT APPLICABLE

IF HOMICIDE, WHAT WAS THE **RELATIONSHIP OF THE PERPETRATOR TO THE DECEDENT?**

☐ NO RELATIONSHIP
☐ PARTNER
☐ EX-PARTNER
☐ OTHER RELATIVE
☐ OTHER
☐ ACQUAINTANCE
☐ OTHER, SPECIFY:
☐ UNKNOWN
☐ NOT APPLICABLE

[1] Underlying cause refers to the disease or injury that initiated the chain of events leading to death or the circumstances of the accident or violence which produced the fatal injury.
[2] OPTIONAL field, CDC does not use this data.
[3] Add descriptions of contributors in the pathway between the immediate and underlying cause of death, as provided by the committee. Note that this is different from the contributing factors worksheet on page 2.
[4] If "Yes" or "Probably" is selected for preventable deaths, then an aligned contributing factor class and description would be expected in the grid on page 2.
[5] Encompasses Discrimination, Interpersonal Racism, and Structural Racism as described in Appendix B.

[56] Maternal Mortality Review Committee Decisions Form v.24. May 8, 2024, op. cit., p. 31.

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MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v24 2

COMMITTEE DETERMINATION OF PREVENTABILITY

A death is considered preventable if the committee determines that there was at least some chance of the death being averted by one or more reasonable changes to patient, family, provider, facility, system and/or community factors.

WAS THIS DEATH PREVENTABLE?	☐ YES	☐ NO
CHANCE TO ALTER OUTCOME[6]	☐ GOOD CHANCE ☐ NO CHANCE	☐ SOME CHANCE ☐ UNABLE TO DETERMINE

CONTRIBUTING FACTORS AND RECOMMENDATIONS FOR ACTION (Entries may continue to grid on page 3)

CONTRIBUTING FACTORS WORKSHEET

What were the factors that contributed to this death? Multiple contributing factors may be present at each level: Choose one contributing factor per row until all contributing factors have been identified and described.

RECOMMENDATIONS OF THE COMMITTEE

If there was at least some chance that the death could have been averted, what were the specific and feasible actions that, if implemented or altered, might have changed the course of events? Develop one recommendation per row until all contributing factors have been addressed.

DESCRIPTION OF ISSUE (enter a description for EACH contributing factor listed)	CONTRIBUTING FACTOR (enter one per row; repeat as needed if a contributor has more than one recommendation)	LEVEL	COMMITTEE RECOMMENDATION [Who?] should [do what?] [when?] Map recommendations to contributing factors; repeat as needed if a recommendation has more than one contributor.	LEVEL	PREVENTION TYPE (choose below)	EXPECTED IMPACT (choose below)

CONTRIBUTING FACTOR KEY (DESCRIPTIONS IN APPENDIX B)

- Access/financial
- Adherence
- Assessment
- Chronic disease
- Clinical skill/quality of care
- Communication
- Continuity of care/care coordination
- Cultural/religious
- Delay
- Discrimination
- Environmental
- Equipment/technology
- Interpersonal racism
- Knowledge
- Law Enforcement
- Legal
- Mental health conditions
- Outreach
- Policies/procedures
- Referral
- Social support/ isolation
- Structural racism
- Substance use disorder - alcohol, illicit/prescription drugs
- Tobacco use
- Trauma
- Unstable housing
- Violence
- Other

DEFINITION OF LEVELS

- PATIENT/FAMILY: An individual before, during or after a pregnancy, and their family, internal or external to the household, with influence on the individual
- PROVIDER: An individual with training and expertise who provides care, treatment, and/or advice
- FACILITY: A physical location where direct care is provided - ranges from small clinics and urgent care centers to hospitals with trauma centers
- SYSTEM: Interacting entities that support services before, during, or after a pregnancy - ranges from healthcare systems and payors to public services and programs
- COMMUNITY: A grouping based on a shared sense of place or identity - ranges from physical neighborhoods to a community based on common interests and shared circumstances

PREVENTION TYPE

- PRIMARY: Prevents the contributing factor before it ever occurs
- SECONDARY: Reduces the impact of the contributing factor once it has occurred (i.e., treatment)
- TERTIARY: Reduces the impact or progression of what has become an ongoing contributing factor (i.e., management of complications)

EXPECTED IMPACT

- SMALL: Education/counseling (community- and/or provider-based health promotion and education activities)
- MEDIUM: Clinical intervention and coordination of care across continuum of well-woman visits (protocols, prescriptions)
- LARGE: Long-lasting protective intervention (improve readiness, recognition and response to obstetric emergencies/LARC)
- EXTRA LARGE: Change in context (promote environments that support healthy living/ensure available and accessible services)
- GIANT: Address social drivers of health (poverty, inequality, etc.)

[6] If "Good Chance" or "Some Chance" are selected, then CDC considers this is a "Yes" in their analytic use of the preventability determination.

MMRIA

MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v24 3

CONTRIBUTING FACTORS AND RECOMMENDATIONS FOR ACTION (Continued from page 2)

CONTRIBUTING FACTORS WORKSHEET

What were the factors that contributed to this death? Multiple contributing factors may be present at each level: Choose one contributing factor per row until all contributing factors have been identified and described.

RECOMMENDATIONS OF THE COMMITTEE

If there was at least some chance that the death could have been averted, what were the specific and feasible actions that, if implemented or altered, might have changed the course of events? Develop one recommendation per row until all contributing factors have been addressed.

DESCRIPTION OF ISSUE (enter a description for EACH contributing factor listed)	CONTRIBUTING FACTOR (enter one per row; repeat as needed if a contributor has more than one recommendation)	LEVEL	COMMITTEE RECOMMENDATIONS [Who?] should [do what?] [when?] Map recommendations to contributing factors; repeat as needed if a recommendation has more than one contributor.	LEVEL	PREVENTION TYPE (choose below)	EXPECTED IMPACT (choose below)

MMRIA

MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v24 4

CONTRIBUTING FACTORS AND RECOMMENDATIONS FOR ACTION (Continued from page 3)

CONTRIBUTING FACTORS WORKSHEET

What were the factors that contributed to this death? Multiple contributing factors may be present at each level: Choose one contributing factor per row until all contributing factors have been identified and described.

RECOMMENDATIONS OF THE COMMITTEE

If there was at least some chance that the death could have been averted, what were the specific and feasible actions that, if implemented or altered, might have changed the course of events? Develop one recommendation per row until all contributing factors have been addressed.

DESCRIPTION OF ISSUE (enter a description for EACH contributing factor listed)	CONTRIBUTING FACTOR (enter one per row; repeat as needed if a contributor has more than one recommendation)	LEVEL	COMMITTEE RECOMMENDATIONS [Who?] should [do what?] [when?] Map recommendations to contributing factors; repeat as needed if a recommendation has more than one contributor.	LEVEL	PREVENTION TYPE (choose below)	EXPECTED IMPACT (choose below)

APPENDIX A. PMSS-MM CODES: IF PREGNANCY-RELATED,[7] COMMITTEE DETERMINATION OF UNDERLYING[1] CAUSE OF DEATH

Hemorrhage (Excludes Aneurysms or CVA)
10.1 - Hemorrhage – Uterine Rupture
10.2 - Placental Abruption
10.3 - Placenta Previa
10.4 - Ruptured Ectopic Pregnancy
10.5 - Hemorrhage – Uterine Atony/Postpartum Hemorrhage
10.6 - Placenta Accreta/Increta/Percreta
10.7 - Hemorrhage due to Retained Placenta
10.10 - Hemorrhage – Laceration/Intra-Abdominal Bleeding
10.9 - Other Hemorrhage/NOS

Infection
20.1 - Postpartum Genital Tract (e.g., of the Uterus/ Pelvis/Perineum/Necrotizing Fasciitis)
20.2 - Sepsis/Septic Shock
20.4 - Chorioamnionitis/Antepartum Infection
20.6 - Urinary Tract Infection
20.7 - Influenza
20.8 - COVID-19
20.10 - Pneumonia
20.11 - Other Non-Pelvic Infection (e.g., TB, Meningitis, HIV)
20.9 - Other Infection/NOS

Embolism (Excludes Cerebrovascular)
30.1 - Embolism – Thrombotic
30.9 - Other Embolism (Excludes Amniotic Fluid Embolism)/NOS

Amniotic Fluid Embolism
31.1 - Amniotic Fluid Embolism

Hypertensive Disorders of Pregnancy (HDP)
40.1 - Preeclampsia
50.1 - Eclampsia
60.1 - Chronic Hypertension with Superimposed Preeclampsia

Anesthesia Complications
70.1 - Anesthesia Complications

Cardiomyopathy
80.1 - Postpartum/Peripartum Cardiomyopathy
80.2 - Hypertrophic Cardiomyopathy
80.9 - Other Cardiomyopathy/NOS

Hematologic
82.1 - Sickle Cell Anemia
82.9 - Other Hematologic Conditions including Thrombophilias/TTP/HUS/NOS

Collagen Vascular/Autoimmune Diseases
83.1 - Systemic Lupus Erythematosus (SLE)
83.9 - Other Collagen Vascular Diseases/NOS

Conditions Unique to Pregnancy
85.1 - Conditions Unique to Pregnancy (e.g., Gestational Diabetes, Hyperemesis, Liver Disease of Pregnancy)

Injury
88.1 - Intentional (Homicide)
88.2 - Unintentional
88.9 - Unknown Intent/NOS

Cancer
89.1 - Gestational Trophoblastic Disease (GTD)
89.3 - Malignant Melanoma
89.9 - Other Malignancies/NOS

Other Cardiovascular Conditions (excluding cardiomyopathy, HDP, and CVA)
90.1 - Coronary Artery Disease/Myocardial Infarction (MI)/Atherosclerotic Cardiovascular Disease
90.2 - Pulmonary Hypertension
90.3 - Valvular Heart Disease Congenital and Acquired
90.4 - Vascular Aneurysm/Dissection (Non-Cerebral)
90.5 - Hypertensive Cardiovascular Disease
90.6 - Marfan Syndrome
90.7 - Conduction Defects/Arrhythmias
90.8 - Vascular Malformations Outside Head and Coronary Arteries
90.9 - Other Cardiovascular/NOS, including CHF, Cardiomegaly, Cardiac Hypertrophy, Cardiac Fibrosis, Non-Acute Myocarditis

Pulmonary Conditions (Excludes ARDS-Adult Respiratory Distress Syndrome)
91.1 - Chronic Lung Disease
91.2 - Cystic Fibrosis
91.3 - Asthma
91.9 - Other Pulmonary Disease/NOS

Neurologic/Neurovascular Conditions (Excluding CVA)
92.1 - Epilepsy/Seizure Disorder
92.9 - Other Neurologic Diseases/NOS

Renal Disease
93.1 - Chronic Renal Failure/End-Stage Renal Disease (ESRD)
93.9 - Other Renal Disease/NOS

Cerebrovascular Accident (CVA) not Secondary to HDP
95.1 - Cerebrovascular Accident (Hemorrhage/ Thrombosis/Aneurysm/Malformation) not Secondary to Hypertensive Disorders of Pregnancy

Metabolic/Endocrine
96.2 - Diabetes Mellitus
96.9 - Other Metabolic/Endocrine Disorders/NOS

Gastrointestinal Disorders
97.1 - Crohn's Disease/Ulcerative Colitis
97.2 - Liver Disease/Failure/Transplant
97.9 - Other Gastrointestinal Diseases/NOS

Mental Health Conditions
100.1 - Depressive Disorder
100.2 - Anxiety Disorder (including Post-Traumatic Stress Disorder)
100.3 - Bipolar Disorder
100.4 - Psychotic Disorder
100.5 - Substance Use Disorder
100.9 - Other Psychiatric Conditions/NOS

Unknown COD
999.1 - Unknown COD

[1] Underlying cause refers to the disease or injury that initiated the chain of events leading to death or the circumstances of the accident or violence which produced the fatal injury.
[7] Pregnancy-related death: death during pregnancy or within one year of the end 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.

APPENDIX B. CONTRIBUTING FACTOR DESCRIPTIONS

LACK OF ACCESS/FINANCIAL RESOURCES
Systemic barriers, e.g., lack or loss of healthcare insurance or other financial duress, as opposed to noncompliance, impacted their ability to care for themself (e.g., did not seek services because unable to miss work or afford postpartum visits after insurance expired). Other barriers to accessing care: insurance non-eligibility, provider shortage in their geographical area, and lack of public transportation.

ADHERENCE TO MEDICAL RECOMMENDATIONS
The provider or patient did not follow protocol or failed to comply with standard procedures (i.e., non adherence to prescribed medications).

FAILURE TO SCREEN/INADEQUATE ASSESSMENT OF RISK
Factors placing the individual at risk for a poor clinical outcome recognized, and they were not transferred/transported to a provider able to give a higher level of care.

CHRONIC DISEASE
Occurrence of one or more significant pre-existing medical conditions (e.g., obesity, cardiovascular disease, or diabetes).

CLINICAL SKILL/QUALITY OF CARE (PROVIDER OR FACILITY PERSPECTIVE)
Personnel were not appropriately skilled for the situation or did not exercise clinical judgment consistent with standards of care (e.g., error in the preparation or administration of medication or unavailability of translation services).

POOR COMMUNICATION/LACK OF CASE COORDINATION OR MANAGEMENT/ LACK OF CONTINUITY OF CARE (SYSTEM PERSPECTIVE)
Care was fragmented (i.e., uncoordinated or not comprehensive) among or between healthcare facilities or units, (e.g., records not available between inpatient and outpatient or among units within the hospital, such as Emergency Department and Labor and Delivery).

LACK OF CONTINUITY OF CARE (PROVIDER OR FACILITY PERSPECTIVE)
Care providers did not have access to individual's complete records or did not communicate their status sufficiently. Lack of continuity can be between prenatal, labor and delivery, and postpartum providers.

CULTURAL/RELIGIOUS, OR LANGUAGE FACTORS
The provider or patient demonstrated that any of these factors was either a barrier to care due to lack of understanding or led to refusal of therapy due to beliefs (or belief systems).

DELAY
The provider or patient was delayed in referring or accessing care, treatment, or follow-up care/action.

DISCRIMINATION
Treating someone less or more favorably based on the group, class or category they belong to resulting from biases, prejudices, and stereotyping. It can manifest as differences in care, clinical communication and shared decision-making. (Hardeman, 2022)[8]

ENVIRONMENTAL FACTORS
Factors related to weather or social environment.

INADEQUATE OR UNAVAILABLE EQUIPMENT/TECHNOLOGY
Equipment was missing, unavailable, or not functional, (e.g., absence of blood tubing connector).

INTERPERSONAL RACISM
Discriminatory interactions between individuals based on differential assumptions about the abilities, motives, and intentions of others and resulting in differential actions toward others based on their race. It can be conscious as well as unconscious, and it includes acts of commission and acts of omission. It manifests as lack of respect, suspicion, devaluation, scapegoating, and dehumanization. (Hardeman, 2022)[8]

KNOWLEDGE - LACK OF KNOWLEDGE REGARDING IMPORTANCE OF EVENT OR OF TREATMENT OR FOLLOW-UP
The provider or patient did not receive adequate education or lacked knowledge or understanding regarding the significance of a health event (e.g., shortness of breath as a trigger to seek immediate care) or lacked understanding about the need for treatment/follow-up after evaluation for a health event (e.g., needed to keep appointment for psychiatric referral after an ED visit for exacerbation of depression).

INADEQUATE LAW ENFORCEMENT RESPONSE
Law enforcement response was not in a timely manner or was not appropriate or thorough in scope.

LEGAL
Legal considerations that impacted outcome.

MENTAL HEALTH CONDITIONS
The patient had a documented diagnosis of a psychiatric disorder. This includes postpartum depression. If a formal diagnosis is not available, refer to your review committee subject matter experts (e.g., psychiatrist, psychologist, licensed counselor) to determine whether the criteria for a diagnosis of substance use disorder or another mental health condition are met based on the available information.

INADEQUATE COMMUNITY OUTREACH/RESOURCES
Lack of coordination between healthcare system and other outside agencies/organizations in the geographic/cultural area that work with maternal health issues.

LACK OF STANDARDIZED POLICIES/PROCEDURES
The facility lacked basic policies or infrastructure germane to the individual's needs (e.g., response to high blood pressure, or a lack of or outdated policy or protocol).

LACK OF REFERRAL OR CONSULTATION
Specialists were not consulted or did not provide care; referrals to specialists were not made.

SOCIAL SUPPORT/ISOLATION - LACK OF FAMILY/ FRIEND OR SUPPORT SYSTEM
Social support from family, partner, or friends was lacking, inadequate, and/or dysfunctional.

STRUCTURAL RACISM
The systems of power based on historical injustices and contemporary social factors that systematically disadvantage people of color and advantage white people through inequities in housing, education, employment, earnings, benefits, credit, media, health care, criminal justice, etc. (Hardeman, 2022)[8]

SUBSTANCE USE DISORDER – ALCOHOL, ILLICIT/ PRESCRIPTION DRUGS
Substance use disorder is characterized by recurrent use of alcohol and/or drugs causing clinically and functionally significant impairment, such as health problems or disability. The committee may determine that substance use disorder contributed to the death when the disorder directly compromised their health status (e.g., acute methamphetamine intoxication exacerbated pregnancy- induced hypertension, or they were more vulnerable to infections or medical conditions).

TOBACCO USE
The patient's use of tobacco directly compromised the patient's health status (e.g., long-term smoking led to underlying chronic lung disease).

TRAUMA
The individual experienced trauma: i.e., loss of child (death or loss of custody), rape, molestation, or one or more of the following: sexual exploitation during childhood plus persuasion, inducement, or coercion of a child to engage in sexually explicit conduct; or other physical or emotional abuse other than that related to sexual abuse during childhood.

UNSTABLE HOUSING
Individual lived "on the street," in a homeless shelter, or in transitional or temporary circumstances with family or friends.

VIOLENCE AND INTIMATE PARTNER VIOLENCE (IPV)
Physical or emotional abuse perpetrated by current or former intimate partner, family member, friend, acquaintance, or stranger.

OTHER
Contributing factor not otherwise mentioned. Please provide description.

[8] Hardeman RR, et al. *Developing Tools to Report Racism in Maternal Health for the CDC Maternal Mortality Review Information Application (MMRIA): Findings from the MMRIA Racism & Discrimination Working Group.* Matern Child Health J. 2022.

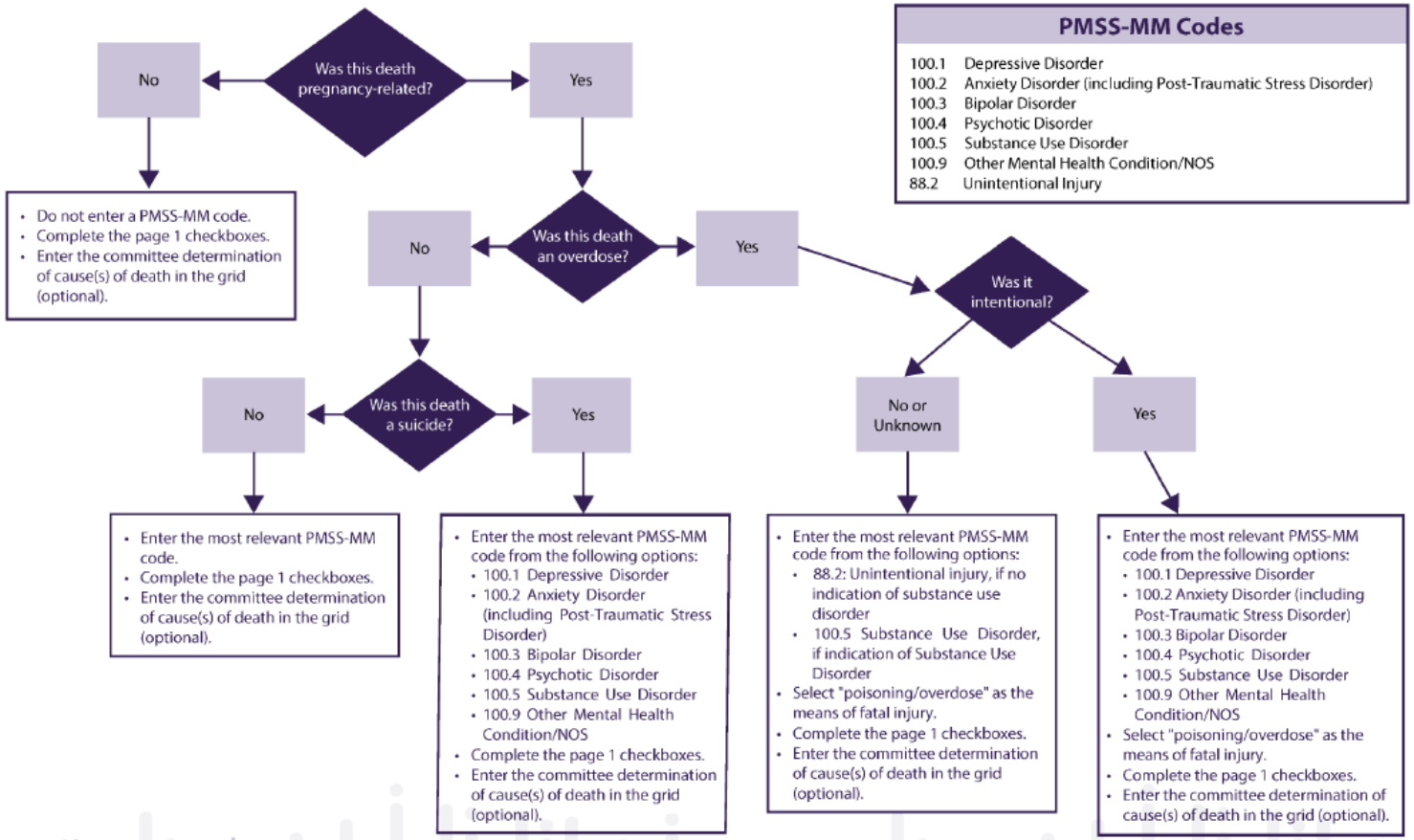
APPENDIX C. CONSENSUS PREGNANCY-RELATED CRITERIA FOR SUICIDE AND UNINTENTIONAL OVERDOSES[9, 10]

Present Y/N	Consensus pregnancy-related criteria for suicide and unintentional overdoses	Examples
	Pregnancy Complication	
	Increased pain directly attributable to pregnancy or postpartum events leading to self-harm or drug use that are implicated in suicide or unintentional drug-related death. *[consensus during pregnancy]*	Back pain, pelvic pain, kidney stones, cesarean incision, or perineal tear pain
	Traumatic event in pregnancy or postpartum (diagnosis of fetal anomaly, stillbirth, preterm delivery, neonatal or infant death, traumatic delivery experience, removal of children from custody) with a temporal relationship between the event leading to self-harm or increased drug use and subsequent death. *[consensus in all time periods]*	Stillbirth, preterm delivery, diagnosis of fetal anomaly, traumatic delivery experience, relationship destabilization due to pregnancy, removal of child(ren) from custody
	Pregnancy-related complication likely exacerbated by drug use leading to subsequent death. *[consensus in pregnancy – only time period considered]*	Placental abruption or preeclampsia in setting of drug use
	Chain of Events Initiated by Pregnancy	
	Cessation or attempted taper of medications for pregnancy-related concerns (neonatal/fetal exposure risk, fear of child protective service involvement) leading to maternal destabilization or drug use and subsequent death. Neonatal or fetal risk - *[consensus in all time periods]*. Child Protective Service involvement - *[consensus during pregnancy]*	Substance use pharmacotherapy (methadone or buprenorphine), psychiatric medications, pain medications
	Inability to access inpatient or outpatient addiction or mental health treatment due to pregnancy. *[consensus during and within 6 months of pregnancy]*	Health care professionals uncomfortable with treating pregnant women, facilities not available that accept pregnant women
	Perinatal psychiatric conditions resulting in maternal destabilization or drug use and subsequent death. *[consensus during and within 6 months of pregnancy]*	Depression diagnosed in pregnancy or postpartum resulting in suicide
	Recovery/stabilization of substance use disorder achieved during pregnancy or postpartum with clear statement in records that pregnancy was motivating factor with subsequent relapse and subsequent death. *[no consensus at any time period]*	Relapse leading to overdose due to decreased tolerance or polysubstance use
	Aggravation of Underlying Condition by Pregnancy	
	Worsening of underlying depression, anxiety or other psychiatric condition in pregnancy or postpartum period with documentation that mental illness led to drug use or self-harm and subsequent death. *[consensus during and within 6 months of pregnancy]*	Pre-existing depression exacerbated in the postpartum period leading to suicide
	Exacerbation, under-treatment or delayed treatment of pre-existing condition in pregnancy or postpartum leading to use of prescribed or illicit drugs resulting in death, or suicide. *[consensus during and within 6 months of pregnancy]*	Undertreatment of chronic pain leading to misuse of medications or use of illicit drugs, resulting in death
	Medical conditions secondary to drug use in setting of pregnancy or postpartum that may be attributable to pregnancy-related physiology and increased risk of complications leading to death. *[no consensus at any time period]*	Stroke or cardiovascular arrest due to stimulant use

[9] Smid MC et al, 2023. *Consensus pregnancy-related criteria for suicide and unintentional overdoses using a Delphi process.* Arch Womens Ment Health.

[10] The italicized text in brackets specify where the Delphi exercise with representatives from 48 MMRCs and eight experts in maternal mortality, substance use disorder, and maternal mental health reached consensus on the criterion. Lack of Delphi consensus as shown in brackets should not override committee consensus on a specific case. If "Yes" is chosen by the committee for at least one of the boxes under any of the three categories then that would constitute a pregnancy-related death.

APPENDIX D. CODING UNDERLYING CAUSE OF DEATH FOR SUICIDES AND OVERDOSES



ERASE MM
Enhancing Reviews and Surveillance to Eliminate Maternal Mortality

MMRIA
MATERNAL MORTALITY REVIEW INFORMATION APP

CDC

APPENDIX E. FAQ: COMMITTEE DETERMINATIONS ON CIRCUMSTANCES SURROUNDING DEATH

These frequently asked questions refer to the following checkboxes on the committee decisions form:

Did obesity contribute to the death?
Did discrimination[11] contribute to the death?
Did mental health conditions other than substance use disorder contribute to the death?
Did substance use disorder[12] contribute to the death?
Was this death a suicide?
Was this death a homicide?
If accidental death, homicide, or suicide, list the means of fatal injury.
If homicide, what was the relationship of the perpetrator to the decedent?

1. **Should the checkboxes be completed for all pregnancy-associated deaths or just those determined to be pregnancy-related?**

   The checkboxes should be completed for all deaths reviewed by your committee, regardless of relatedness. If your committee does not review a pregnant or postpartum person's death because it is considered out of your scope, there is no need to complete the checkboxes.

2. **Should the checkboxes be completed in reference to the pregnant or postpartum person, or the broader context surrounding the death?**

   The checkboxes refer to the decedent's own experience. For example, if a pregnant or postpartum person had a substance use disorder which contributed to the death, the checkbox should be marked 'yes'. In contrast, if the death was a homicide where the perpetrator had a substance use disorder that contributed to causing a death, and the victim did not have a substance use disorder, or the victim had a substance use disorder that did not contribute to the death, the checkbox should be marked 'no'.

3. **Does discrimination encompass racism and other forms of bias?**

   Yes, and more specificity may be added using the contributing factors worksheet on page 2 of the committee decisions form. Interpersonal racism or structural racism may also be documented there.

4. **If substance use was involved in the death, should we choose 'yes' for the substance use disorder checkbox?**

   This checkbox refers to 'substance use disorder', not just substance use. The committee should only choose 'yes' or 'probably' if there is indication of a substance use disorder diagnosis or an expert on the committee (e.g., psychiatrist, psychologist, licensed counselor) who feels that the criteria for a diagnosis of substance use disorder are met based on the available information. Additionally, the checkbox should only be marked 'yes' if the committee decides that the substance use disorder was a contributing factor in the death. If the pregnant or postpartum person had a substance use disorder but this did not contribute to the death, the checkbox should be marked 'no'.

   If the committee determines the death was an intentional or accidental overdose, this should be recorded as poisoning/overdose under means of fatal injury.

5. **For the substance use disorder and mental health conditions checkboxes, is a formal diagnosis required?**

   A diagnosis should ideally be indicated in the pregnant or postpartum person's medical records. However, this may underestimate the number of pregnant or postpartum people with substance use disorder or mental health conditions if persons are unable to access care or treatment. Refer to your review committee subject matter experts (e.g. psychiatrist, psychologist, licensed counselor) to determine whether the criteria for a diagnosis of substance use disorder or another mental health condition are met based on the available information.

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[11] Defined as treating someone less or more favorably based on the group, class or category they belong to resulting from biases, prejudices, and stereotyping [including racism]. It can manifest as differences in care, clinical communication and shared decision-making. (Hardeman RR, et al. *Developing Tools to Report Racism in Maternal Health for the CDC Maternal Mortality Review Information Application (MMRIA): Findings from the MMRIA Racism & Discrimination Working Group.* Matern Child Health J. 2022.)

[12] Characterized by recurrent use of alcohol and/or drugs causing clinically and functionally significant impairment, such as health problems or disability. The committee may determine that substance use disorder contributed to the death when the disorder directly compromised a pregnant or postpartum person's health status (e.g., acute methamphetamine intoxication exacerbated pregnancy-induced hypertension, or the pregnant or postpartum person was more vulnerable to infections or medical conditions).

6. **If substance use disorder contributed to the death, but another mental health condition did not, should we also choose 'yes' for the mental health conditions checkbox?**

   No, substance use disorder should be captured separately from other mental health conditions.

7. **Does substance use disorder include tobacco use?**

   No, substance use disorder as defined here does not include tobacco use. You would NOT mark the substance use disorder checkbox as 'yes' or 'probably' based solely on tobacco use. If the committee determines that tobacco use was a contributor to the death, ensure that Tobacco Use is noted in the contributing factor worksheet with an actionable recommendation that addresses it.

8. **When do we need to choose a means of fatal injury on the committee decisions form?**

   If the committee determines that a death was an accidental death, homicide, or suicide, they should also determine the means of fatal injury to be recorded on the committee decisions form. Unintentional and intentional overdoses should be recorded as poisoning/overdose.

9. **If the committee selects 'yes' or 'probably' for any of the checkboxes (obesity, discrimination, mental health conditions, and/or substance use disorder), should they always document the corresponding contributing factor class and an actionable recommendation?**

   Typically, we expect the circumstances surrounding a death to align with a specified contributing factor class and recommendation. However, recommendations are focused on actions that would have prevented the death. If your committee determines that a circumstance such as obesity contributed to a death that is not preventable, they do not need to document a contributing factor class and recommendation.

10. **When do we need to choose a relationship of the perpetrator to the decedent?**

    If the committee determines that a death was a homicide, they should also record the relationship of the perpetrator to the decedent on the committee decisions forms. The means of fatal injury checkbox should also be filled out for all homicides.

11. **If certain deaths are not reviewed by our committee (for example, suicides and homicides), should we still complete the checkboxes?**

    No, these checkboxes are intended to capture the committee decisions. If a death is not reviewed by the committee, the Circumstances Surrounding Death checkboxes should not be completed.

12. **What if our determination for manner of death does not match the manner indicated on the death record?**

    The checkboxes are intended to capture the decisions of the review committee, and it is expected that sometimes these decisions may differ from the death record. For example, an overdose may have an unknown manner of death on the death certificate, but relevant subject matter experts (e.g. medical examiner), could review additional information and determine that the overdose was intentional. The committee would then check 'yes' for the suicide checkbox. There is also a place on the committee decisions form for indicating whether the committee agrees with the cause of death listed on the death certificate.

13. **Are there opportunities for quality improvement with the checkbox data?**

    Yes, there are lots of opportunities using checkbox data. For example, all unintentional overdoses and overdoses of unknown intent with indication of substance use disorder should have an underlying cause of death PMSS-MM code of 100.5 (Substance Use Disorder) or 100.9 (Other Mental Health Conditions/NOS). If the substance use disorder checkbox is marked 'yes', but the PMSS-MM code is 88.2 (Unintentional Injury), there may be discrepancies in how the MMRC is selecting PMSS-MM codes.

    Another opportunity for quality improvement is to compare the obesity checkbox with the decedent's actual BMI calculated using the height and weight provided in the records. Are there instances where your committee is selecting 'yes' when the BMI suggests the person was at a healthy weight? Of note—this checkbox is intended to capture whether obesity contributed to the death, not whether the pregnant or postpartum person was obese / obesity was present.