OKLAHOMA

Maternal Health Morbidity & Mortality

ANNUAL REPORT 2025

OKLAHOMA MATERNAL HEALTH TASK FORCE

OKLAHOMA State Department of Health

Table of Contents

Executive Summary

Women's Health

Women of reproductive age and mothers in Oklahoma face unique challenges when seeking, accessing, and utilizing health care. Compared with other states and the United States overall, women of reproductive age in Oklahoma are more likely to have limited access to health care, higher rates of poverty and being uninsured, and a greater likelihood of living in a maternity care desert (counties with no facilities offering obstetric care, no obstetric care providers, and any proportion of women aged 18-64 without health insurance).[1-4]

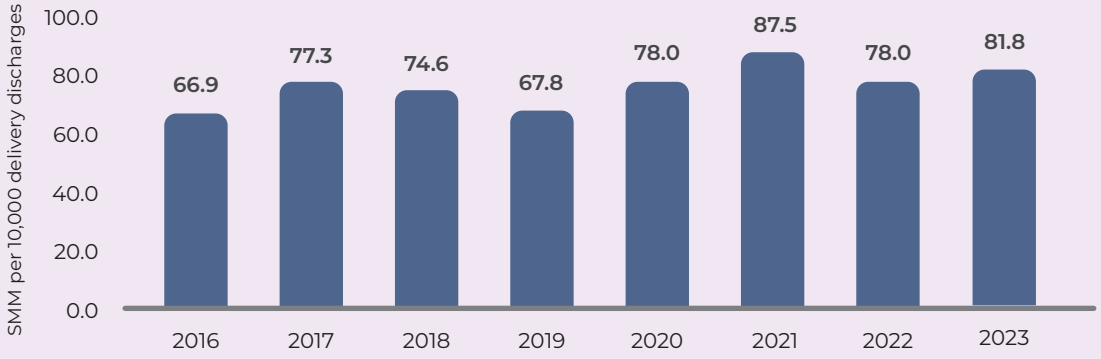
In 2021, Oklahoma's Medicaid program, SoonerCare, expanded the income threshold for eligibility for adults 19-64 to 138% (133% with a 5% disregard) of the federal poverty level or lower, which resulted in over 300,000 Oklahomans enrolled through the expansion by June 2022.[5] Additionally, in 2023 SoonerCare extended postpartum coverage from 60 days to 12 months and expanded income eligibility for pregnant members from 133% to 185%, equivalent to 210% of the federal poverty level after conversion to Modified Adjusted Gross Income methodology (205% with a 5% disregard).[6] While these expansions provide further coverage for women of reproductive age and pregnant/postpartum women, care availability, transportation, and financial challenges may still impact access to and utilization of preconception, prenatal, and postpartum health care.

Severe Maternal Morbidity (SMM)

Rates of SMM in Oklahoma have varied since 2016, with the highest rate at 87.5 SMM events per 10,000 delivery discharges in 2021. From 2022 to 2023, SMM slightly increased by about 5% to 81.8 (Chart ES-1, [Chart 2]).

Chart ES-1: Rate of severe maternal morbidity (SMM) excluding transfusions per 10,000 delivery discharges, Oklahoma 2016 - 2023

Source: Oklahoma State Department of Health, Center for Health Statistics, Oklahoma Hospital Discharge Data 2016 - 2023



The five most common indicators of SMM in 2023 were hysterectomy, acute renal failure, acute respiratory distress syndrome (ARDS), pulmonary edema, and disseminated intravascular coagulation (DIC). From 2021 to 2023, there were disparities in the rate and most common indicators of SMM observed for both maternal race and age.

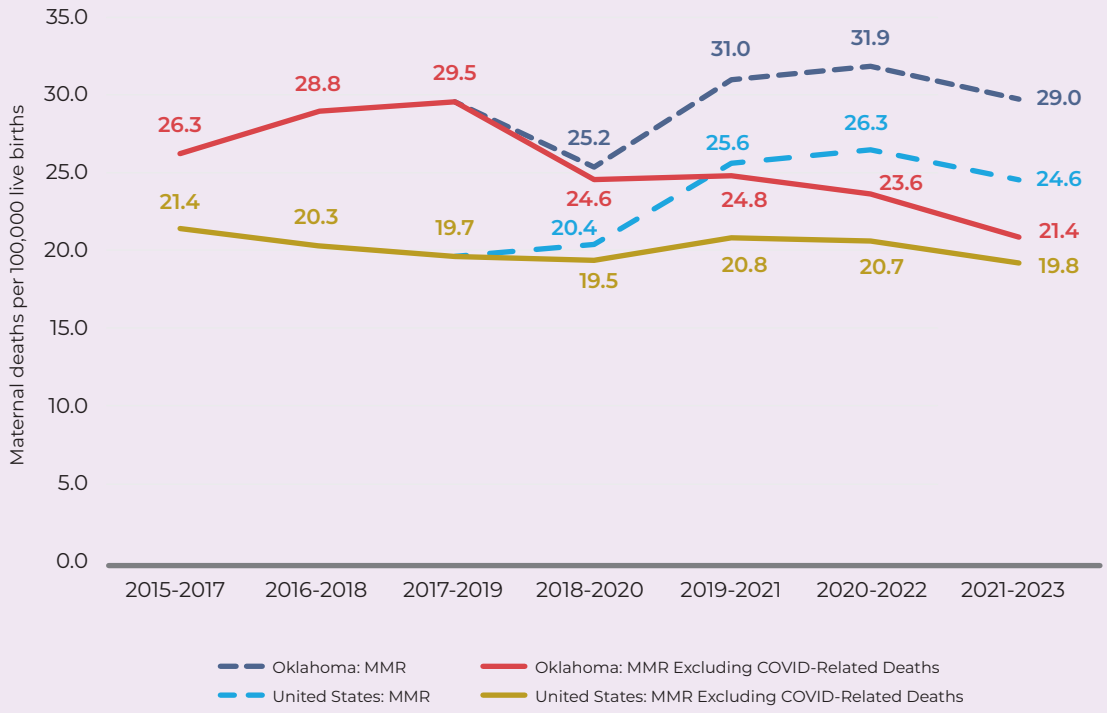
Maternal Mortality

After notably increasing in the 2019 – 2021 and 2020 – 2022 time periods due to the impact of the 2021 increase in maternal deaths, the maternal mortality rate (MMR) decreased in the 2021 – 2023 time period. While the single-year maternal mortality rate in Oklahoma decreased substantially from 2021 to 2023, the three-year rolling maternal mortality rate remains somewhat elevated due to the inclusion of the increased mortality observed in 2021. The MMR is expected to decrease notably in the 2022–2024 time period, due to the exclusion of 2021 from the rolling mortality rate.

Observing a rolling three-year maternal mortality rate, the MMR for both the United States overall[7-9] and Oklahoma decreased from 2020 – 2022 to 2021 – 2023, each by 6.5% and 9.1%, respectively (ES-2, [Chart 8]). Excluding COVID-related maternal deaths, the maternal mortality rate decreased by 4.3% nationally and by 9.3% in Oklahoma. From 2021 – 2023, COVID-related maternal deaths made up about one-fifth of maternal deaths nationally and a quarter of maternal deaths in Oklahoma.

Chart ES-2: Three-year rolling maternal mortality rate (MMR) excluding and including COVID-related deaths, Oklahoma and United States 2015 - 2023

Source: Oklahoma Vital Statistics, 2015 - 2023; CDC Wonder, Mortality and Natality, 2015 - 2023
Definitions: Maternal death - underlying cause of death A34, O00-O95, O98-O99; COVID-related death - any multiple cause of death U07.1



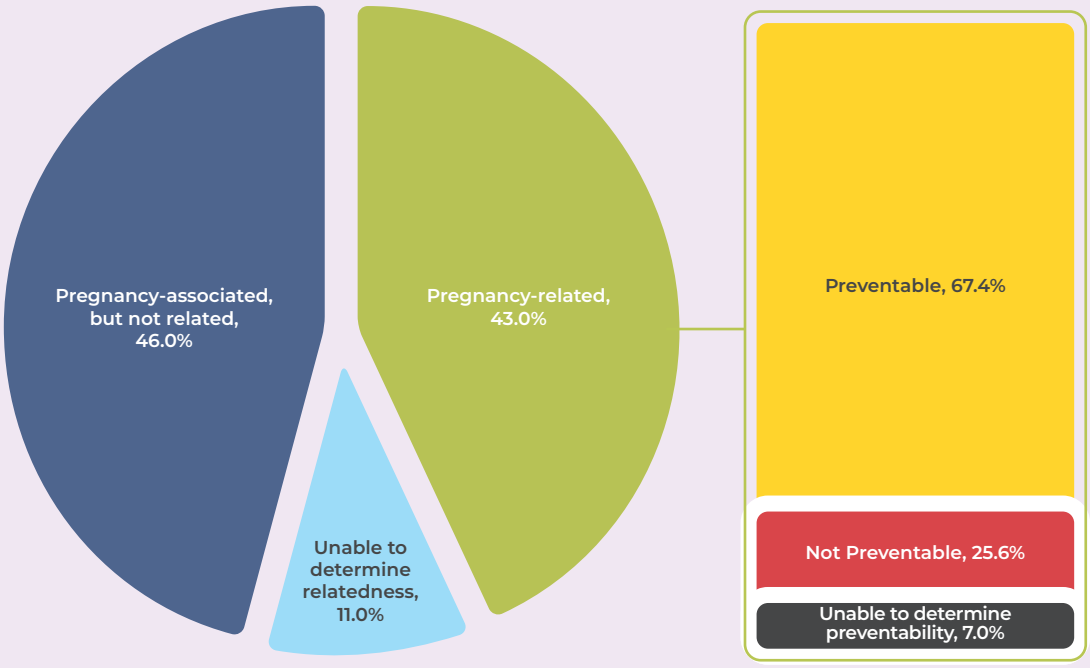
Maternal Mortality Review Committee

The Oklahoma Maternal Mortality Review Committee (MMRC) reviewed 100 deaths occurring during pregnancy or within one year of termination of pregnancy, with dates of death from 2018 – 2022. Of these deaths, 43.0% were determined to be pregnancy-related: a death caused by a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy (Chart ES-3, [Chart 11]). Of these pregnancy-related deaths, nearly 70% were determined to have been preventable, and the majority occurred 1 to 365 days after delivery or termination of pregnancy. Among pregnancy-related deaths with an MMRC determination of cause of death, the top causes of pregnancy-related deaths were hemorrhage, infection, and cardiac conditions. The vast majority of hemorrhage and infection deaths (approximately 90% each) were preventable, while less than half of deaths due to cardiovascular conditions were considered to have been preventable.

Chart ES-3: Relatedness of pregnancy-associated deaths and preventability of pregnancy-related deaths*, Oklahoma 2018 - 2022

*With an MMRC determination of preventability

Source: Oklahoma Maternal Mortality Review Committee (MMRC), 2018 - 2022



For pregnancy-related deaths from 2018 – 2022, there were 63 factors identified as contributing to the death. The most common contributing factor classes were adherence (19.0%), clinical skill/quality of care (17.5%), and delay (12.7%). These factors were most often noted at the patient/family (41.3%) and provider (31.7%) levels.

Among contributing factors at the patient/family level, common themes were related to lack of vaccination and lack of, delayed, or limited perinatal care, comprising about 20% and 40% of factors at this level, respectively. Factors related to reduced access to care were due to general delays or not seeking care, religious/cultural beliefs, substance use, and financial challenges such as uninsurance, lack of childcare, and transportation. Among contributing factors at the provider level, common themes were related to delay in treatment and not following the standard of care regarding diagnosis, treatment, and timely follow-up.

The Oklahoma State Department of Health (OSDH), along with governmental and nongovernmental partners such as the Oklahoma Perinatal Quality and Improvement Collaborative (OPQIC), the Oklahoma Hospital Association (OHA), the Oklahoma Health Care Authority (OHCA), the Oklahoma Department of Mental Health and Substance Abuse Services (ODMHSAS), and the Southern Plains Tribal Health Board (SPTHB), among others, are actively engaged in several activities to put the MMRC recommendations into action throughout Oklahoma. These efforts have included:

- Raising awareness on maternal health topics through social media campaigns, toolkits, and trainings.
- Improving patient care and safety through the implementation of maternal health initiatives and training.
- Increasing access to care through direct care programs and the expansion of SoonerCare coverage for pregnant enrollees.
- Improving data collection for MMRC reviews through the introduction and passing of legislation to increase the likelihood of autopsy referral and report for maternal deaths.

Women's Health Overview: Oklahoma

Women of reproductive age in Oklahoma have higher rates of being uninsured, experiencing poverty, and living in a maternity care desert compared to other states and the United States as a whole.[1-3]

According to 2022 Census data, Oklahoma had the fourth-highest rate in the United States of women aged 19 to 44 not covered by private or public insurance, at 16.3%.[2] Notably, over half of births in Oklahoma in 2023 (59.7%) were covered by SoonerCare (Oklahoma's Medicaid program).[10] In recent years, there have been significant updates to SoonerCare benefits to increase insurance coverage and access to care for Oklahomans in need, specifically for those who are pregnant. In 2021, SoonerCare expanded the income threshold for eligibility for adults 19 to 64 to 138% (133% with a 5% disregard) of the federal poverty level or lower, which resulted in over 300,000 Oklahomans enrolled through the expansion by June 2022.[5] Additionally, in 2023 SoonerCare extended postpartum coverage from 60 days to 12 months and expanded income eligibility for pregnant members from 133% to 185%, equivalent to 210% of the federal poverty level after conversion to Modified Adjusted Gross Income methodology (205% with a 5% disregard).[6] The expansion and extension of pregnancy and postpartum SoonerCare benefits can reduce insurance coverage disruption and improve health care access and utilization for mothers in need.

However, there are additional factors that may affect health care access and utilization for women of reproductive age and those who are pregnant or postpartum. Maternity care deserts are defined by the March of Dimes as counties with no facilities offering obstetric care, no obstetric care providers, and any proportion of women aged 18 to 64 without health insurance. Per the 2024 March of Dimes report, over half of Oklahoma counties are defined as maternity care deserts, compared with about a third of counties in the U.S.[1] Further, on average, Oklahoma women living in maternity care deserts were 29.9 miles away from maternity care, traveling 4.5 times farther than those living in areas with full access. Compared with other states, Oklahoma ranked 42nd for women between the ages of 15 and 44 living in a maternity care desert (12.3%, compared to 3.7% nationally) and 43rd for women 18 to 44 living below the poverty level (19.4%, compared to 15.2% nationally), and ranked 47th for the number of obstetricians, gynecologists, and midwives per 100,000 females aged 15 and older (34.2, compared to 46.9 nationally).[2-4] Therefore, barriers to the utilization of prenatal and postpartum care may persist, despite increased access to insurance coverage.

Per the Oklahoma Behavioral Risk Factor Surveillance System (BRFSS), chronic conditions and reduced access to care are prevalent among women of reproductive age in Oklahoma, which may increase the risk of maternal morbidity and mortality.[11] Among women aged 18 to 44 years in Oklahoma during 2023, 16.3% reported their health status as fair or poor, and 22.0% felt that, within the past year, a doctor visit was too costly to be able to attend. Approximately 4.1% of women aged 18 to 44 reported ever receiving a diabetes diagnosis, and 3.8% reported gestational diabetes. Among women of reproductive age with known body mass index (BMI), 65.4% were considered to be overweight or obese. Smoking also continues to be a public health concern: among women in this age group, 13.8% were current smokers, 9.7% smoked daily, and 17.2% were former smokers. Among births in Oklahoma in 2023, per Oklahoma vital statistics, 1.2% reported pre-pregnancy diabetes, 6.6% reported gestational diabetes, 3.4% reported pre-pregnancy hypertension, 8.6% reported gestational hypertension, and 62.0% were overweight or obese based on their pre-pregnancy weight.

Postpartum Visits

According to recent Pregnancy Risk Assessment Monitoring System (PRAMS) data (2023), 86.9% of new mothers in Oklahoma attended their postpartum visit.[12] Non-Hispanic White mothers reported the highest postpartum visit rate at 90.7%, compared with 84.0% of Non-Hispanic American Indian mothers, 80.2% of Non-Hispanic Black mothers, and 79.6% of Hispanic mothers.

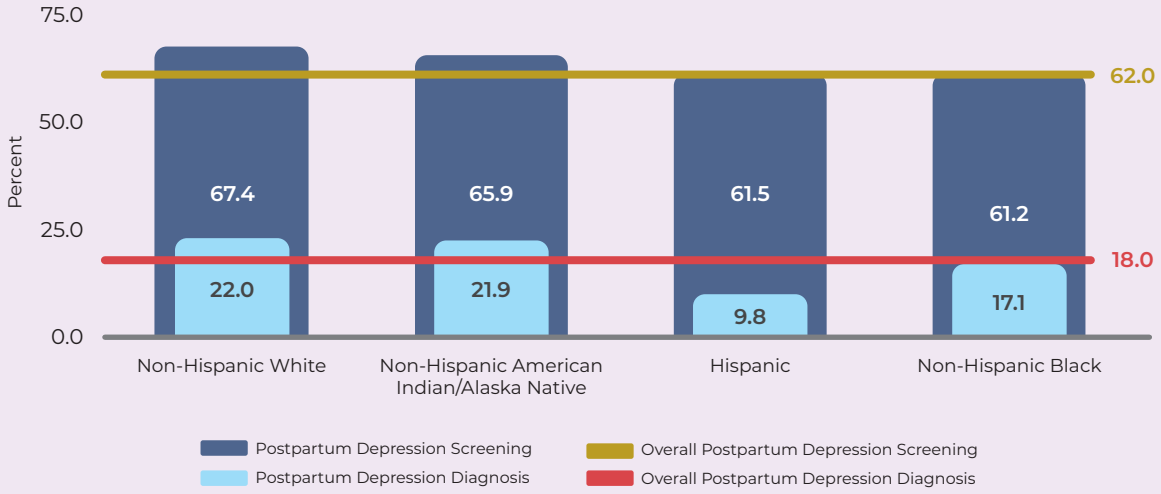
Postpartum Depression

According to the Centers for Disease Control and Prevention (CDC), postpartum depression (PPD) occurs in an estimated 1 in 8 women who give birth every year.[13] The onset of depressive, sad, or pessimistic feelings that may interfere with daily activities usually occurs during the six months after giving birth, but the onset of symptoms can happen up to one year postpartum. According to the national 2022 PRAMS data, 12.7% of women nationally experienced depressive symptoms or feelings of hopelessness following pregnancy and delivery[14], compared with 11.9% of women in Oklahoma in 2023.

According to the most recent data (2018 – 2023) from The Oklahoma Toddler Survey (TOTS), 62.0% of new mothers were screened for PPD and 18.0% of mothers were diagnosed with PPD (Chart 1).[15] Non-Hispanic White mothers had the highest prevalence of PPD screening at 67.4%, followed by Non-Hispanic American Indian/Alaska Native mothers, Hispanic mothers, and Non-Hispanic Black mothers. Non-Hispanic White mothers also reported the highest prevalence of PPD diagnosis at 22.0%, followed by Non-Hispanic American Indian/Alaska Native mothers, Non-Hispanic Black mothers, and Hispanic mothers.

Chart 1: Postpartum depression screening and diagnosis by race and Hispanic origin, Oklahoma 2018 - 2023

Source: Oklahoma State Department of Health, The Oklahoma Toddler Survey (TOTS) 2018 - 2023



Severe Maternal Morbidity (SMM)

The Alliance for Innovation on Maternal Health (AIM) provides support to states to improve work being done toward the goal of reducing SMM and maternal mortality. Both the CDC and Oklahoma utilize an SMM definition from AIM, characterized by identifying in-hospital deliveries where a mother develops severe complications during labor and delivery based on a list of 21 indicators that correspond to applicable International Statistical Classification of Diseases (ICD) codes (20 excluding blood transfusions).[16] Blood transfusion codes are excluded in the working definition of SMM for this report. Rates for SMM are reported as inpatient delivery discharges with any SMM indicator per 10,000 inpatient delivery discharges.

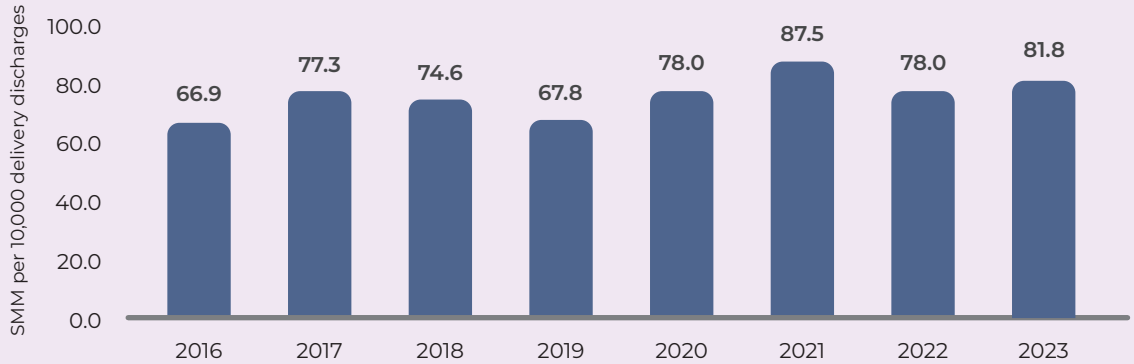
Of note, only state-licensed facilities contribute to the collection of SMM data in Oklahoma; therefore, there are limitations to the process of analyzing hospital discharge data to capture all of Oklahoma's potential SMM cases. Deliveries that occur outside of acute care hospitals (e.g., home births, birthing centers, facilities not licensed by the state) are not included in the inpatient discharge data from which SMM rates are calculated. Specifically, some hospitals operated by tribal entities are exempt from state regulation and may therefore be excluded from SMM analyses. Thus, SMM metrics for American Indian/Alaska Native persons may be underestimated.

According to the most recent data available from the Healthcare Cost and Utilization Project (HCUP), SMM rates have continued to increase nationally, affecting approximately 29,000 women annually in the last decade and over 35,000 women in 2020.[17] SMM rates increased by 33.4% from 69.8 per 10,000 in-hospital deliveries in 2011 to 93.1 in 2022, and decreased by 7.9% from 2021 to 2022.

In Oklahoma, the rate of SMM excluding transfusions has varied since 2016, reaching a high of 87.5 per 10,000 inpatient delivery discharges in 2021. From 2022 to 2023, the SMM rate increased slightly from 78.0 to 81.8 (Chart 2), representing a 4.9% increase.

Chart 2: Rate of severe maternal morbidity (SMM) excluding transfusions per 10,000 delivery discharges, Oklahoma 2016 - 2023

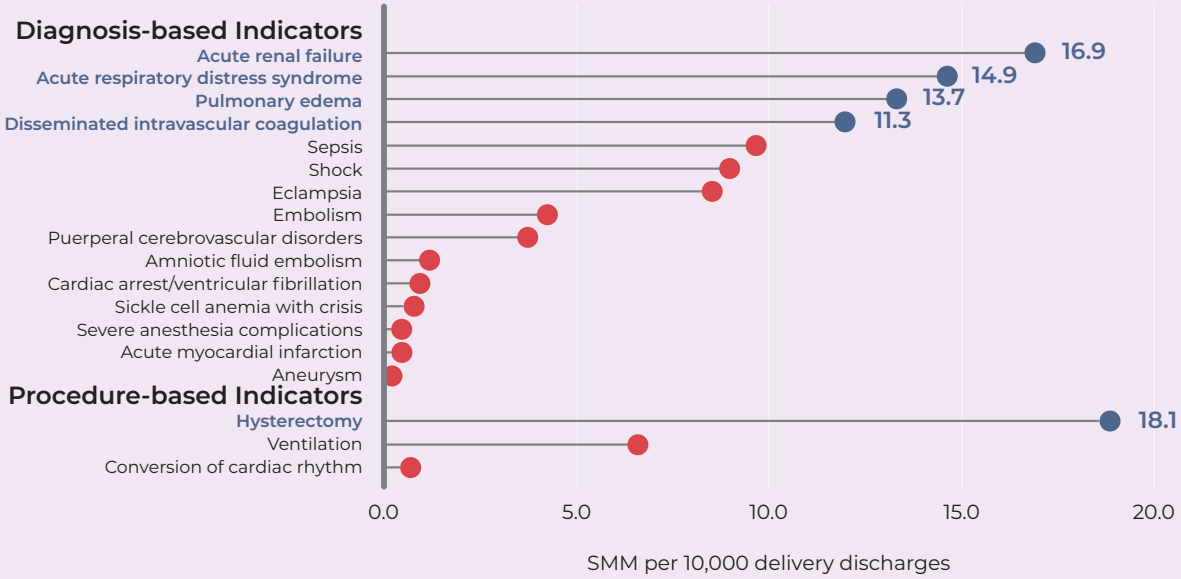
Source: Oklahoma State Department of Health, Center for Health Statistics, Oklahoma Hospital Discharge Data 2016 - 2023



The five most common indicators of SMM in 2023 were hysterectomy, acute renal failure, acute respiratory distress syndrome (ARDS), pulmonary edema, and disseminated intravascular coagulation (DIC) (Chart 3).

Chart 3: Rates of severe maternal morbidity (SMM) by indicator (**top five causes excluding blood transfusion**), Oklahoma 2023

Source: Oklahoma State Department of Health, Center for Health Statistics, Oklahoma Hospital Discharge Data 2023



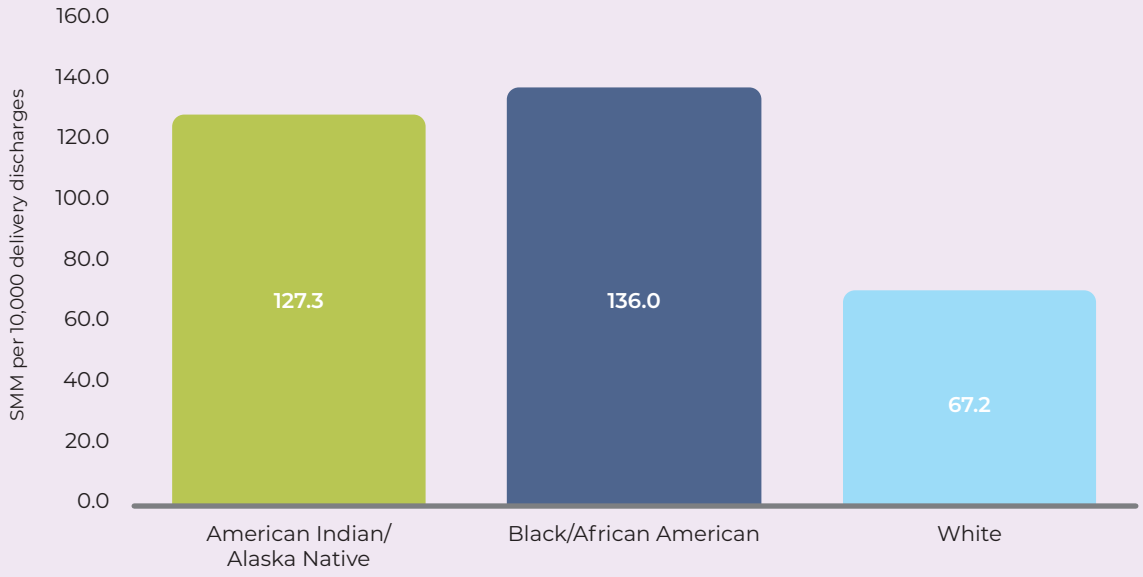
Race

Additionally, severe maternal morbidity varied by race in Oklahoma from 2021 to 2023 (Chart 4). White women had the lowest rates of SMM, while the rates of SMM for American Indian/Alaska Native and Black women were approximately two times higher. Hispanic origin was not available in the data source for SMM.

Chart 4: Severe maternal morbidity (SMM) excluding transfusions per 10,000 delivery discharges by race*, Oklahoma 2021 - 2023

Source: Oklahoma State Department of Health, Center for Health Statistics, Oklahoma Hospital Discharge Data 2021-2023

*Hispanic origin information unavailable



The leading causes of SMM also varied by race (Table 1). ARDS was the leading cause of SMM overall and for all race groups except for Black/African American women, for whom acute renal failure was the top cause of SMM. ARDS, acute renal failure, hysterectomy, and pulmonary edema were in the top five causes for all racial subgroups, and additionally, DIC was in the top five for two of the three racial subgroups. Eclampsia and ventilation were only in the top five for American Indian women, while sepsis was only in the top five for White women.

Table 1: Top causes of severe maternal morbidity (SMM) by race, Oklahoma 2021 - 2023

Rank	Black / African American	American Indian / Alaska Native	White	Overall (Includes Other Race)
1	ARF	ARDS	ARDS	ARDS
2	ARDS	ARF	Hysterectomy	ARF
3	PE/AHF	Hysterectomy (tie)	ARF	Hysterectomy
4	Hysterectomy	PE/AHF (tie)	DIC	DIC
5	DIC	Ventilation (tie) / Eclampsia (tie)	PE/AHF (tie) / Sepsis (tie)	PE/AHF

Abbreviations: ARDS = Acute Respiratory Distress Syndrome, ARF = Acute Renal Failure, DIC = Disseminated Intravascular Coagulation, PE/AHF = Pulmonary Edema/Acute Heart Failure

NOTE: Oklahoma utilizes the Alliance for Innovation on Maternal Health (AIM) definition of severe maternal morbidity, which aligns with the Federally Available Data (FAD) Resource Document.

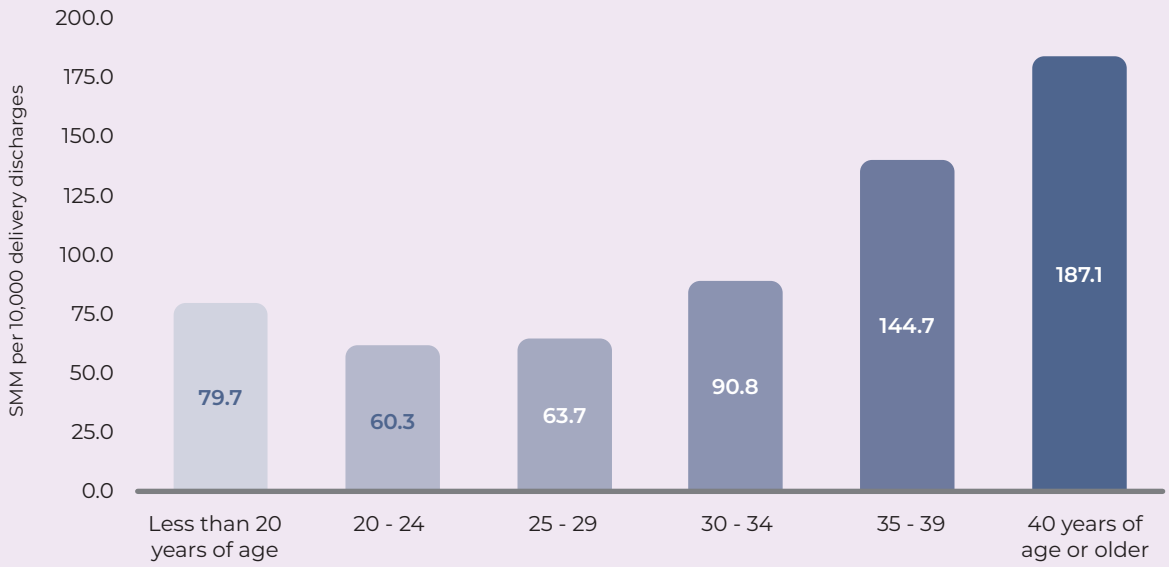
Source: Oklahoma State Department of Health, Center for Health Statistics, Oklahoma Hospital Discharge Data, 2021 - 2023

Age

Severe maternal morbidity also varied by age (Chart 5). From 2021 – 2023, women in Oklahoma between the ages of 20 and 24 had the lowest rate of SMM at 60.3 per 10,000 inpatient delivery discharges. The rate of SMM increased with maternal age above the age of 25, with women 40 years of age and older having an SMM rate over three times higher than that of women 20 to 24. Mothers under the age of 20 also had an increased rate of SMM, with a rate 1.3 times higher than that for women 20 to 24.

Chart 5: Severe maternal morbidity (SMM) excluding transfusions per 10,000 delivery discharges by age, Oklahoma 2021 - 2023

Source: Oklahoma State Department of Health, Center for Health Statistics, Oklahoma Hospital Discharge Data 2021 - 2023



The leading causes of SMM varied by age group as well (Table 2). From 2021 – 2023 in Oklahoma, ARDS or hysterectomy were the leading causes of SMM for every age group, apart from those under the age of 20, for whom the leading cause was eclampsia. ARDS was in the top three causes for every age group, with acute renal failure and DIC in the top five causes for every age group under 40. Eclampsia and sepsis were in the top causes of SMM only for those under the age of 25, while hysterectomy was in the top causes for those 25 years of age and older.

Table 2: Top causes of severe maternal morbidity (SMM) by age, Oklahoma 2021 - 2023

Rank	<20	20 - 24	25 - 29	30 - 34	35 - 39	40+
1	Eclampsia	ARDS	ARDS (tie)	Hysterectomy	ARDS	Hysterectomy
2	Sepsis	Sepsis	ARF (tie)	ARDS	Hysterectomy	ARDS
3	ARDS	ARF	Hysterectomy	ARF	ARF	*
4	ARF (tie)	Eclampsia	DIC	DIC	PE/AHF	*
5	DIC (tie) PE/AHF (tie)	DIC	Shock (tie) PE/AHF (tie)	PE/AHF	DIC	*

Abbreviations: ARDS = Acute Respiratory Distress Syndrome, ARF = Acute Renal Failure, DIC = Disseminated Intravascular Coagulation, PE/AHF = Pulmonary Edema/Acute Heart Failure

NOTE: Oklahoma utilizes the Alliance for Innovation on Maternal Health (AIM) definition of severe maternal morbidity, which aligns with the Federally available Data (FAD) Resource Document.
*Data excluded where number of events is less than 10
Source: Oklahoma State Department of Health, Center for Health Statistics, Oklahoma Hospital Discharge Data, 2021 - 2023

Maternal Mortality

Summary of National Data

A maternal death is defined by the World Health Organization (WHO) as the death of a woman "from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and childbirth or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy."[18]

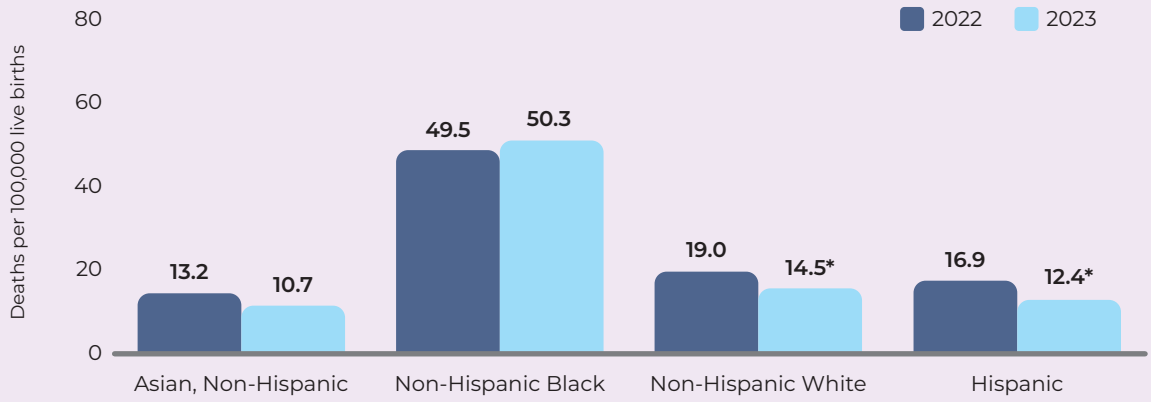
Maternal mortality rates are defined as the number of maternal deaths per 100,000 live births. The CDC estimates for 2023 show that the U.S. had a statistically significant decrease in maternal mortality with 18.6 maternal deaths per 100,000 live births, compared with 22.3 reported in 2022 (Chart 6, adapted from *Maternal Mortality Rates in the United States, 2023*).[19] Health equity continues to be of concern, with a persistent disparity of maternal mortality rates between race/Hispanic origin groups. In 2023, Non-Hispanic Black women had a significantly higher maternal mortality rate than all other groups, by approximately three to five times. National maternal mortality rates for Non-Hispanic American Indian/Alaska Native women and other races were not available.

Chart 6: Maternal mortality rate, by race and Hispanic origin: United States, 2022 and 2023

Source: Maternal Mortality Rates in the United States, 2023, National Center for Health Statistics

Definitions: Maternal death - underlying cause of death A34, O00-O95, O98-O99

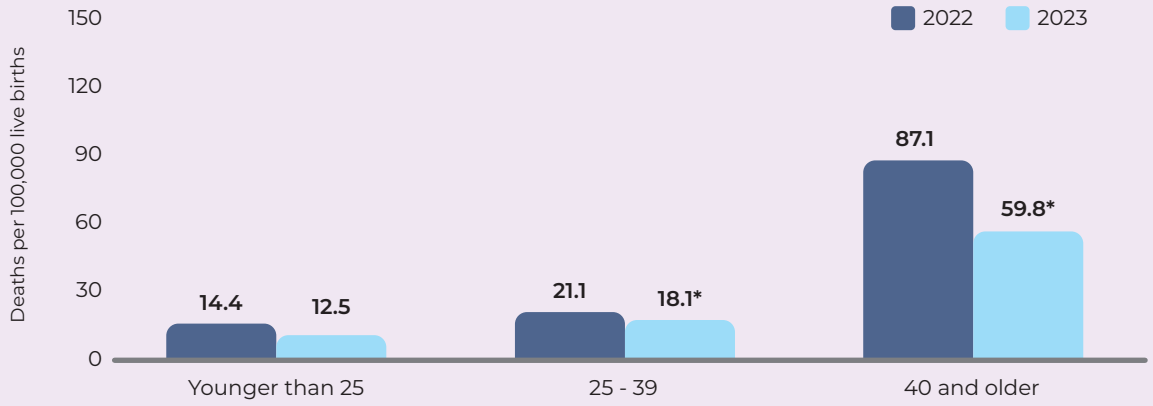
*Statistically significant decrease from previous year ($p < 0.05$)



From 2022 to 2023, maternal mortality rates decreased significantly for those 25 to 39 and 40 and older, by 14.2% and 31.3%, respectively (Chart 7, adapted from *Maternal Mortality Rates in the United States, 2023*). Women 40 years of age and older again had the highest maternal mortality rate, which decreased from 87.1 in 2022 to 59.8 deaths per 100,000 live births in 2023. The 2023 maternal mortality rate for women 40 years of age or older was significantly higher than women under 25 (by 4.8 times) and women 25 - 39 (by 3.3 times).

Chart 7: Maternal mortality rate, by age group: United States, 2022 and 2023

Source: Maternal Mortality Rates in the United States, 2023, National Center for Health Statistics
Definitions: Maternal death - underlying cause of death A34, O00-O95, O98-O99
*Statistically significant decrease from previous year (p < 0.05)



Oklahoma Maternal Mortality

Definitions and Methodology

The Oklahoma definitions for maternal death and maternal-related conditions are adapted from the definitions of the World Health Organization (WHO) and the National Center for Health Statistics (NCHS) within the CDC.[18,19] Both organizations define a maternal death as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes." To compute national estimates of maternal deaths, the NCHS uses data from the National Vital Statistics System (NVSS) and "does not include all deaths occurring to pregnant or recently pregnant women, but only those deaths with the underlying cause of death assigned to ICD codes A34, O00–O95, and O98–O99." Oklahoma's definition of a maternal-related condition is consistent with these ICD codes.

- **Maternal Death**: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.
- **COVID-Related Maternal Death**: A maternal death where any multiple cause of death field included ICD code U07.1 (COVID-19).
- **Maternal Mortality Ratio (MMR)**: The number of maternal deaths per 100,000 live births. Also referred to as maternal mortality rate.
- **Maternal-Related Condition**: A condition assigned to code numbers A34, O00–O95, and O98–O99 of the International Classification of Diseases, 10th Revision.

For consistency with the national maternal mortality estimates from NCHS, Oklahoma computes maternal mortality estimates from vital statistics. To identify maternal deaths for reporting a statewide maternal mortality rate, Oklahoma selects all death certificates of individuals where:

- The state of maternal residence is Oklahoma *and*
- Age at time of death is between 10 and 59 *and*
- The underlying cause of death contains a maternal-related condition *and*
- The pregnancy checkbox indicates that the death occurred while pregnant, within 42 days of pregnancy termination, or pregnancy status is unknown *and*
- The manner of death was not determined to be an accident, suicide, or homicide.

Maternal Mortality Rate

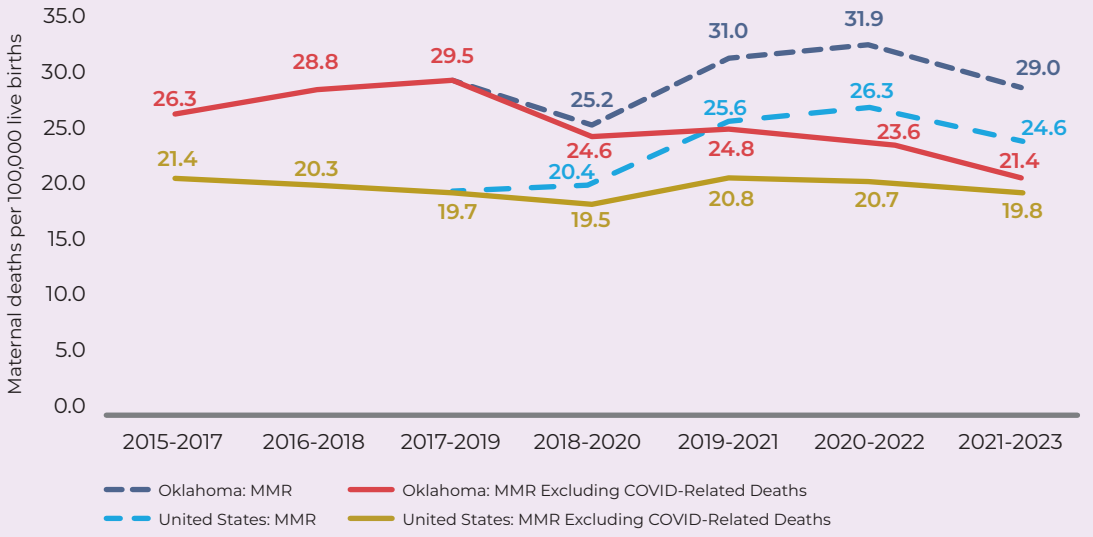
Due to small numbers of maternal deaths in the state, there is variability in the number and rate of maternal deaths each year. For rate stability, a three-year average is used for reporting maternal mortality in Oklahoma. After notably increasing in the 2019 – 2021 and 2020 – 2022 time periods due to the impact of the 2021 increase in maternal deaths, the MMR decreased in the 2021 – 2023 time period. While the single-year maternal mortality rate in Oklahoma decreased substantially from 2021 to 2023, the three-year rolling maternal mortality rate remains somewhat elevated due to the inclusion of the increased mortality observed in 2021. The MMR is expected to notably decrease in the 2022 – 2024 time period, due to the exclusion of 2021 in the rolling mortality rate.

Of note, the decrease in Oklahoma for 2023 follows the national trend of decreasing maternal mortality; however, the number of maternal deaths in 2023 is the lowest in the past decade and is less than half of the average number of deaths per year in the 2013 - 2022 time period, suggesting a notable departure from the trend. This low count could be due to inherent variability, or possibly due to an undercount related to misclassified elements of death certificates.

Observing a rolling three-year maternal mortality rate, the MMR for both the United States overall[7-9] and Oklahoma decreased from 2020 – 2022 to 2021 – 2023, each by 6.5% and 9.1%, respectively (Chart 8). Excluding COVID-related maternal deaths, the maternal mortality rate decreased by 4.3% nationally and by 9.3% in Oklahoma. From 2021 – 2023, COVID-related maternal deaths made up about one-fifth of maternal deaths nationally and a quarter of maternal deaths in Oklahoma.

Chart 8: Three-year rolling maternal mortality rate (MMR) excluding and including COVID-related deaths, Oklahoma and United States 2015 - 2023

Source: Oklahoma Vital Statistics, 2015-2023; CDC Wonder, Mortality and Natality, 2015-2023
Definitions: Maternal death - underlying cause of death A34, O00-O95, O98-O99; COVID-related death - any multiple cause of death U07.1



Demographic Characteristics

Maternal Mortality Rate by Race/Hispanic Origin

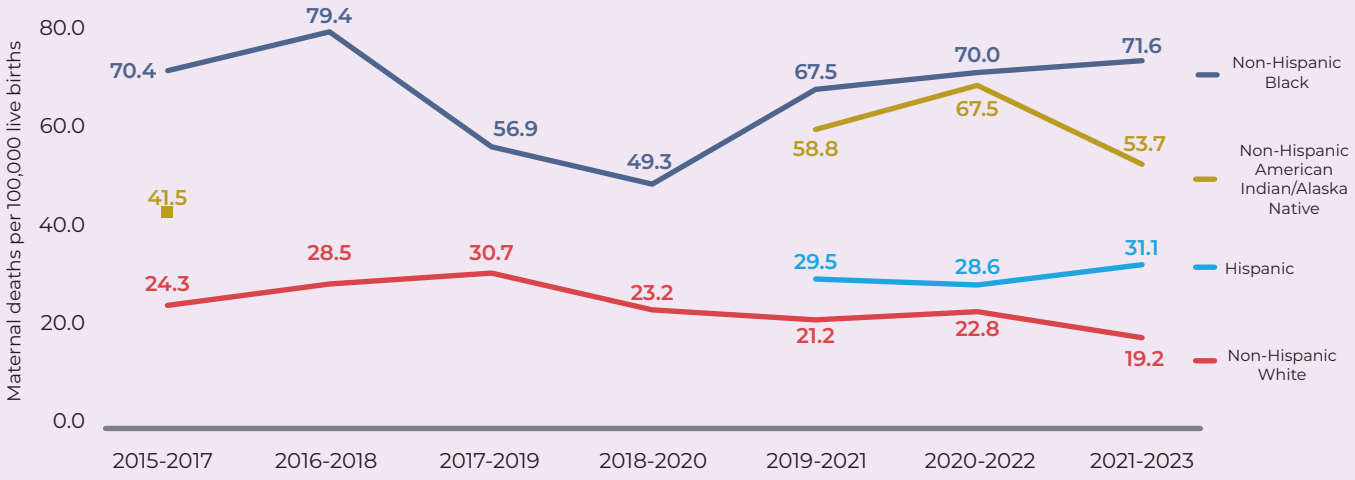
For 2021 – 2023, the MMR increased for Non-Hispanic Black and Hispanic women and decreased for Non-Hispanic American Indian/Alaska Native and Non-Hispanic White women (Chart 9). Non-Hispanic White women had the lowest MMR, at 19.2 deaths per 100,000 live births. Disparities in maternal mortality continued to be observed for Non-Hispanic Black and Non-Hispanic AIAN women: from 2021 – 2023, the MMRs for each were 2.8 times higher for Non-Hispanic AIAN women and 3.7 times higher for Non-Hispanic Black women, compared to Non-Hispanic White women. Data is excluded for time periods where the number of deaths was less than five.

Chart 9: Three-year rolling maternal mortality rate by race/Hispanic origin, Oklahoma 2015 - 2023

Source: Oklahoma Vital Statistics, 2015 - 2023

Definitions: Maternal death - underlying cause of death A34, O00-O95, O98-O99

*Data is excluded for time periods where the number of deaths was less than 5

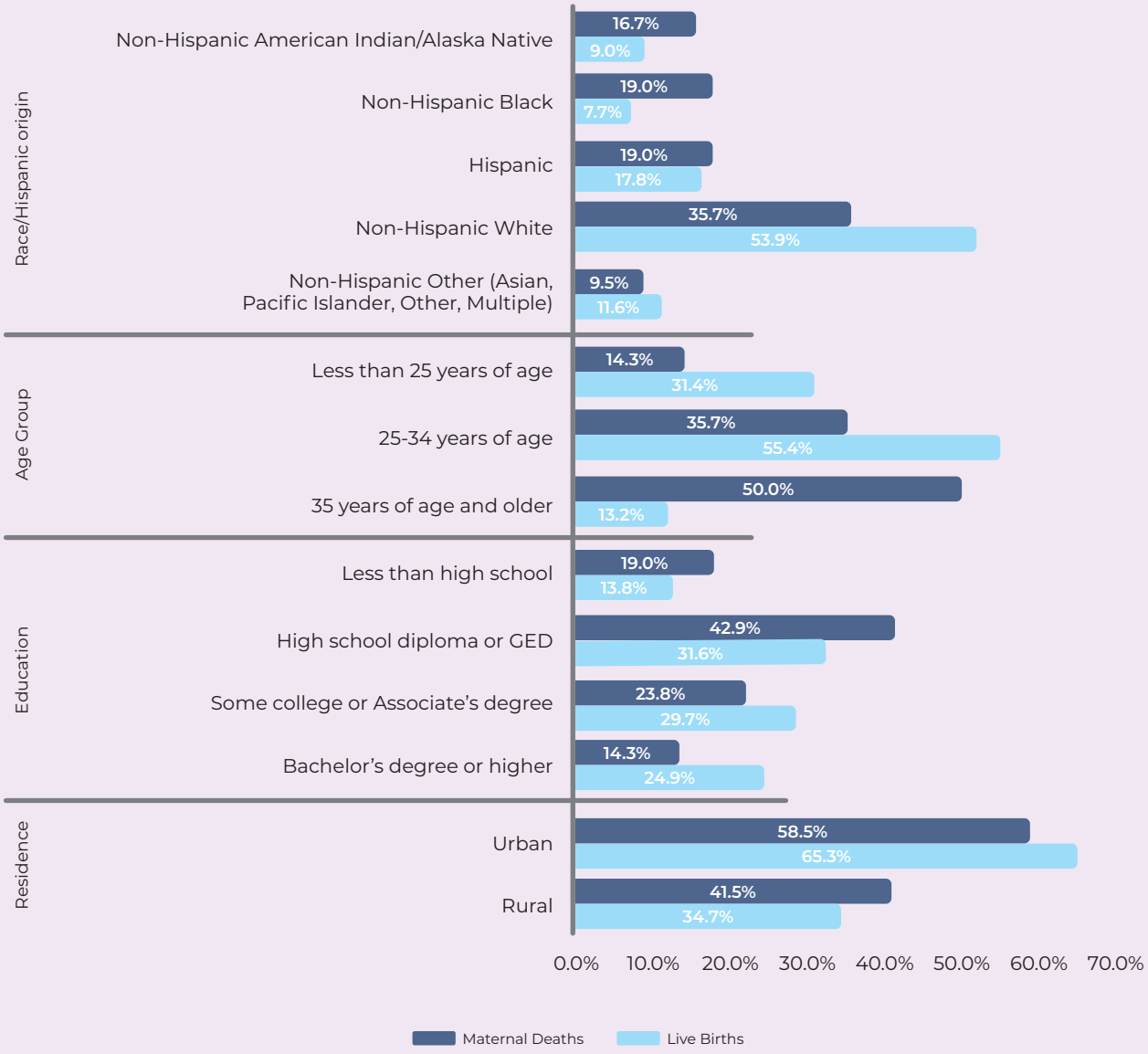


Race/Hispanic Origin, Age, Educational Attainment, and Residence

Compared with live births, maternal mortality disproportionately affected Non-Hispanic AIAN mothers, Non-Hispanic Black mothers, mothers 35 years of age or older, mothers who received a high school education or less, and mothers with a rural residence per USDA rural-urban commuting area codes[20] (Chart 10).

Chart 10: Demographic characteristics of maternal deaths and live births, Oklahoma 2021 - 2023

Source: Oklahoma Vital Statistics, 2021 - 2023
Definitions: Maternal death - underlying cause of death A34, O00-O95, O98-O99



Maternal Mortality Review Committee (MMRC)

Definitions

MMRC Definitions:[21]

- **Pregnancy-associated death**: A death during or within one year of pregnancy, regardless of the cause. These deaths make up the universe of maternal mortality; within that universe are pregnancy-related deaths and pregnancy-associated, but not related deaths.
- **Pregnancy-related death**: A death during or within one year of pregnancy, from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.
- **Pregnancy-associated, but not related death**: A death during or within one year of pregnancy, from a cause that is not related to pregnancy.
- **Preventability**: 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. MMRCs use this definition to determine if a death they review is preventable.

Overview

Oklahoma has a process to identify and explore the circumstances surrounding maternal deaths that has been designed to help improve health care for pregnant and postpartum women. The Maternal Mortality Review Committee (MMRC) is a vital statewide effort established through legislative action. The MMRC is a statutory committee with a defined membership, responsibilities, and reporting criteria, which are utilized to explore opportunities to enhance and improve services to women, infants, and their families. Through communication and collaboration, the MMRC serves as a continuous quality improvement system, resulting in a more comprehensive understanding of maternal issues and identifying challenges surrounding maternal health care services. The overall goal of the MMRC is prevention through the understanding of causes and risk factors by way of qualitative, in-depth reviews.

The Maternal Mortality Review Project in Oklahoma originated as a joint effort between the Oklahoma State Department of Health and the Oklahoma State Medical Association (OSMA). The committee began reviewing maternal deaths in 1950, with the purpose of improving obstetric care and ultimately reducing maternal morbidity and mortality in Oklahoma. At that time, the OSMA had the lead role in maternal mortality review. The committee reviewed in detail 75.9% of the pregnancy-related deaths in Oklahoma from 1950 to 1979.

The Maternal and Child Health Service of the Oklahoma State Department of Health (OSDH) re-established the MMRC in 2009, which became a statutory committee in 2019 per the “Maternal Mortality Review Act”, House Bill 2334.[22] Through this legislation, the MMRC received statutory authority to review pregnancy-associated deaths and obtain records and reports pertaining to pregnancy-associated deaths (e.g., medical examiner reports, medical records, law enforcement records). In 2024, MMRC membership was reduced, and maternal deaths were added as a type of death required to be reported to the Office of the Chief Medical Examiner, per House Bill 2152.[23]

While the Maternal Mortality Review Act gives statutory authority to the MMRC to request records for use in the review of pregnancy-associated deaths, there are limitations to data ascertainment. Oklahoma state statute does not necessarily apply to tribal organizations and providers, due to indigenous data sovereignty, which is the inherent right of Tribal Nations to govern the collection, ownership, and application of their own data.[24] Therefore, the MMRC has challenges obtaining records from tribal providers and facilities, which often limits the information available for review for tribally-affiliated cases. Limitations in access to prenatal, delivery, and postpartum care records can pose challenges in assessing the events and factors that contributed to a pregnancy-associated death, and thus may limit the ability to determine the pregnancy-relatedness, preventability, and actionable recommendations to prevent a death. More information about this challenge, and efforts to address it, can be found in the appendix of this report.

The MMRC operates under the auspices of the Oklahoma State Department of Health (OSDH). Through uniform procedures and defined processes, the OSDH initiates the MMRC process by identifying all pregnancy-associated cases. The Oklahoma MMRC identifies all potential maternal deaths where the official death certificate pregnancy checkbox indicates that the death occurred during pregnancy or within one year of pregnancy termination, there is a maternal code in the underlying or other causes of death, or a death can be linked to a birth or fetal death in the year prior to the death. The MMRC reviews deaths confirmed to have been pregnant at the time of death or within a year of death, but does not review motor vehicle accident deaths, defined as deaths that have an underlying cause of death with an ICD code between V01 and V99.

The MMRC also determines the extent to which the impact of timely and appropriate intervention could have had on the outcome of a particular case. The MMRC efforts are designed to:

- Improve and enhance public health efforts to reduce and prevent maternal death in Oklahoma.
- Improve identification of maternal deaths to interpret trends, identify high-risk groups, and develop effective interventions.
- Utilize review information to identify health care system issues and gaps in service delivery and care.
- Develop action plans and preventive strategies to implement recommendations in communities and provider networks.

Interventions, strategies, and the development of systems that increase knowledge and decrease pregnancy-related mortality will serve not only to improve the health of women and children, but will also provide overwhelming health-related benefits for all Oklahomans. Health benefits could include reduced rates of obesity and smoking during pregnancy, increased access to prenatal and well-woman care, and education for health care providers on postpartum warning signs and evidence-based quality improvement strategies.

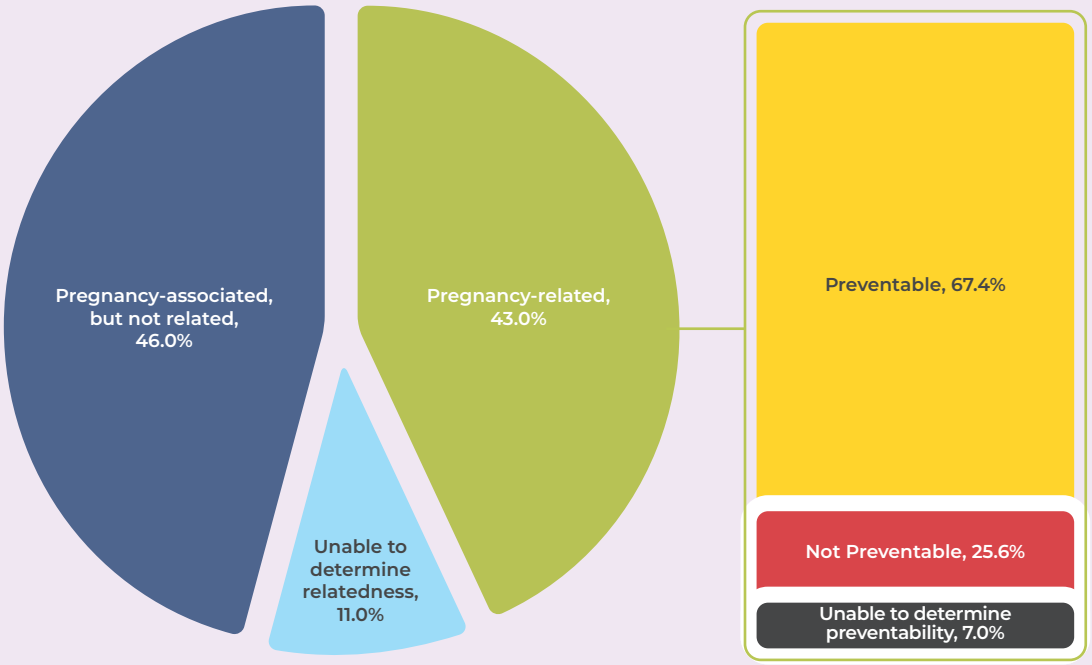
MMRC Case Reviews

The Oklahoma MMRC reviewed 100 deaths occurring between 2018 and 2022. Of these deaths, 43.0% were determined to be pregnancy-related, and 67.4% of pregnancy-related deaths were determined to have been preventable (Chart 11).

Chart 11: Relatedness of pregnancy-associated deaths and preventability of pregnancy-related deaths*, Oklahoma 2018 - 2022

*With an MMRC determination of preventability

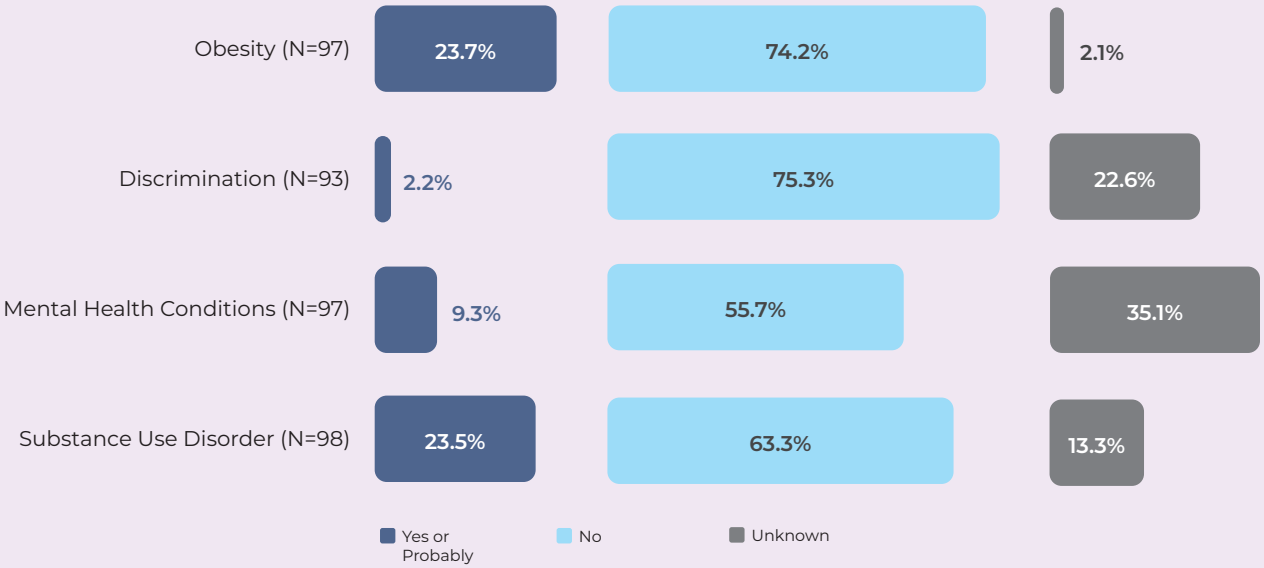
Source: Oklahoma Maternal Mortality Review Committee (MMRC), 2018 - 2022



For each case reviewed, the MMRC determines if various circumstances contributed to the death, specifically obesity, discrimination, mental health conditions other than substance use disorder, and substance use disorder. Obesity and substance use disorder contributed to nearly a quarter of pregnancy-associated deaths each, with mental health conditions contributing to about 10% of deaths (Chart 12). However, identifying these contributors can be challenging due to limited documentation of discrimination, mental health conditions, and substance use disorders in medical records. For several cases, while it is possible that these circumstances contributed to the death, the committee could not make a definitive determination due to these limitations. Therefore, these contributions are unknown for a notable proportion of deaths, and their impact is likely underestimated.

Chart 12: Circumstances contributing+ to pregnancy-associated deaths* in Oklahoma, 2018 - 2022

Source: Oklahoma Maternal Mortality Review Committee, 2018 - 2022

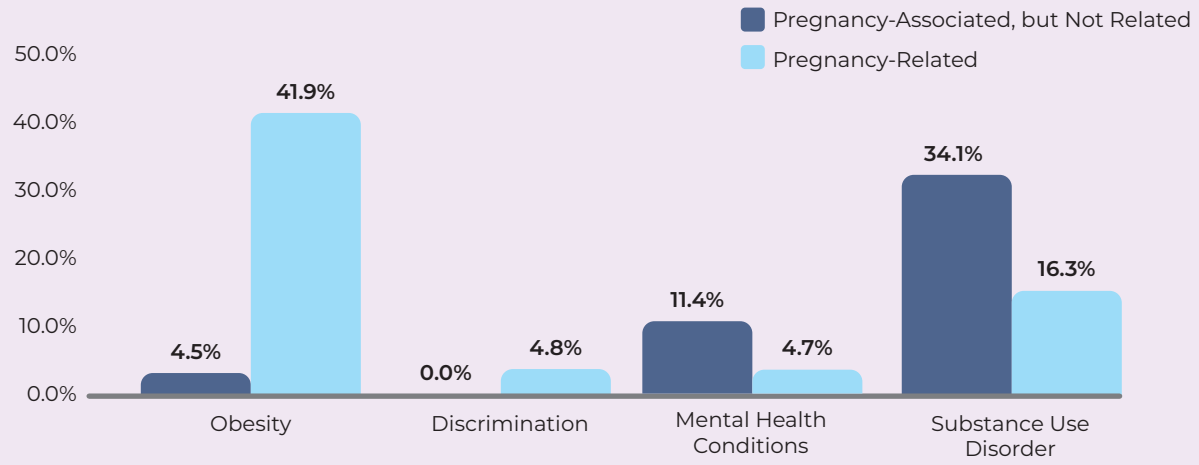


+Circumstances were considered contributing to the death if the MMRC determined "Yes" or "Probably" for "Did [circumstance] contribute to the death?"
*With a committee determination of circumstances surrounding death

The circumstances surrounding deaths also differed by pregnancy-relatedness (Chart 13). Obesity was a much larger contributor to pregnancy-related deaths than to pregnancy-associated but not related deaths. Conversely, mental health conditions and substance use disorder were larger contributors to pregnancy-associated but not related deaths.

Chart 13: Circumstances contributing+ to pregnancy-associated deaths* by relatedness, Oklahoma 2018 - 2022

Source: Oklahoma Maternal Mortality Review Committee, 2018 - 2022



+Circumstances were considered contributing to the death if the MMRC determined "Yes" or "Probably" for "Did [circumstance] contribute to the death?"
*With a committee determination of circumstances surrounding death

Pregnancy-Related Deaths

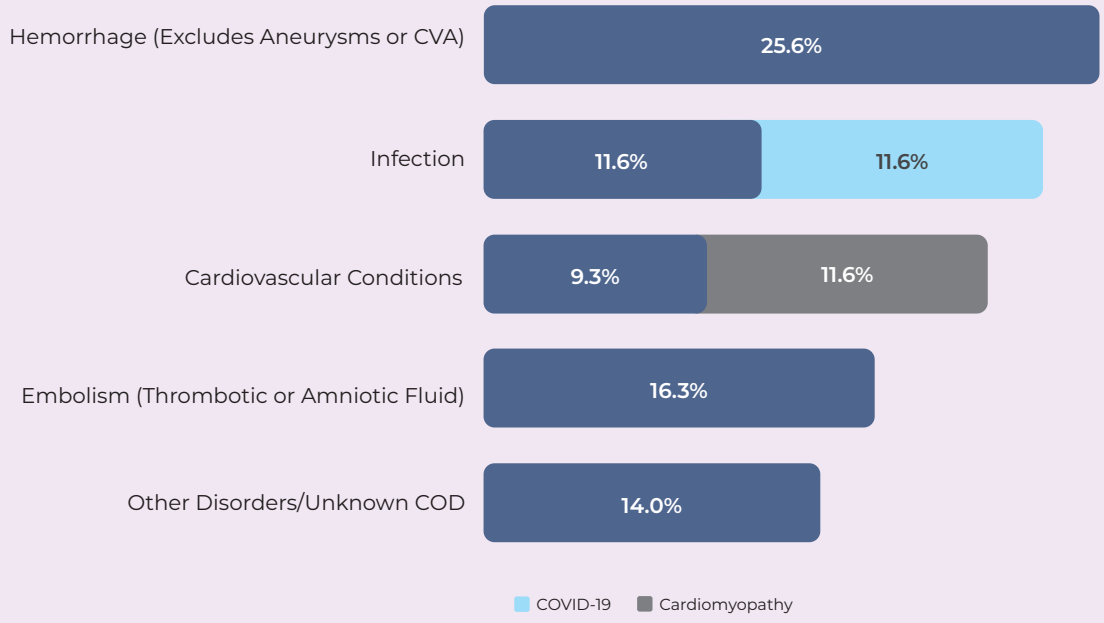
Top Causes of Pregnancy-Related Deaths

Among pregnancy-related deaths with an MMRC determination of underlying cause of death, the top three causes of pregnancy-related deaths from 2018 – 2022 were hemorrhage, infection, and cardiac conditions, comprising about 70% of the deaths (Chart 14). Ruptured ectopic pregnancy, sepsis and COVID-19, and cardiomyopathy and cardiovascular conditions comprised the majority of hemorrhage, infection, and cardiac condition deaths, respectively. About 30% of pregnancy-related deaths were due to other causes, such as thrombotic embolism, amniotic fluid embolism, and hypertensive disorders related to pregnancy. Most of the hemorrhage and infection deaths (approximately 90% each) were preventable, while less than half of deaths due to cardiovascular conditions were considered to have been preventable.

Per the Pregnancy Mortality Surveillance System, the top five causes of pregnancy-related deaths in 2022 were infection or sepsis (including COVID-19), hemorrhage, other cardiovascular conditions, thrombotic pulmonary or other embolisms, and other non-cardiovascular conditions.[25] Comparatively, the leading causes of pregnancy-related deaths in the United States in 2021, as determined by MMRCs, were infection (including COVID-19), mental health conditions, cardiovascular conditions, and hemorrhage.[26]

Chart 14: Top causes of pregnancy-related deaths, Oklahoma 2018 - 2022

Source: Oklahoma Maternal Mortality Review Committee, 2018 - 2022



Characteristics of Pregnancy-Related Deaths

Most pregnancy-related deaths, approximately 60%, occurred in the postpartum period (1 to 365 days after the end of pregnancy) (Chart 15).

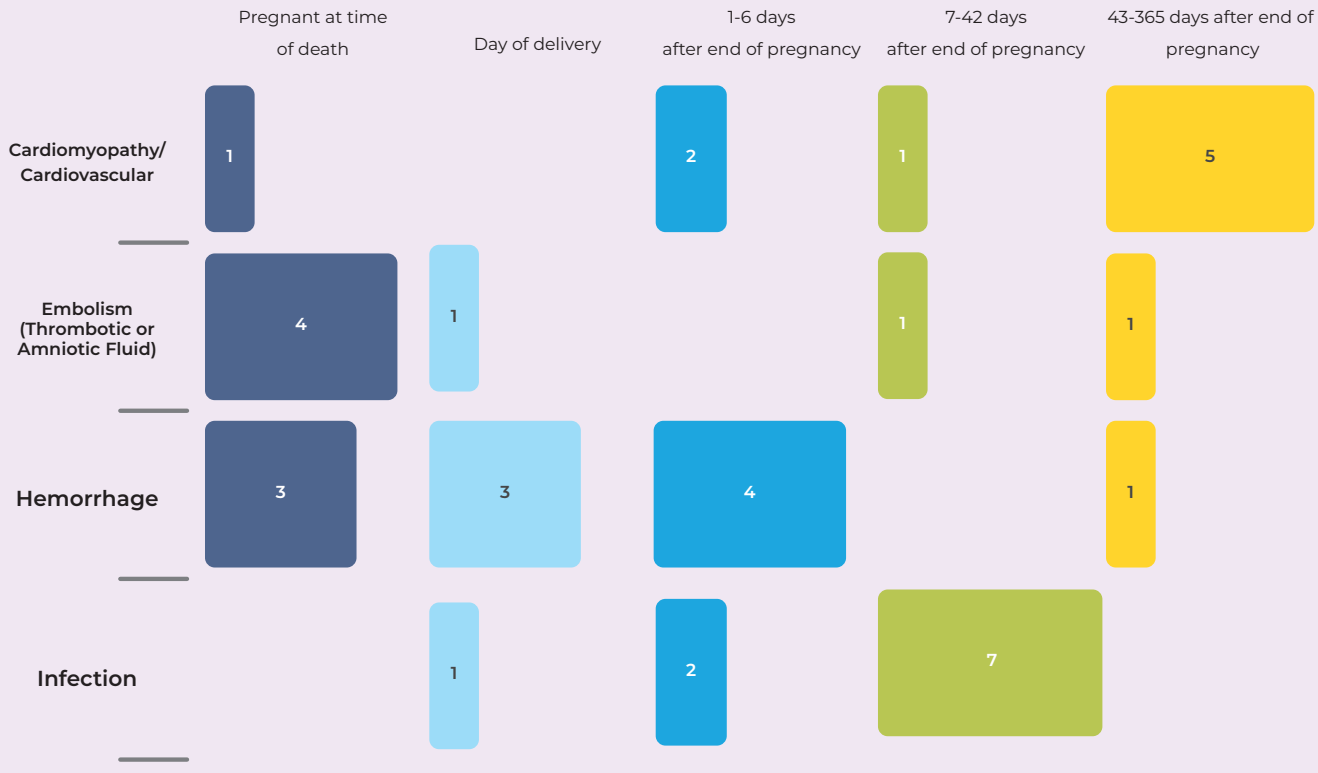
Chart 15: Timing of pregnancy-related deaths, Oklahoma 2018 - 2022

Source: Oklahoma Maternal Mortality Review Committee, 2018 - 2022

The timing of death varied by the cause of death. Most deaths due to infection and cardiovascular conditions occurred postpartum, whereas most of the hemorrhage and embolism deaths occurred during pregnancy or on the day of delivery (Chart 16).

Chart 16: Timing of pregnancy-related deaths by cause of death, Oklahoma 2018 - 2022

Source: Oklahoma Maternal Mortality Review Committee, 2018 - 2022

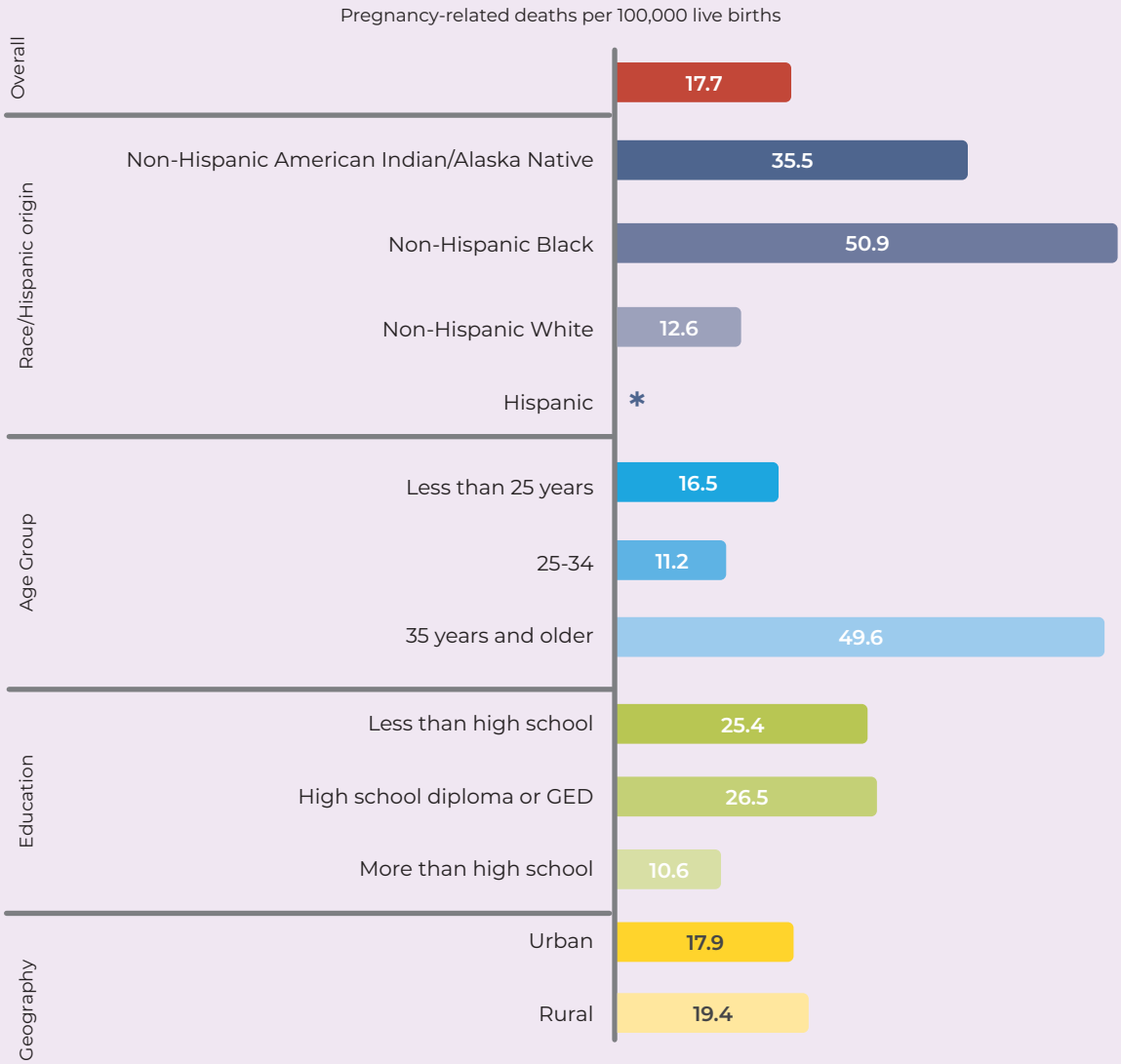


From 2018 – 2022 in Oklahoma, the pregnancy-related mortality rate was 17.7 pregnancy-related deaths per 100,000 live births. Pregnancy-related mortality disproportionately affected Non-Hispanic American Indian/Alaska Native women, Non-Hispanic Black women, women 35 years of age or older, women with a high school education or less, and women residing in a rural area, per USDA Rural-Urban Commuting Area codes[20] (Chart 17). Per reporting criteria from the CDC Maternal Mortality Prevention Team, Pregnancy-Related Mortality Rates (PRMRs) are not calculated when the numerator is less than eight. Therefore, the PRMR is suppressed for Hispanic individuals. However, the proportion of births to Hispanic mothers is approximately equal to the proportion of pregnancy-related deaths to Hispanic women, suggesting a proportionate effect of pregnancy-related mortality among Hispanic women.

Chart 17: Pregnancy-related mortality rates (PRMRs) by demographic characteristic, Oklahoma 2018 - 2022

Source: Oklahoma Maternal Mortality Review Committee, 2018-2022

*PRMRs are not reported where the number of deaths is less than 8



Contributing Factors

To generate actionable recommendations to reduce pregnancy-related mortality, the MMRC reviewed the factors that contributed to each pregnancy-related and preventable death. For pregnancy-related deaths from 2018 – 2022, there were 63 factors identified as contributing to the death. The most common contributing factor classes were adherence (19.0%), clinical skill/quality of care (17.5%), and delay (12.7%). These factors were most often noted at the patient/family (41.3%) and provider (31.7%) levels.

Among contributing factors at the patient/family level, common themes were related to lack of vaccination and lack of, delayed, or limited perinatal care, comprising about 20% and 40% of factors at this level, respectively. Factors related to reduced access to care were due to general delays or not seeking care, religious/cultural beliefs, substance use, and financial challenges such as uninsurance, lack of childcare, and transportation.

Among contributing factors at the provider level, common themes were related to delay in treatment and not following the standard of care regarding diagnosis, treatment, and timely follow-up.

Recommendations

Through comprehensive case reviews from June 2024 to April 2025, the MMRC generated recommendations identified to help improve access to quality pregnancy-related health care that will contribute to a reduction in the incidence of maternal morbidity cases and the number of maternal deaths in Oklahoma (previous recommendations can be found in the 2024 annual report):

- Facilities should implement obstetric early warning score (EWS) systems to monitor vital signs and other clinical indicators, providing early detection of deteriorating conditions.
- Providers should screen every pregnant patient for mental health conditions and substance use disorders, document screenings, and refer to resources accordingly in the perinatal period, in accordance with professional recommendations.
- Health care workers (providers, social workers, midwives, community health workers, etc.) should provide consistent touchpoints to encourage engagement with available resources throughout the perinatal period.
- The MMRC should establish an advisory group to address perinatal mental health and substance use.
- The MMRC should advocate for legislative action to prioritize housing support for pregnant and postpartum individuals.

Additionally, in reviewing pregnancy-associated deaths, the MMRC has found that many women enter pregnancy with health issues that impact pregnancy outcomes. Chronic health conditions, obesity, and substance use, among other factors, may complicate pregnancy and postpartum experiences and contribute to morbidity and mortality. For example, from 2018 – 2022, the MMRC determined that obesity contributed to 41.9% of pregnancy-related deaths, with substance use disorder contributing to 16.3% of pregnancy-related deaths. The MMRC generally recommends promoting access to care that supports lifestyle modification across the continuum of childbearing years, as well as increasing awareness in both reproductive-age individuals and health care providers of the importance of preconception health, regardless of pregnancy intention, since approximately half of pregnancies are not intended at the time they occur.

The implementation of recommendations made by the MMRC is expected to help reduce maternal mortality in Oklahoma. The MMRC agrees that the increase in shared knowledge and education among professionals and non-professionals will encourage more women and their families to seek health care prior to pregnancy, during pregnancy, and after pregnancy to improve birth outcomes.

Ongoing Successes

The OSDH and its partners are engaging in several activities to implement the MMRC's recommendations throughout Oklahoma, including raising awareness of maternal health topics, enhancing patient care and safety, increasing access to care, and improving data collection for MMRC reviews.

Raising Awareness

Social Media Campaigns

- The OSDH, OPQIC, and SPTHB are engaged in several social media campaigns related to maternal health topics, including but not limited to low-dose aspirin use, preconception health, the importance of prenatal care, COVID-19 in pregnancy, and vaccine promotion, particularly for influenza and COVID-19.
- The OPQIC promotes the CDC's "Hear Her" campaign through conducting social media campaigns and collaborating with partners to promote the campaign, as well as offering resources and training programs for providers to effectively communicate with patients, identify potential complications, and provide timely interventions.[27]
- The OSDH continues to partner with the SPTHB to conduct culturally competent social media campaigns for maternal health topics, including but not limited to, congenital syphilis, birth defects awareness, interconception health, and vaccine promotion.

Toolkits and Trainings

- The OSDH, OPQIC, and the George Kaiser Family Foundation developed a toolkit to educate patients and providers on the risk factors and symptoms of preeclampsia and the recommendation of low-dose aspirin use for those at risk of developing preeclampsia.[28] The toolkit includes a screening for preeclampsia risk factors, prescribing guidelines for providers for low-dose aspirin, and resources for patients with instructions for use and adherence to a low-dose aspirin regimen. The OPQIC is also engaged in public awareness campaigns to promote the initiative, including social media campaigns, billboard promotions, presentations at health care facilities and conferences, and news media coverage.

- The OPQIC has developed, disseminated, and made publicly available the Empower Pregnant and Postpartum Patients Toolkit, which includes information and resources for patients and providers on urgent maternal warning signs and post-birth warning signs to signal when to seek emergent care from a health care provider.[29] The OSDH and OPQIC also work with birthing hospitals to ensure that patients giving birth are given information on post-birth warning signs during their birth hospitalization, before and at discharge, to increase knowledge on when and how to seek care for symptoms and conditions occurring in the postpartum period.[30,31]

Improving Patient Care and Safety

Initiatives

- The OSDH and OPQIC have worked with hospitals throughout the state to implement the TeamBirth initiative in all birthing hospitals in Oklahoma. The TeamBirth initiative aims to improve communication and collaboration between pregnant women, their support people, and health care providers throughout the birthing process to improve patient outcomes and ensure everyone involved feels empowered to participate in decision-making. TeamBirth participants have reported increased satisfaction and perceptions of autonomy and increased trust in their health care team during their birthing experiences.[32-34]

Trainings

- With over half of the state's counties being maternity care deserts, non-obstetric providers may see patients with emergent obstetric and postpartum clinical situations.[1] The OSDH, OPQIC, and the Oklahoma Hospital Association are actively engaging with rural and non-obstetric emergency care teams to provide resources and education on obstetrical care readiness for emergency care providers through didactic and simulation activities.[35] The program aims to ensure that emergency care providers are equipped to handle common obstetric and postpartum emergencies (e.g., ectopic pregnancy, preeclampsia, hemorrhage) to improve quality of care and outcomes for women experiencing pregnancy-related complications who seek care at the emergency department.

Increasing Access to Care

Direct Care

- The OSDH began offering maternity care at select county health departments in 2022 and currently offers care in 10 county health departments throughout the state.[36] Maternity care clinics offer routine prenatal care, linkage with local obstetric providers for delivery and transfer care for high-risk conditions, case management, education, and referrals to wrap-around services, nutrition counseling, and WIC referrals.

SoonerCare Coverage Expansion

- The Oklahoma Health Care Authority (OHCA) extended SoonerCare postpartum coverage from 60 days to 12 months in January 2023.[6] This extension assists in providing access to postpartum care for SoonerCare enrollees, as well as reducing disrupted insurance coverage and health care access for participants in the SoonerCare for Pregnant Women program.

- Effective February 1, 2023, the OHCA expanded prescription coverage to cover low-dose aspirin for pregnant women at high risk for preeclampsia without requiring a prior authorization.[37] This coverage can improve access to an evidence-based preventive medication regimen and reduce possible complications for those at risk of preeclampsia.
- Beginning July 1, 2023, SoonerCare began offering doula services to pregnant enrollees, covering eight prenatal/postnatal visits and one labor and delivery visit.[38] This benefit can help increase awareness and utilization of doula services, specifically for populations who may struggle with access to care.

Improving Data Collection for MMRC Reviews

- Per House Bill 2152, legislation was passed and signed by the governor to require a reasonable and good-faith effort for hospitals and birthing centers to report deaths occurring during pregnancy or within one year of termination of pregnancy to the Office of the Medical Examiner, and to add maternal deaths as a type of death to be investigated by the Office of the Medical Examiner.[23] The bill aims to increase the data available for MMRC reviews by increasing the likelihood of an autopsy referral and report for maternal deaths.

Appendix: Tribal Addendum

Data Challenges

A known challenge of assessing mortality in tribal populations is the possibility of racial misclassification on death certificates. Racial misclassification refers to the concept of people being recorded as a different race than their self-identified race on government records.[39] American Indian or Alaska Native persons are more likely to be incorrectly classified on death certificates compared with other race groups. The CDC estimates that from 1979 – 2011, when comparing the race on death certificates to self-identification on the Current Population Survey from the Census, only 51 to 55% of those who self-identified as American Indian or Alaska Native were correctly classified as such on their death certificate.[40] Those who were misclassified were most likely to be classified as White on their death certificate.

Further, an analysis of racial misclassification in Oklahoma using Indian Health Service (IHS) linkage found that while misclassification significantly improved from 1991 – 2015, approximately 1 in 5 American Indian/Alaska Native persons were misclassified as another race on their death certificate.[41] This misclassification also resulted in significant underestimates of actual American Indian/Alaska Native deaths, by approximately 29% from 2011 – 2015. Racial misclassification is more likely to occur in mortality data, as self-report of demographic information is not possible and the data collector (e.g., funeral director, medical examiner, coroner) may rely on information from the decedent's next of kin or their own assumptions based on subjective observation if next of kin are unavailable. It may also be difficult to obtain information on specific tribal affiliation or membership, even with next of kin available: decedents may be initially misclassified, and the data collector is not prompted to enter tribal affiliation, the data collector may not have information on affiliation available, or the decedent's family may disagree on affiliation.

Additionally, for comparisons with other race groups, American Indian/Alaska Native persons are often aggregated for analyses and reports as Non-Hispanic American Indian/Alaska Native Alone, where individuals are counted as American Indian/Alaska Native if the option is selected as their only race and they do not report Hispanic origin. This approach excludes those who identify as American Indian/Alaska Native in addition to another racial group or report having Hispanic origin. Per the 2020 Census, approximately 2.3 million people identified themselves as Non-Hispanic American Indian/Alaska Native Alone, comprising 0.8% of the total United States population.[42] However, nearly 9.7 million people identified themselves as American Indian/Alaska Native Alone or in combination with another race, regardless of Hispanic origin, comprising 2.9% of the total population.

Comparatively, for Oklahoma births in 2023, 8.5% of mothers were Non-Hispanic American Indian/Alaska Native Alone, while 15.8% of mothers were American Indian/Alaska Native Alone or in combination regardless of Hispanic origin, and over 70% of multiple race mothers were American Indian/Alaska Native in combination with at least one other race. While single-race classifications exclusive of Hispanic origin are beneficial for comparing mutually exclusive race/Hispanic origin groups, the method excludes individuals of multiple races, a group that has grown considerably, by 276% between the 2010 and 2020 Censuses.

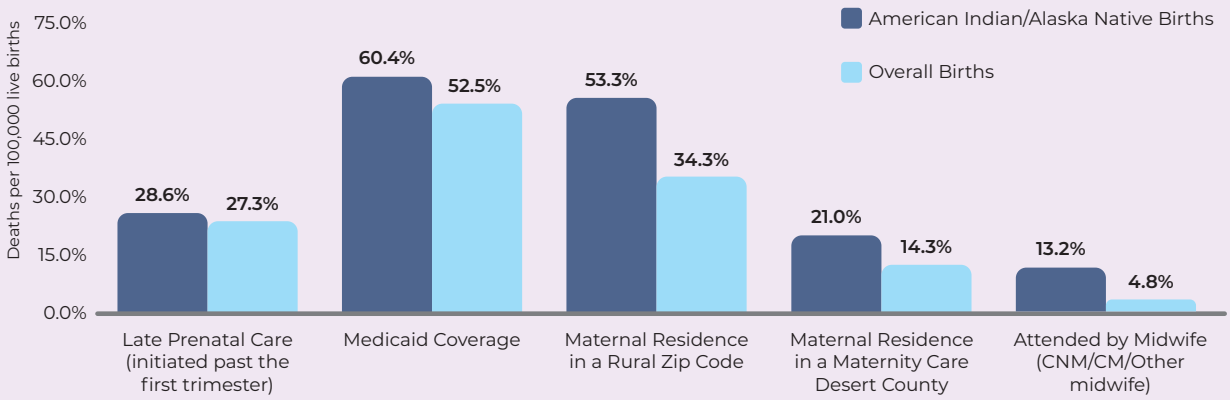
Due to potential racial misclassification on death certificates, review of maternal deaths by an MMRC can provide further data sources to more accurately identify tribally-affiliated deaths, since other records with self-reported race may be utilized in the process of review (e.g., prenatal, delivery, and postpartum records). These records are instrumental in MMRC reviews, as records of care before, during, and after pregnancy can provide a timeline of events and an overarching view of the factors that contributed to the death. However, as mentioned on page 20, Oklahoma MMRC abstractors face challenges in receiving relevant records from tribal providers and facilities due to indigenous data sovereignty, which is defined as "the right of each Native nation to govern the collection, ownership, and application of the tribe's data."[24] As federally designated sovereign nations, Tribes have the right to determine what, how, and with whom their data is shared and how the data is used. Based on these principles, tribal entities are therefore excluded from the statutory authority of the MMRC to obtain records relevant to case review. While this exclusion can create gaps in the data available for MMRC review, indigenous data sovereignty must be respected and promoted.

Another challenge to record acquisition is that American Indian/Alaska Native women may have limited prenatal care or receive care outside the health care system. A qualitative study of women from a Northern Plains tribe investigated perceptions of and barriers to receiving prenatal care for American Indian/Alaska Native women.[43] The study identified communication, institutional, and other barriers, such as distrust of the health care system, lack of continuity of care, and interpersonal problems, which could prevent women from seeking care and attending appointments, such as transportation issues, work schedules, poverty, abuse, mental health conditions, and substance use. Participants also indicated a strong preference for nurse-midwife maternity care, due to more personalized and consistent care, as well as discomfort with male providers. These barriers may result in delayed or disjointed prenatal care, care outside of the health care system, or a lack of prenatal care altogether.

For Oklahoma specifically, American Indian/Alaska Native mothers in 2023 were more likely to receive late prenatal care, be covered by Medicaid, reside in a rural area or maternity care desert, and have a birth attended by a midwife, compared to mothers overall (Chart A-1). These factors suggest that American Indian/Alaska Native mothers in Oklahoma may experience similar barriers to receiving prenatal care services to those observed in the Northern Plains region.

Chart A-1: Characteristics of 2023 Oklahoma Births, American Indian/Alaska Native Mothers* and Overall

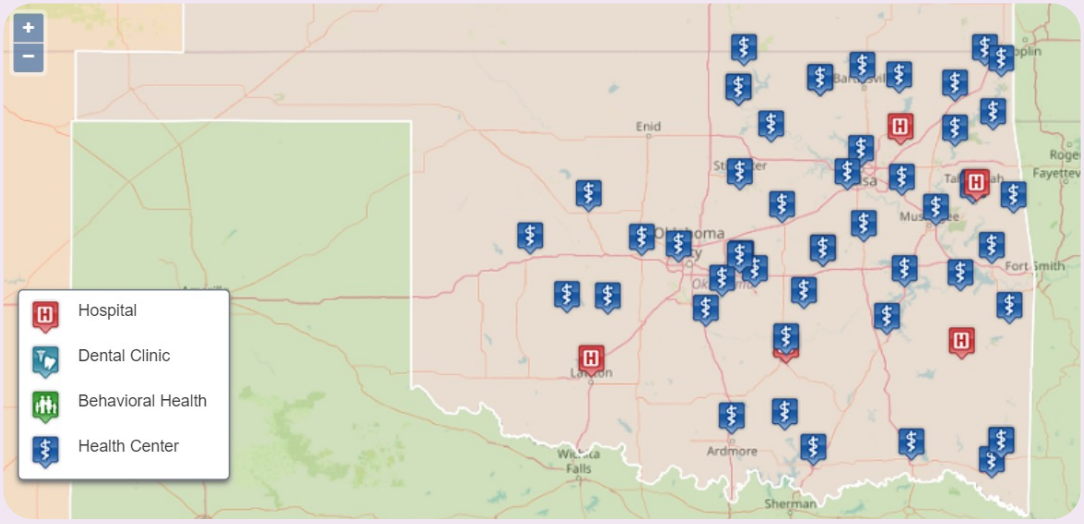
*American Indian/Alaska Native alone or in combination, regardless of Hispanic origin
Source: Oklahoma Vital Statistics, Live Births 2023



Additionally, in Oklahoma American Indian/Alaska Native persons may struggle with access to care and continuity of care. There are nine Indian Health Service (IHS) facilities, 34 tribally-run health care facilities, and two Urban Indian Organizations (UIOs) throughout Oklahoma, which provide a range of services for tribal members (Map A-1). However, while IHS facilities provide services to members of federally recognized tribes, other tribal health care facilities serving tribal members may offer similar or additional services to IHS facilities, but have varying eligibility criteria to receive services. For example, some facilities may require general American Indian/Alaska Native descent, while others may require affiliation with a specific tribe. Therefore, tribal members may face difficulties accessing care depending on their tribal affiliation and distance from a facility where they meet eligibility criteria to receive services. Individuals may also require additional care beyond the scope of IHS or tribally-run facilities and may require referrals to non-tribal health care facilities. Furthermore, individuals who receive care at multiple types of facilities may experience higher rates of fragmented care due to several factors, including reliance on resident clinicians, heavy patient loads, a lack of provider coordination across departments and facilities, and differing electronic health record systems.

Map A-1: Indian Health Service, Tribal, or Urban Indian Health Program facilities in Oklahoma

Source: https://www.ihs.gov/findhealthcare/



Fragmented health care, limited prenatal care, and seeking care outside the health care system pose additional challenges for record acquisition for the purpose of MMRC reviews, due to constraints in the availability of records and ability to acquire records. These challenges, in addition to limitations in data collection due to racial misclassification and data sovereignty, can impact the availability of records for MMRC review as well as the conclusions and recommendations that can be generated from review of tribally-affiliated maternal deaths.

Addressing Data Challenges

Notably, American Indian/Alaska Native persons experience health disparities in both health outcomes and social drivers of health (nonmedical factors that influence health outcomes), for which cultural trauma is a major contributing factor.[44] These factors include poverty, food insecurity, lack of quality education and health education, racial and socioeconomic discrimination, and adverse childhood experiences. In Oklahoma specifically, American Indian/Alaska Native persons were more likely to experience poverty and food insecurity compared to nontribal populations, and nationally, Non-Hispanic American Indian/Alaska Native women were 2.3 times more likely to experience pregnancy-related mortality than Non-Hispanic White women from 2007 – 2016.[45-47]

To address the increased burden of maternal mortality and its contributing factors in American Indian/Alaska Native populations, the CDC and the National Indian Health Board (NIHB) are working with tribal organizations to explore the possibility of tribally-led MMRCs.[48] Currently, there are no tribally-led MMRCs, and few MMRCs have tribal representation. While Oklahoma is one of the few states to have specific tribal representation on its MMRC, there are still the aforementioned barriers to identifying and reviewing tribally-affiliated MMRC cases.

In August 2023, the CDC launched a funding opportunity to strengthen the quality, performance, and infrastructure of tribal public health systems: the Strengthening Public Health Systems and Services in Indian Country grant. The Southern Plains Tribal Health Board (SPTHB) received funding through this grant and has initiated the Supporting Maternal Mortality Prevention in Indian Country program. As part of this program, SPTHB is collaborating with multiple governmental and nongovernmental partners to assess the feasibility of establishing a tribally-led maternal mortality review committee in Oklahoma.

The establishment of a tribally-led MMRC, or an MMRC component, could substantially improve the review of tribally-affiliated cases, both in case abstraction through improved data acquisition and in case review through enhanced cultural competency and perspective during the review process. The partnerships developed through this funding opportunity include collaborations with the OSDH Maternal and Child Health Service as well as the Oklahoma MMRC, in reviewing data sharing agreements and protocols, convenings, and the dissemination of relevant educational materials as part of determining the feasibility of an MMRC model more equipped to serve tribal communities. There are several potential models for tribally-led MMRCs, each with specific considerations and varying advantages and disadvantages.[49] However, since the Oklahoma MMRC is a statutory committee, there are limitations on which model could be implemented successfully. Therefore, the MMRC and SPTHB are working closely to determine if the proposed committee models are feasible for implementation in Oklahoma, and which model is most feasible in conjunction with state statute.

References

1. Fontenot, J, Lucas, R, Stoneburner, A, Brigance, C, Hubbard, K, Jones, E, Mishkin, K. Where You Live Matters: Maternity Care Deserts and the Crisis of Access and Equity in Oklahoma. March of Dimes. 2024. Accessed May 29, 2025. https://www.marchofdimes.org/peristats/reports/oklahoma/maternity-care-deserts

2. America's Health Rankings analysis of U.S. Census Bureau, American Community Survey, United Health Foundation, AmericasHealthRankings.org, accessed 2025.

3. America's Health Rankings analysis of March of Dimes, Perinatal Data Center, United Health Foundation, AmericasHealthRankings.org, accessed 2025.

4. America's Health Rankings analysis of U.S. HHS, Centers for Medicare & Medicaid Services, National Plan and Provider Enumeration System, United Health Foundation, AmericasHealthRankings.org, accessed 2025.

5. Medicaid Expansion. Oklahoma Health Care Authority, About. Accessed May 29, 2025. https://oklahoma.gov/ohca/about/medicaid-expansion/expansion.html

6. Expanded Pregnancy and Postpartum Coverage for SoonerCare Members. Oklahoma Health Care Authority. Accessed May 29, 2025. https://oklahoma.gov/content/dam/ok/en/okhca/docs/individuals/programs/pregnancy-services/Postpartum%20Providers%20Flyer%20EN.pdf

7. Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 2018-2023 on CDC WONDER Online Database, released in 2024. Data are from the Multiple Cause of Death Files, 2018-2023, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/mcd-icd10-expanded.html on Jun 9, 2025.

8. Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/mcd-icd10.html on Jun 9, 2025.

9. Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Natality on CDC WONDER Online Database. Data are from the Natality Records 2007-2023, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/natality-current.html on Jun 9, 2025.

10. SoonerCare Delivery Fast Facts: State Fiscal Year 2023. Oklahoma Health Care Authority. 2025. Accessed May 29, 2025 https://oklahoma.gov/content/dam/ok/en/okhca/docs/research/data-and-reports/fast-facts/2025/january/SFY2023%20Deliveries%20Fast%20Facts.pdf

11. Oklahoma State Department of Health (OSDH), Center for Health Statistics, Health Care Information, Behavioral Risk Factor Surveillance System 2023, on Oklahoma Statistics on Health Available for Everyone (OK2SHARE). Accessed June 9, 2025. https://www.health.state.ok.us/

References

12. Oklahoma Pregnancy Risk Assessment Monitoring System (PRAMS), Oklahoma State Department of Health.

13. Bauman BL, Ko JY, Cox S, et al. Vital Signs: Postpartum Depressive Symptoms and Provider Discussions About Perinatal Depression — United States, 2018. MMWR Morb Mortal Wkly Rep 2020;69:575–581. DOI: http://dx.doi.org/10.15585/mmwr.mm6919a2.

14. Prevalence of Selected Maternal and Child Health Indicators for All Pregnancy Risk Assessment Monitoring System (PRAMS) Sites, 2016–2022. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Reproductive Health. Accessed May 29, 2025. https://www.cdc.gov/prams/php/data-research/mch-indicators-by-site.html

15. The Oklahoma Toddler Survey (TOTS), Oklahoma State Department of Health.

16. Identifying Severe Maternal Morbidity (SMM): SMM indicators and corresponding ICD Codes. Maternal Infant Health, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion. Accessed May 29, 2025. https://www.cdc.gov/maternal-infant-health/php/severe-maternal-morbidity/icd.html

17. HCUP Fast Stats. Healthcare Cost and Utilization Project (HCUP). December 2022. Agency for Healthcare Research and Quality, Rockville, MD. Accessed May 29, 2025. https://datatools.ahrq.gov/hcup-fast-stats/

18. World Health Organization, Maternal, Newborn, Child and Adolescent Health and Ageing Data Portal. Accessed May 29, 2025. https://www.who.int/data/gho/indicator-metadata-registry/imr-details/4622

19. Hoyert DL. Maternal mortality rates in the United States, 2023. NCHS Health E-Stats. 2025. Accessed May 29, 2025. DOI. https://dx.doi.org/10.15620/cdc/174577.

20. 2010 Rural-Urban Commuting Area Codes, ZIP Code File. United States Department of Agriculture, Economic Research Service. Published August 17, 2020. Accessed June 2, 2025. https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes

21. MMRCs 101. Maternal Mortality Prevention: About Maternal Mortality Review Committees. Centers for Disease Control and Prevention. Accessed May 29, 2025. https://www.cdc.gov/maternal-mortality/php/mmrc/index.html

22. Oklegislature.gov. “HB2334 (2019): Maternal Mortality Review Act”. Oklegislature.gov, May 28, 2019. Accessed May 29, 2025. http://www.oklegislature.gov/BillInfo.aspx?Bill=HB2334

23. Oklegislature.gov. “HB2152 (2024)”. Oklegislature.gov, May 3, 2024. Accessed May 29, 2025. http://oklegislature.gov/BillInfo.aspx?Bill=HB2152&Session=2300

24. Carroll SR, Rodriguez-Lonebear D, Martinez A. Indigenous Data Governance: Strategies from United States Native Nations. Data Sci J. 2019;18:31. DOI: 10.5334/dsj-2019-031. PMID: 34764990; PMCID: PMC8580324.

References

25. Data from the Pregnancy Mortality Surveillance System. Maternal Mortality Prevention. Centers for Disease Control and Prevention. Published April 29, 2025. Accessed May 30, 2025. https://www.cdc.gov/maternal-mortality/php/pregnancy-mortality-surveillance-data/index.html?cove-tab=2

26. Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees. Centers for Disease Control and Prevention. Published August 22, 2025. Accessed September 22, 2025.

27. HEAR HER Campaign. Centers for Disease Control and Prevention (CDC). Accessed May 29, 2025. https://www.cdc.gov/hearher/index.html

28. Low Dose Aspirin Preeclampsia Prevention Campaign. Oklahoma Perinatal Quality Improvement Collaborative. Accessed May 29, 2025. https://opqic.org/lda/

29. OPQIC Empower Pregnant and Postpartum Patients Toolkit. Oklahoma Perinatal Quality Improvement Collaborative. Accessed May 29, 2025. https://www.livebinders.com/b/3532901

30. Maternal Morbidity and Mortality, Post-Birth Warning Signs. Oklahoma Perinatal Quality Improvement Collaborative. Accessed May 29, 2025. https://opqic.org/maternal-morbidity-mortality/

31. Post-Birth Warning Signs Education Program. Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN). Accessed May 29, 2025. https://www.awhonn.org/education/hospital-products/post-birth-warning-signs-education-program/

32. TeamBirth Initiative. Oklahoma Perinatal Quality Improvement Collaborative. Accessed May 29, 2025. https://opqic.org/teambirth

33. TEAMBIRTH. Ariadne Labs. Accessed June 9, 2025. https://www.ariadnelabs.org/delivery-decisions-initiative/teambirth/

34. Griffith I, Neergheen V, El Chaer L, Altaher Y, Short T, Weiseth A. Effect of TeamBirth on Patient Trust and Autonomy During Childbirth in Oklahoma. J Obstet Gynecol Neonatal Nurs. 2025 May 29:S0884-2175(25)00183-2. DOI: 10.1016/j.jogn.2025.05.113. Epub ahead of print. PMID: 40451255.

35. OB Readiness in the ED. Oklahoma Perinatal Quality Improvement Collaborative. Accessed May 29, 2025. https://opqic.org/obreadiness/

36. Maternity Program and Prenatal Care. Maternal and Child Health, Perinatal and Reproductive Health. Oklahoma State Department of Health. Accessed May 29, 2025. https://oklahoma.gov/health/health-education/children---family-health/maternal-and-child-health-service/perinatal-and-reproductive-health-/maternity-program-and-prenatal-care.html

37. Pharmacy Updates: Aspirin for Prevention of Preeclampsia, Pentasa Brand Preferred. Oklahoma Health Care Authority. February 6, 2023. Accessed May 29, 2025. https://oklahoma.gov/content/dam/ok/en/okhca/docs/providers/types/pharmacy/policy/02.23%20-%20ASA%20preeclampsia_Pentasa%20brand_02062023_updated%20NDCs.pdf

References

38. Oklahoma adds doula services to SoonerCare benefits. Oklahoma Health Care Authority, Newsroom. July 10, 2023. Accessed May 29, 2025. https://oklahoma.gov/ohca/about/newsroom/2023/july/oklahoma-adds-doula-services-to-soonercare-benefits.html

39. "What Is Racial Misclassification On Death Certificates, And How Does It Affect American Indian And Alaska Native People?". National Council of Urban Indian Health. Accessed July 25, 2024. https://www.racialmisclassification.org/resource/what-is-racial-misclassification-on-death-certificates-and-how-does-it-affect-american-indian-and-alaska-native-people/

40. Arias, Elizabeth and Heron, Melonie P. and Hakes, Jahn K. "The Validity of race and Hispanic origin reporting on death certificates in the United States: an update" (2016).

41. Dougherty TM, Janitz AE, Williams MB, Martinez SA, Peercy MT, Wharton DF, Erb-Alvarez J, Campbell JE. Racial Misclassification in Mortality Records Among American Indians/Alaska Natives in Oklahoma From 1991 to 2015. J Public Health Manag Pract. 2019 Sep/Oct;25 Suppl 5, Tribal Epidemiology Centers: Advancing Public Health in Indian Country for Over 20 Years(Suppl 5 TRIBAL EPIDEMIOLOGY CENTERS ADVANCING PUBLIC HEALTH IN INDIAN COUNTRY FOR OVER 20 YEARS):S36-S43. DOI: 10.1097/PHH.0000000000001019. PMID: 31348189; PMCID: PMC6690744.

42. Race and Ethnicity in the United States: 2010 Census and 2020 Census. United States Census Bureau. August 12, 2021. Accessed May 29, 2025. https://www.census.gov/library/visualizations/interactive/race-and-ethnicity-in-the-united-state-2010-and-2020-census.html

43. Hanson JD. Understanding prenatal health care for American Indian women in a Northern Plains tribe. J Transcult Nurs. 2012 Jan;23(1):29-37. DOI: 10.1177/1043659611423826. Epub 2011 Nov 3. PMID: 22052090; PMCID: PMC4098117.

44. Subica AM, Link BG. Cultural trauma as a fundamental cause of health disparities. Soc Sci Med. 2022 Jan;292:114574. DOI: 10.1016/j.socscimed.2021.114574. Epub 2021 Nov 17. PMID: 34808396; PMCID: PMC9006767.

45. Poverty in Oklahoma: A statistical overview of poverty and how to reduce it. Oklahoma Policy Institute. October 14, 2024. Accessed June 9, 2025. https://okpolicy.org/poverty-in-oklahoma/

46. Blue Bird Jernigan V, Wetherill MS, Hearod J, Jacob T, Salvatore AL, Cannady T, Grammar M, Standridge J, Fox J, Spiegel J, Wiley A, Noonan C, Buchwald D. Food Insecurity and Chronic Diseases Among American Indians in Rural Oklahoma: The THRIVE Study. Am J Public Health. 2017 Mar;107(3):441-446. DOI: 10.2105/AJPH.2016.303605. Epub 2017 Jan 19. PMID: 28103070; PMCID: PMC5296691.

47. Petersen EE, Davis NL, Goodman D, Cox S, Syverson C, Seed K, Shapiro-Mendoza C, Callaghan WM, Barfield W. Racial/Ethnic Disparities in Pregnancy-Related Deaths - United States, 2007-2016. MMWR Morb Mortal Wkly Rep. 2019 Sep 6;68(35):762-765. DOI: 10.15585/mmwr.mm6835a3. PMID: 31487273; PMCID: PMC6730892.

48. “Maternal Mortality Review: A Potential Strategy for Optimizing Native Women’s Health”. National Indian Health Board. May 21, 2020. Accessed May 29, 2025. https://www.nihb.org/wp-content/uploads/2025/04/Tribal-MMRC-Fact-Sheet-5.21.20.pdf

49. Tribally-led Maternal Mortality Review Committees (MMRCs). National Indian Health Board. Accessed May 29, 2025. https://www.nihb.org/tribally-led-maternal-mortality-review-committees-mmrcs/

OKLAHOMA
State Department
of Health

OKLAHOMA

Maternal Health Morbidity & Mortality

ANNUAL REPORT 2025

This project is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant number U7A33713 for the State Maternal Health Innovation Program. The contents are those of the authors and do not necessarily represent the official views of, nor an endorsement by HRSA/HHS, or the U.S. Government.

This publication was issued by the Oklahoma State Department of Health (OSDH), an equal opportunity employer and provider. A digital file has been deposited with the Publications Clearinghouse of the Oklahoma Department of Libraries in compliance with section 3-114 of Title 65 of the Oklahoma Statutes and is available for download at documents.ok.gov. | Issued November 2025