



MATERNAL MORTALITY IN TENNESSEE

Annual Report 2025

Prepared by
Tennessee Department of Health
Division of Family Health & Wellness



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Contributors

Tennessee's Maternal Mortality Review Committee, as outlined in Tennessee Code Annotated § 68-3-601, brings together a diverse, multidisciplinary team from various fields, all committed to reviewing pregnancy-associated deaths, analyzing critical data, and developing actionable recommendations to improve maternal health outcomes.

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Dedication

This report is dedicated to the women whose lives were lost during pregnancy or within one year of the end of their pregnancy. Their stories form the foundation of this work and serve as the driving force behind our commitment to understanding and preventing maternal mortality.

We honor the families and communities that have been forever changed by these losses. Your strength, resilience, and advocacy inspire us to pursue meaningful change.

To the healthcare providers, public health professionals, community organizations, and Maternal Mortality Review Committee members who work tirelessly to review, reflect, and respond—thank you for your unwavering dedication to improving maternal health.

May this report serve not only as a record of what has been, but as a call to action for a future of safety and support for each mother and child.



Definitions

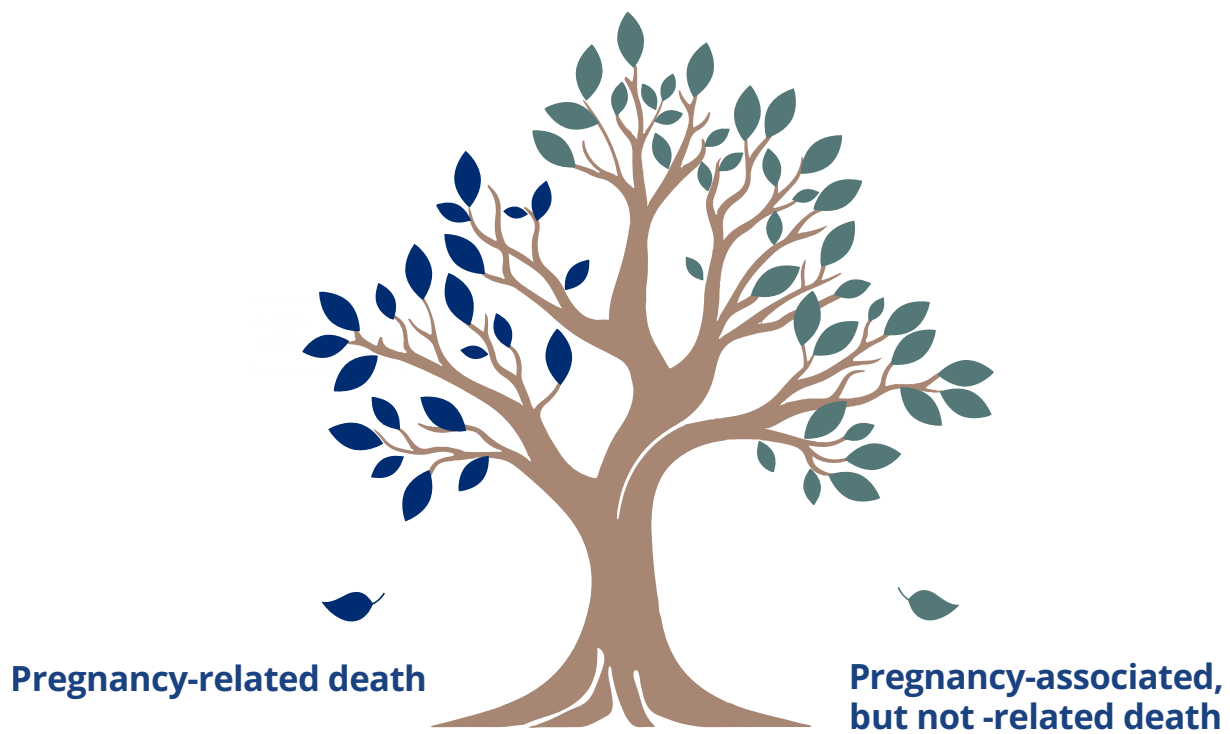
Maternal deaths are categorized based on the timing and cause of death. These categories are described below:

Pregnancy-associated deaths: The death of a woman during pregnancy or within one year of the end of pregnancy from any cause. This definition encompasses all qualifying deaths the MMRC reviews. Pregnancy-associated deaths can be further classified as pregnancy-related deaths or pregnancy-associated, but not -related deaths.

Pregnancy-related deaths: 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 deaths: The death of a woman during pregnancy or within one year of the end of pregnancy from a cause that is not related to the pregnancy.

Pregnancy-Associated Deaths





Executive Summary

Reducing maternal mortality is a key priority in Tennessee. The Maternal Mortality Review Committee (MMRC) reviews all deaths occurring during pregnancy or within one year postpartum. This report presents findings from Tennessee's review of maternal deaths, focusing primarily on pregnancy-related deaths from 2021 to 2023. This report examines trends, leading causes, contributing factors, and disparities and outlines the MMRC's recommendations to reduce pregnancy-related deaths and improve maternal health outcomes.

Key Findings

- » Pregnancy-associated mortality encompasses all deaths that occur during pregnancy or within one year after the end of pregnancy, regardless of the cause. Following a sharp increase between 2019 and 2021, the rate of pregnancy-associated deaths declined 26% in 2022 and 5% in 2023.
- » A subset of these deaths, known as pregnancy-related mortality, includes deaths caused by or directly related to pregnancy, as well as those resulting from unrelated conditions worsened by pregnancy. Between 2019 and 2021, Tennessee saw a 124% rise in pregnancy-related deaths, which was largely driven by the COVID-19 pandemic as well as changes in how the MMRC reviews overdose deaths. The rate declined by 15% in 2022 and another 25% in 2023.
- » Between 2021 and 2023, mental health conditions were the leading cause of pregnancy-related deaths (27%), with most due to substance use disorder. Other leading causes included cardiovascular conditions (24%) and infection, including COVID-19 (18%).
- » Pregnancy-related mortality impacted some populations more than others. Non-Hispanic Black women had the highest mortality rate at 116 deaths per 100,000 live births, which was nearly 3 times the rate of non-Hispanic White women. The rate was also higher among older women, those who were not married, those with less education, and those with TennCare insurance compared to their counterparts.
- » Between 2021 and 2023, substance use disorder was the underlying cause of death in 22% of pregnancy-related deaths and a contributing factor in an additional 17%.
- » Among 2023 pregnancy-related deaths, the MMRC determined that 74% were preventable. Of those that were preventable, about 1 in 3 had a good chance of being prevented, while the remaining had some chance.



Background

Maternal Mortality Crisis

Despite advancements in healthcare, deaths related to or brought on by pregnancy have risen over the past decade in both the United States and Tennessee, devastating families and posing a serious public health challenge. The burden of these deaths is not shared equally - significant disparities persist across racial, socioeconomic, and geographic groups.

2016

The Tennessee Maternal Mortality Review Act of 2016 (T.C.A. § 68-3-601) establishes the Maternal Mortality Review Committee.

2017

The first maternal death cases in Tennessee are reviewed.

2024

Public Chapter 834 is signed into law, appointing four members from community-based organizations to the MMRC.

2025

Public Chapters 99 and 46 are signed into law, mandating action to improve maternal health awareness of post-birth warning signs and the expansion of prenatal testing for syphilis and hepatitis C.

Statewide Action

In 2016, Tennessee passed legislation (Tennessee Code Annotated § 68-3-601) to establish the Maternal Mortality Review Committee (MMRC). The MMRC is a multidisciplinary team of diverse experts from across Tennessee dedicated to conducting thorough and systematic reviews of all pregnancy-associated deaths involving Tennessee women. The committee works to identify the contributing factors to maternal deaths and develop actionable recommendations aimed at preventing future occurrences.

In 2024, the committee expanded by adding four representatives from community-based organizations to diversify committee membership.

In 2025, new legislation reflecting MMRC recommendations advanced statewide efforts to raise awareness of post-birth warning signs and strengthen maternal health screenings.

Report Goals

The purpose of this report is to analyze the underlying causes of pregnancy-related maternal deaths in Tennessee, identify trends and contributing factors, and put forth specific, actionable recommendations aimed at reducing preventable pregnancy-related deaths.



Maternal Mortality Review Process

1. CASE IDENTIFICATION

Accurately identifying deaths that occur during pregnancy or within one year postpartum—referred to as pregnancy-associated deaths—is a crucial first step in understanding the factors involved. Below are the ways in which these deaths can be identified:

1. Linkage of the death certificate to a birth certificate or fetal death record that occurred within one year of the mother's death.
2. The cause of death on the death certificate indicates a current or recent pregnancy.
3. A checkbox response on the death certificate that indicates pregnancy within one year of death.
4. Linkage of the death certificate to hospital discharge data containing a diagnosis or procedure code indicating pregnancy within one year of the death.



2. RECORDS REQUEST

Requested records include medical records (from hospitals, emergency departments, and prenatal care providers), autopsy reports, and reports from legal and social services. Obituaries, social media, and media and news reports are also utilized.



3. CASE ABSTRACTION

The program's nurse abstractors use their clinical expertise to review records, extract relevant information, and summarize the case for committee review.



4. STANDARDIZED REVIEW

For each case, the MMRC is tasked with answering six key questions:

1. *Was the death pregnancy-related?*
2. *What was the cause of death?*
3. *Was the death preventable?*
4. *What were the critical contributing factors to the death?*
5. *What are the committee's recommendations to prevent future deaths?*
6. *What is the anticipated impact of implementing the recommendations?*



5. RECOMMENDATIONS INTO ACTION

Data are shared with the Maternal Health Task Force, partners, and community members to help inform and guide their future efforts in preventing maternal deaths.





MATERNAL MORTALITY DATA

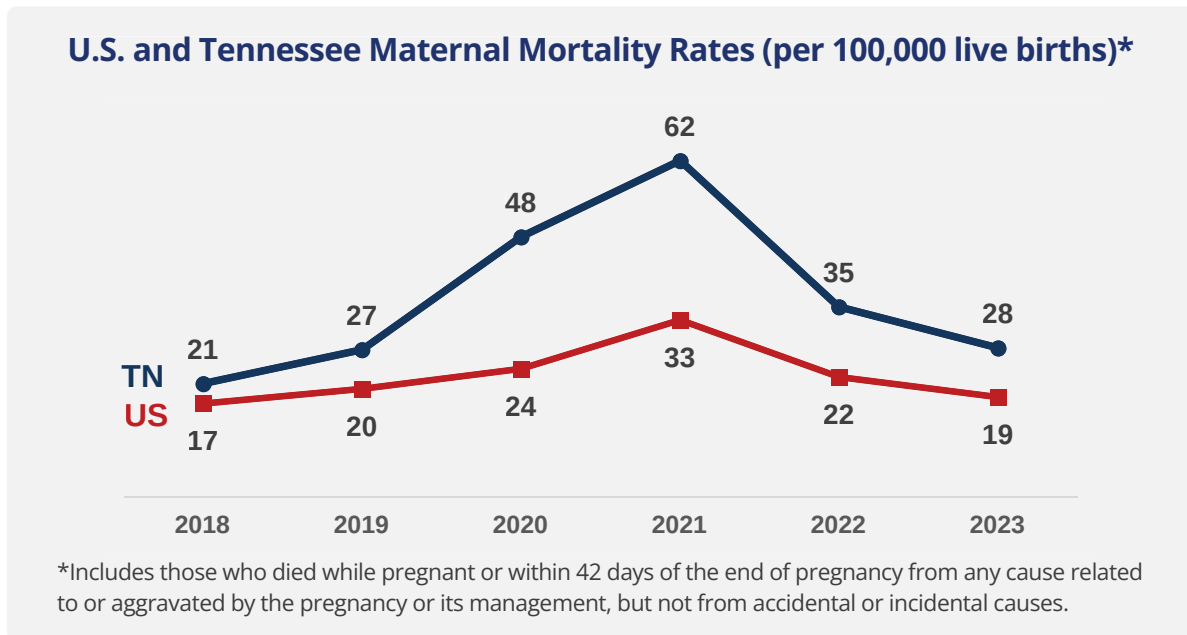


Maternal Mortality in the U.S.

The processes for tracking and monitoring maternal deaths vary widely by state. Therefore, when making national-level comparisons, the *international definition* of maternal mortality is used.

The international definition of maternal mortality is *the death of a woman while pregnant or within 42 days of the end 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.*

The data in the graph below shows the U.S. and Tennessee maternal mortality rates using the international definition. The national rate nearly doubled from 2018 to 2021, followed by declines in subsequent years (33% in 2022 and 14% in 2023), likely due in large part to the direct and indirect effects of the COVID-19 pandemic. In Tennessee, the maternal mortality rate nearly tripled from 2018 to 2021, mirroring the national trend. The rate then declined in each subsequent year, by 44% in 2022 and 20% in 2023.



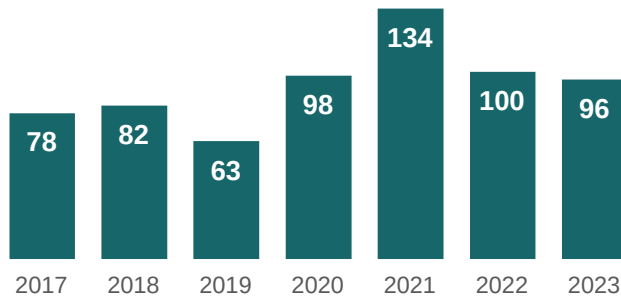
The international definition of maternal mortality is useful for making comparisons at the national level, and the data are more timely than data from MMRCs. However, there are limitations to these data.

For these rates, deaths are identified using two elements from the death certificate: the pregnancy checkbox and the underlying cause of death. Studies have shown that the pregnancy checkbox on death certificates can be unreliable. During 2021-2023 in Tennessee, about one in four deaths identified by the MMR program was a false positive. Over 70% of false positives were identified via the pregnancy checkbox, an average of 27 cases per year. Moreover, the MMRC's comprehensive identification, abstraction, and review process provides context beyond the death certificate, and its inclusion of deaths up to one year postpartum (rather than the international 6-week standard) offers a more complete understanding of maternal mortality and the broader social factors that influence it.

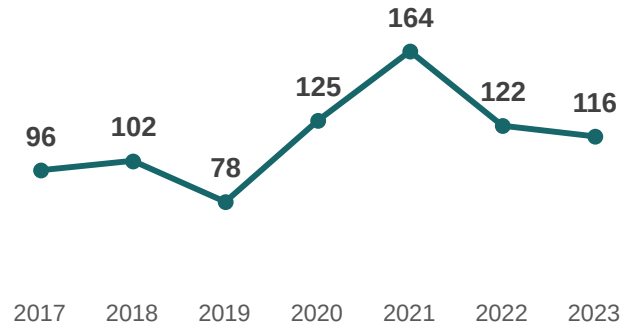
Pregnancy-Associated Deaths

A pregnancy-associated death is the death of a woman during pregnancy or within one year following the end of pregnancy from any cause. This encompasses all of the deaths that are reviewed by the MMRC.

Number of Pregnancy-Associated Deaths



Rate per 100,000 Live Births

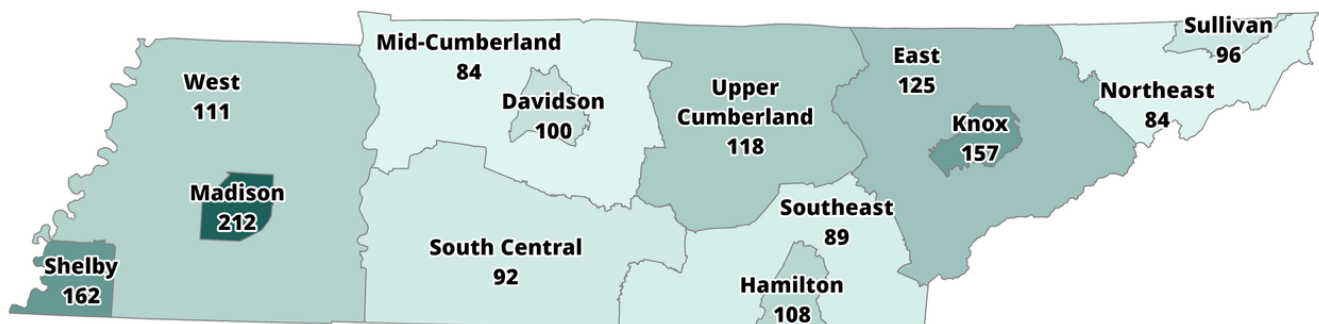


Although the rate of pregnancy-associated deaths increased sharply between 2019 and 2021, it has since decreased. There was a 26% decrease in the rate of pregnancy-associated deaths in 2022, followed by a 5% decrease in 2023.

The spike in pregnancy-associated deaths in 2020-2021 was likely a result of several factors, including an increase in overdose deaths, the COVID-19 pandemic, and improvements in identifying pregnancy-associated deaths.

Pregnancy-Associated Mortality Rate by Region, 2017-2023*

*number of deaths per 100,000 live births



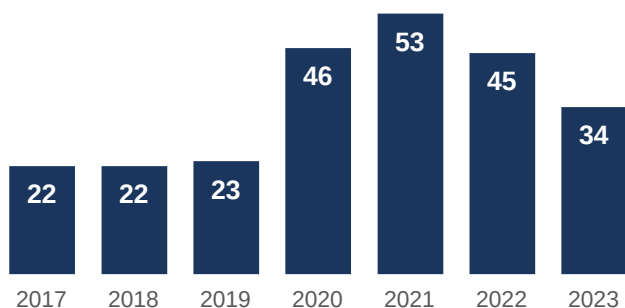
From 2017 to 2023, Madison and Shelby counties in the western part of the state had the highest rates of pregnancy-associated mortality at 212 and 162 deaths per 100,000 live births, respectively. The Knox, East, and Upper Cumberland regions in the northeastern half of the state also had relatively high rates at 157, 125, and 118, respectively. Conversely, the Mid-Cumberland and Northeast regions had the lowest rate of pregnancy-related mortality at 84 deaths per 100,000 live births.



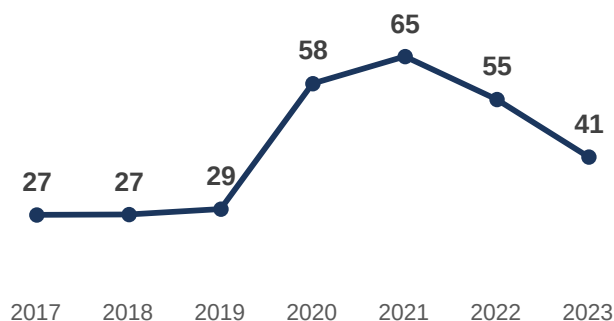
Pregnancy-Related Deaths

Pregnancy-related deaths are a subset of pregnancy-associated deaths. They are caused by or related to the pregnancy, or due to an unrelated condition that was aggravated by the pregnancy. The MMRC reviews all pregnancy-associated deaths and determines which deaths are pregnancy-related (see page 6 for more information on the MMRC review process). The aim of this section is to provide a deeper understanding of the causes, disparities, and contributing factors in pregnancy-related deaths in Tennessee.

Number of Pregnancy-Related Deaths



Rate per 100,000 Live Births

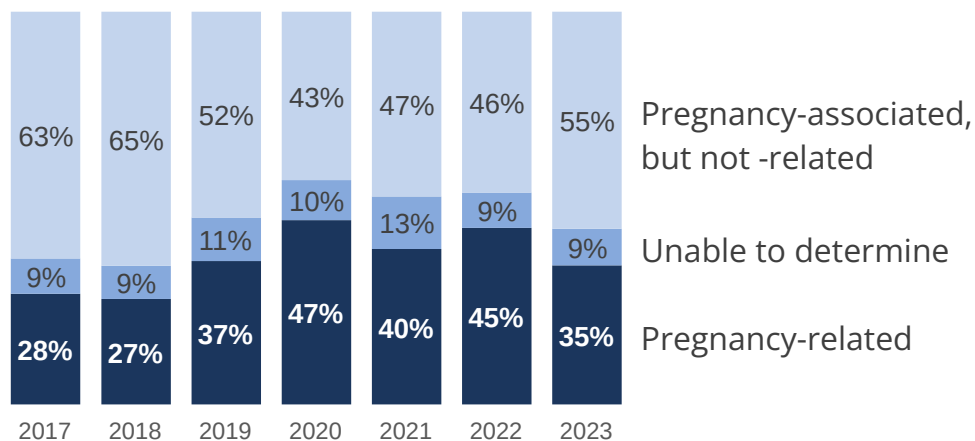


Tennessee saw a 124% increase in pregnancy-related deaths between 2019 and 2021, but has since seen a 37% decrease in 2022-2023. The spike in 2020-2021 was likely due in part to COVID-19, which can cause more severe disease during pregnancy.

Another factor that may have contributed to the spike in 2020-2021 was a change in the MMRC review process. In 2020, in line with national standards, the MMRC implemented new criteria for determining pregnancy-relatedness in deaths due to suicide and unintentional overdose. These criteria help the committee determine when deaths due to mental health conditions are related to pregnancy. This change led to an increase in deaths from these

causes being deemed pregnancy-related. The percentage of deaths deemed pregnancy-related was as low as 27% in 2018 and as high as 47% in 2020. In 2023, 35% of deaths were determined to be pregnancy-related.

Proportion of Pregnancy-Associated Deaths Deemed Pregnancy-Related, 2017-2023

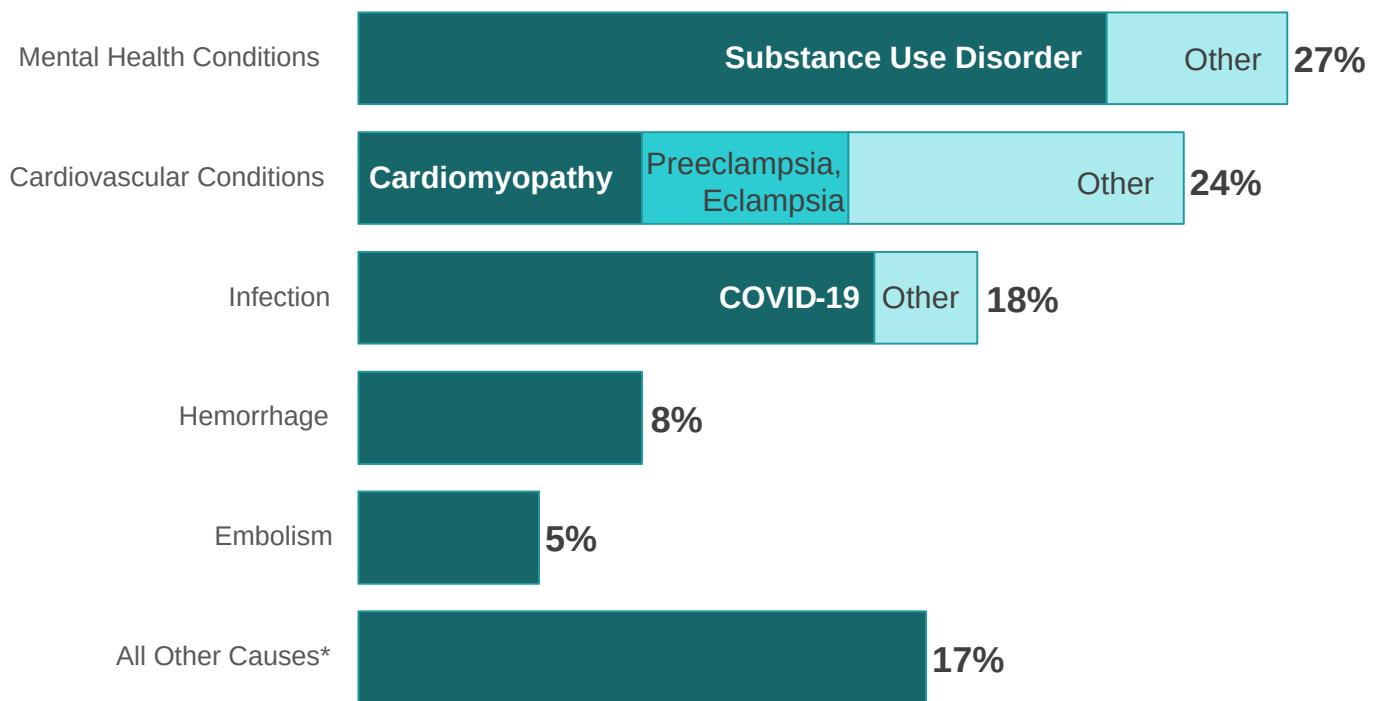




Pregnancy-Related Deaths

A critical part of the Maternal Mortality Review process is determining the underlying cause of each pregnancy-related death. The underlying cause of death is the disease or injury that initiated the chain of events leading to death. Throughout this report, we will refer to underlying cause(s) as simply cause(s).

Leading Causes of Pregnancy-Related Deaths, 2021-2023



*All other causes include: Neurologic/Neurovascular Conditions (Excluding CVA), Cerebrovascular Accident, Injury, Cancer, Conditions Unique to Pregnancy, Pulmonary Conditions (Excludes ARDS), Amniotic Fluid Embolism, Hematologic, Metabolic/Endocrine, Renal Diseases, and Unknown

Mental Health Conditions

Mental health conditions were the leading cause of pregnancy-related mortality, accounting for 27% of deaths in 2021-2023.

- Substance use disorder accounted for 81% of all deaths due to mental health conditions and 22% of all pregnancy-related deaths.
- One in four pregnancy-related deaths due to mental health conditions was found to be a confirmed or probable suicide by the MMRC.

Cardiovascular Conditions

Cardiovascular conditions were the second leading cause of pregnancy-related mortality, accounting for 24% of deaths.

- Cardiomyopathy (disease of the heart muscle) accounted for about one-third of deaths due to cardiovascular conditions.
- Preeclampsia and eclampsia (blood pressure disorders that can develop during pregnancy and postpartum) together accounted for 25% of deaths due to cardiovascular conditions.



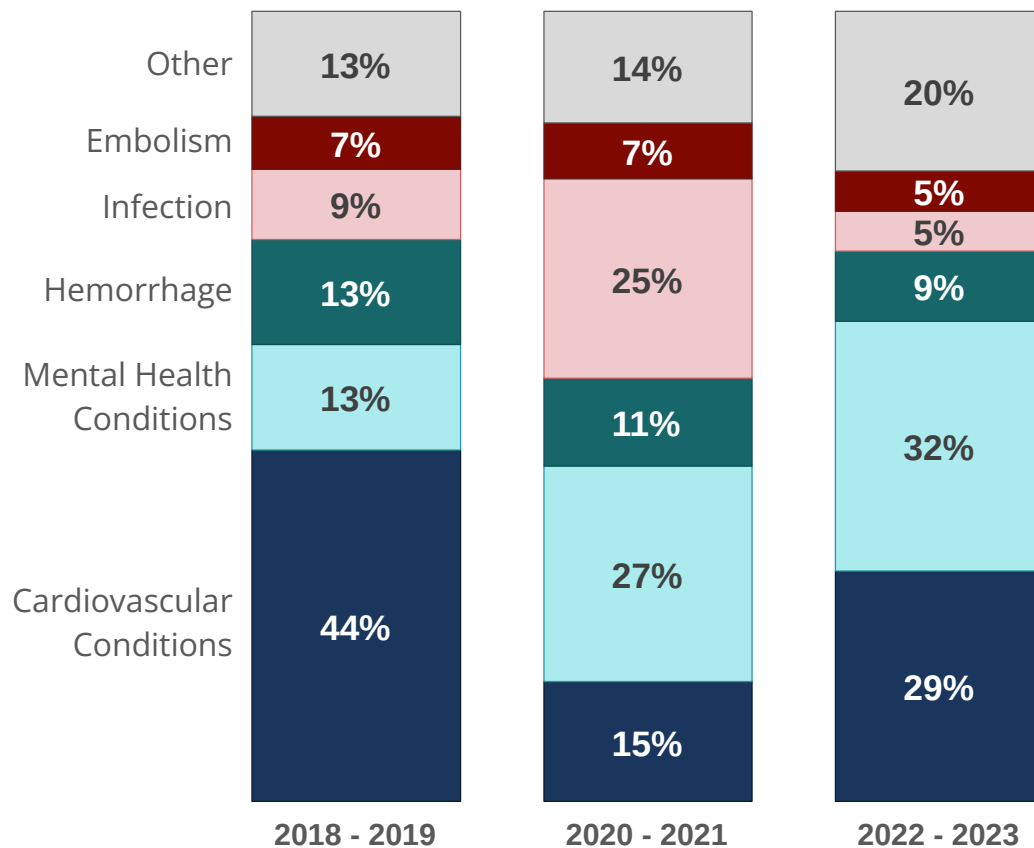
Pregnancy-Related Deaths

Trends in Leading Causes

Although pregnancy-related deaths have had the same leading causes since the inception of Tennessee's MMRC, the proportion of deaths attributed to these causes has shifted with evolving processes and changing external factors. Cardiovascular conditions accounted for 44% of deaths in 2018-2019 compared to 29% in 2022-2023, while mental health conditions went from representing just 13% of deaths to 32%. This change is likely due in part to the implementation of new criteria for determining pregnancy-relatedness in suicide and overdose deaths, as well as increases in overdoses at the population level.

Deaths due to infection spiked in 2020-2021 due to the COVID-19 pandemic, accounting for one in four pregnancy-related deaths, but then decreased substantially in subsequent years. The proportion of deaths caused by hemorrhage and embolism was relatively stable from 2018 through 2023.

Changes in the Distribution of Leading Causes of Pregnancy-Related Deaths Over Time, 2018-2023

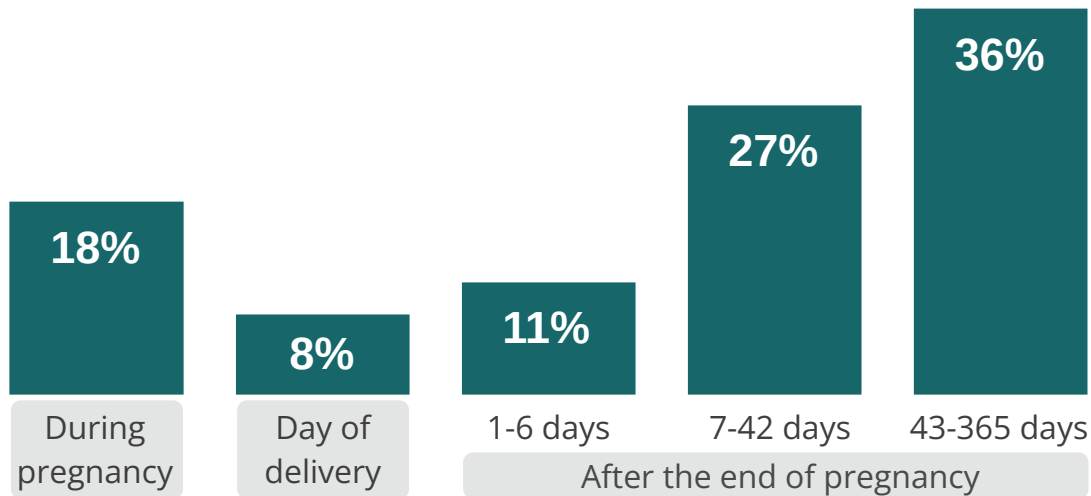




Pregnancy-Related Deaths

Timing and Location of Pregnancy-Related Deaths

Distribution of Pregnancy-Related Deaths by Timing of Death, 2021-2023

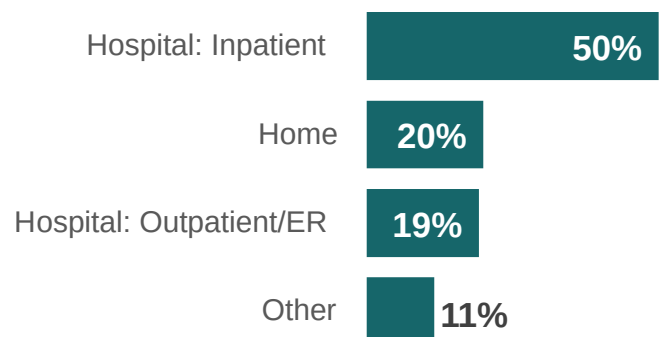


From 2021 to 2023, most pregnancy-related deaths occurred after delivery. More than one-third (36%) occurred 43 days to one year after the end of pregnancy. Less than one in five pregnancy-related deaths occurred during pregnancy.

- Hemorrhage and cardiovascular conditions were the leading causes of death during pregnancy and on the day of delivery.
- During the first 6 weeks following the end of pregnancy (1-42 days), COVID-19 was the leading cause of death, followed by cardiovascular conditions.
- Mental health conditions, including substance use disorder, were the leading cause of deaths that occurred 43 days to 1 year after the end of pregnancy, accounting for 54% of these deaths. Cardiovascular conditions followed with 21%.

Half of all pregnancy-related deaths in 2021-2023 took place in an inpatient hospital setting, where individuals receive overnight care. One in five deaths occurred at home, most of which (69%) occurred 43 days to one year after the end of pregnancy. Another 19% died in the emergency room. Mental health conditions, primarily substance use disorder, were the leading cause of deaths that occurred outside of a hospital, accounting for 68%. Among deaths that occurred in a hospital, infection, primarily COVID-19, and cardiovascular conditions were the leading causes.

Distribution of Pregnancy-Related Deaths by Place of Death, 2021-2023





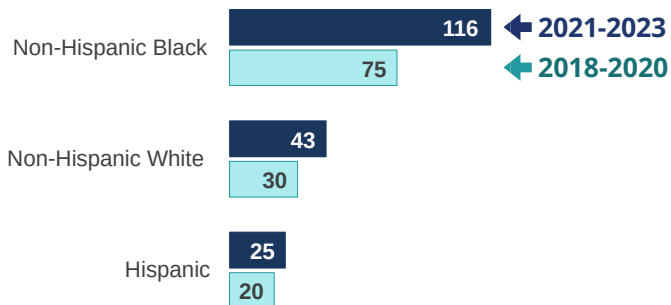
Pregnancy-Related Deaths

Racial and Ethnic Disparities

Non-Hispanic Black women experienced the highest burden of pregnancy-related mortality with a rate of 116 per 100,000 live births between 2021 and 2023. This was 2.7 times as high as the rate among non-Hispanic White women and 4.6 times as high as the rate among Hispanic women.

Pregnancy-Related Mortality Rate by Racial and Ethnic Group

*number of deaths per 100,000 live births

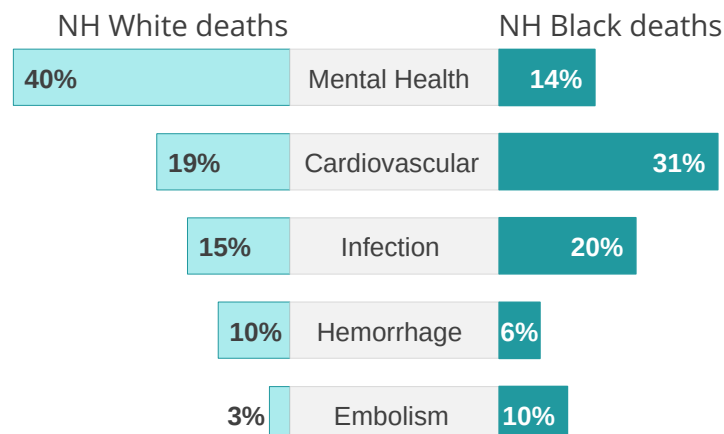


All racial and ethnic groups included in the chart to the left saw increases in their pregnancy-related mortality rates when comparing 2018-2020 to 2021-2023. However, non-Hispanic Black women experienced the largest increase between these two periods – their rate increased from 75 to 116 deaths per 100,000 live births, which is a 56% increase. The rate for non-Hispanic White and Hispanic women increased by 41% and 24%, respectively.

In addition to being the leading cause of pregnancy-related deaths overall, mental health conditions were also the leading cause among non-Hispanic White women, accounting for 40% of deaths. Among non-Hispanic Black women, however, cardiovascular conditions were the leading cause, accounting for 31% of deaths.

Deaths due to infection, which were primarily COVID-19-related, as well as deaths due to embolism, were more prevalent among deaths of non-Hispanic Black women compared to those of non-Hispanic White women, while deaths due to hemorrhage were more prevalent among deaths of non-Hispanic White women.

Distribution of Pregnancy-Related Deaths by Cause Among Non-Hispanic Black and Non-Hispanic White Women, 2021-2023





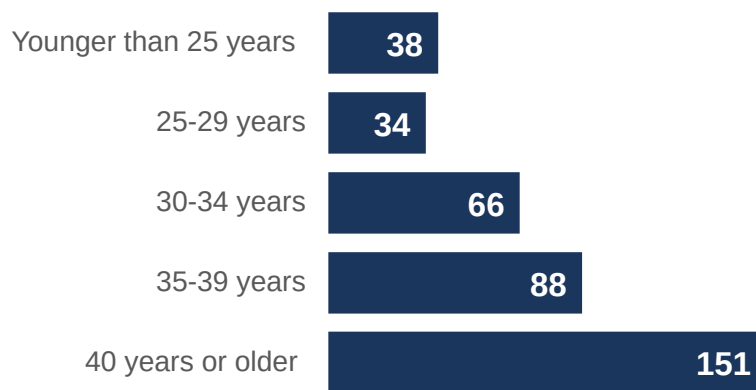
Pregnancy-Related Deaths

Age-Related Disparities

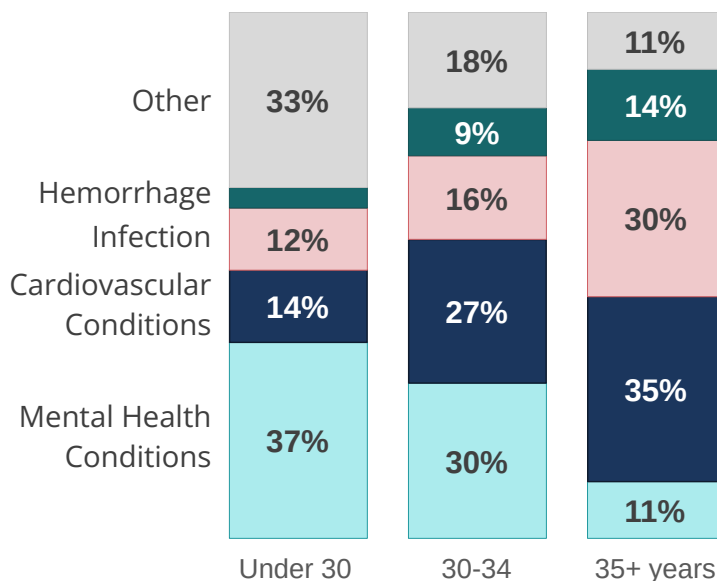
The risks of pregnancy-related complications or death increase with increasing maternal age. Women aged 40 years and older died of pregnancy-related causes at a rate over 4 times as high as those aged 25-29 years (the group with the lowest rate). This is due in part to the fact that older women are more likely to have pre-existing conditions or health problems. Those aged 40+ years account for 3% of live births and 8% of pregnancy-related deaths.

Pregnancy-Related Mortality Rate by Age Group, 2021-2023*

*number of deaths per 100,000 live births



Distribution of Leading Causes of Pregnancy-Related Deaths by Age Groups, 2021-2023



Causes of death varied greatly by age group. Younger women were far more likely to die from mental health conditions than older women. There was also a wider array of causes contributing to deaths in younger women, with one-third of causes being something other than mental health or cardiovascular conditions, infection, and hemorrhage. Women in their 30s and 40s were more likely to die from medical causes. Among women 35 and older, cardiovascular conditions accounted for more than a third of pregnancy-related deaths, and infection (primarily COVID-19) accounted for nearly a third.



Pregnancy-Related Deaths

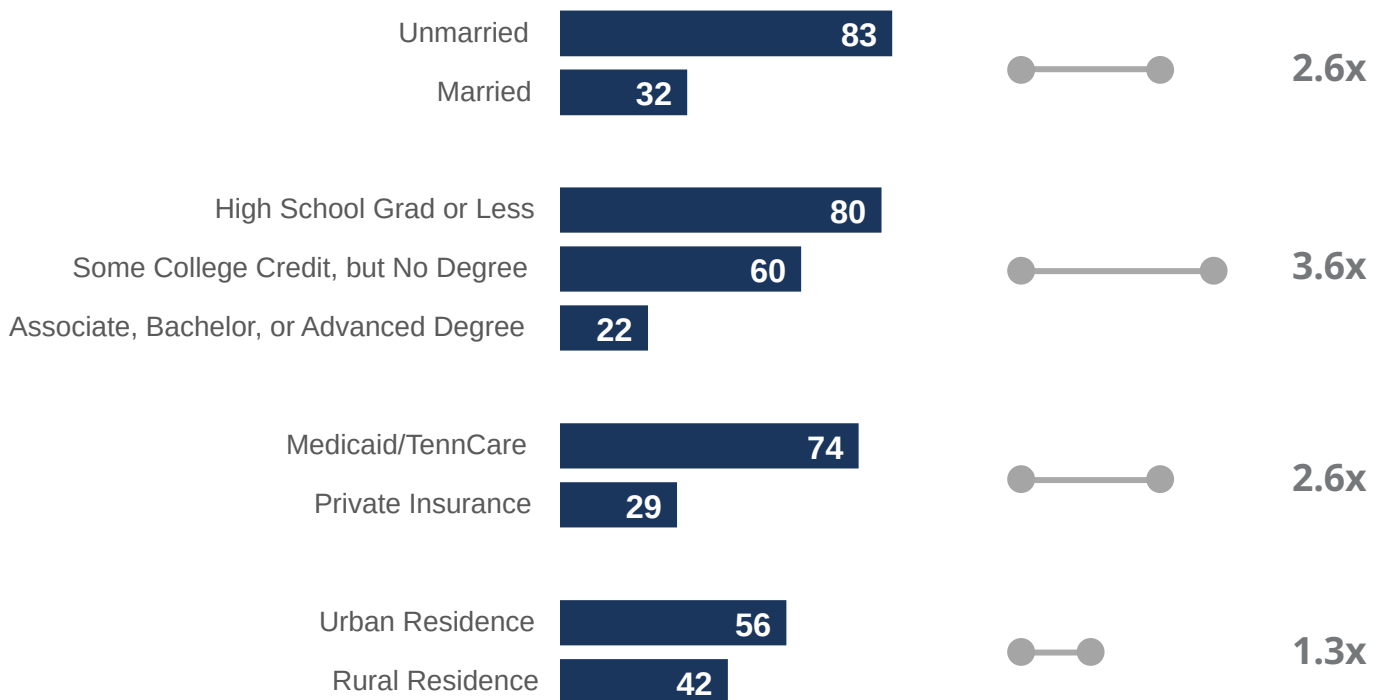
Disparities by Social Drivers of Health

Social drivers of health are the conditions in which people live, work, learn, play, and age.¹ They impact health risks and outcomes as well as functioning and quality of life. Socioeconomic factors like income and education level can tell us about the resources, access, and opportunities a person or group has.

Pregnancy-Related Mortality Rate by Select Social Drivers of Health, 2021-2023*

*number of deaths per 100,000 live births

Disparity between the highest and lowest rates for each factor



Those who were not married, those with less education, those with TennCare coverage, and those residing in urban areas experienced higher rates of pregnancy-related death compared to their counterparts. The largest disparity was among those with less education compared to those with degrees; the rate among those with a high school education level or lower was 3.6 times as high as the rate among those with a post-secondary degree. The rate among those living in urban areas was 1.3 times as high as those living in rural areas, which was the smallest disparity among these factors. This difference has increased since 2018-2020, when the urban rate was only 1.1 times as high as the rural rate.

1. Adapted from *Healthy People 2030*, US Dept. of Health and Human Services, Office of Disease Prevention and Health Promotion. Retrieved [13 Nov. 2024], from <https://odphp.health.gov/healthypeople/objectives-and-data/social-determinants-health>

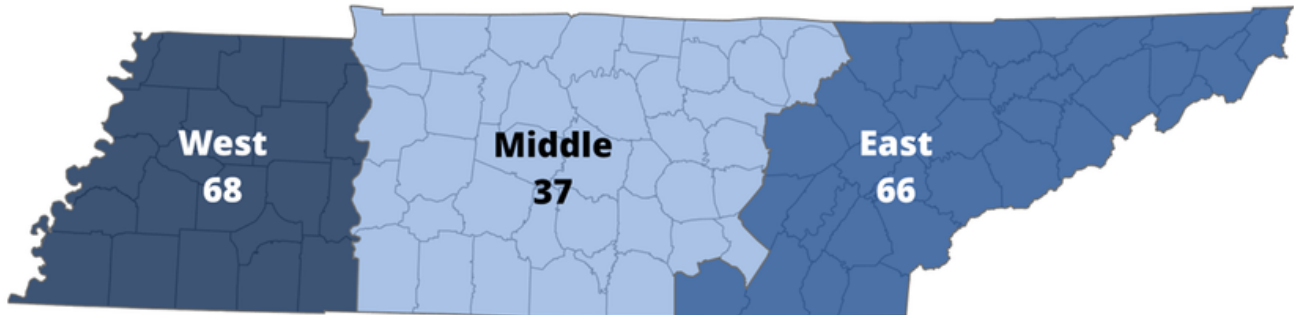


Pregnancy-Related Deaths

Geographic Disparities

Pregnancy-Related Mortality Rate by Tennessee Grand Division, 2021-2023*

*number of deaths per 100,000 live births

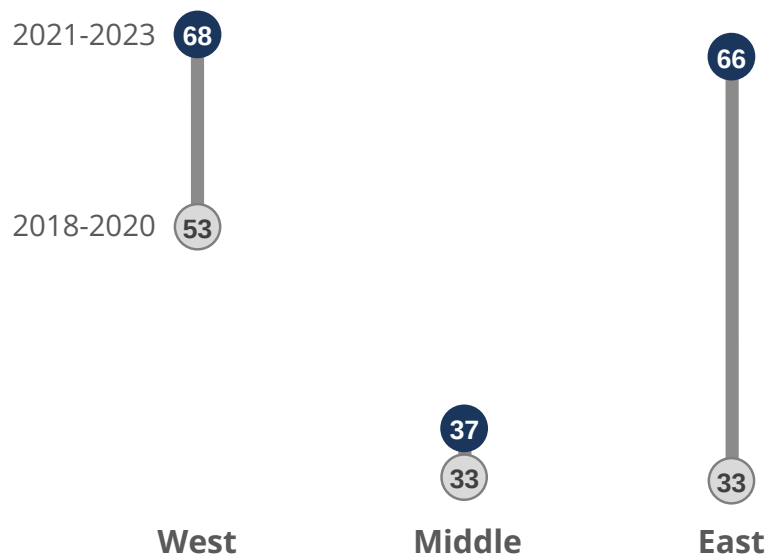


During 2021-2023, the West and East Grand Divisions had the highest rates of pregnancy-related mortality, with rates nearly twice as high as the Middle Grand Division. The West Grand Division had a rate of 68 deaths per 100,000 live births. Cardiovascular conditions were the leading cause of pregnancy-related mortality in the West, accounting for 38% of deaths. The East Grand Division followed very closely behind the West with a rate of 66 per 100,000 live births. Mental health conditions, primarily substance use disorder, were the leading cause in the East, accounting for 42% of deaths. Leading causes in Middle Tennessee, which had the lowest rate at 37 pregnancy-related deaths per 100,000 live births, were mental health conditions and infections – each accounted for 24% of deaths in the Middle Grand Division in 2021-2023.

The East Grand Division saw a 100% increase in 2021-2023 compared to 2018-2020, going from 33 deaths per 100,000 live births to 66. This is due in large part to an increase in substance use-related deaths, as well as changes in the criteria that the MMRC uses to determine pregnancy-relatedness for deaths due to unintentional overdose. The West Grand Division had a 28% increase in pregnancy-related mortality rate between 2018-2020 and 2021-2023, and Middle Tennessee had an 11% increase.

Change in Pregnancy-Related Mortality Rate by Grand Division between 2018-2020 and 2021-2023*

*number of deaths per 100,000 live births





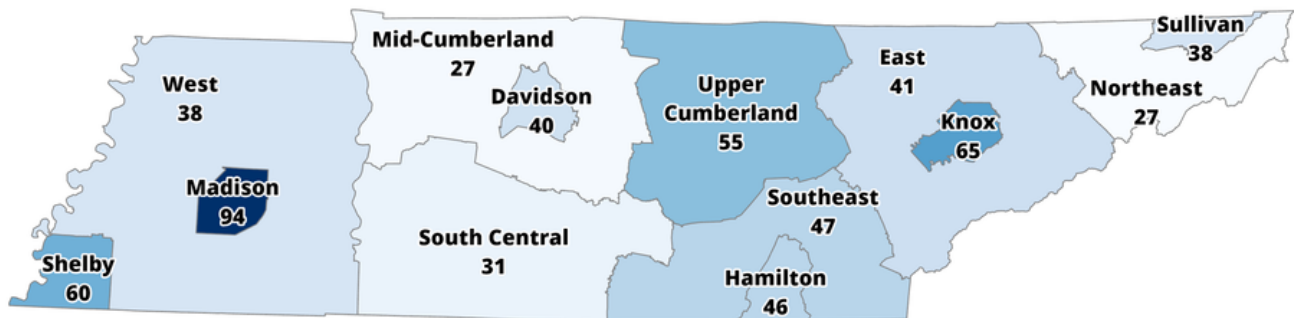
Pregnancy-Related Deaths

Geographic Disparities (continued)

The map below shows the pregnancy-related mortality rate per 100,000 live births by region for 2017 through 2023. Madison County had the highest rate at 94, followed by Knox at 65, and Shelby at 60. The Mid-Cumberland, Northeast, and South Central regions had the lowest rates at 27, 27, and 31, respectively. These data should be interpreted with caution because they are based on a small number of events, which can make them unstable and sensitive to small changes. This can make comparisons of rates over time or between communities challenging or misleading.

Pregnancy-Related Mortality Rate by Region, 2017-2023*

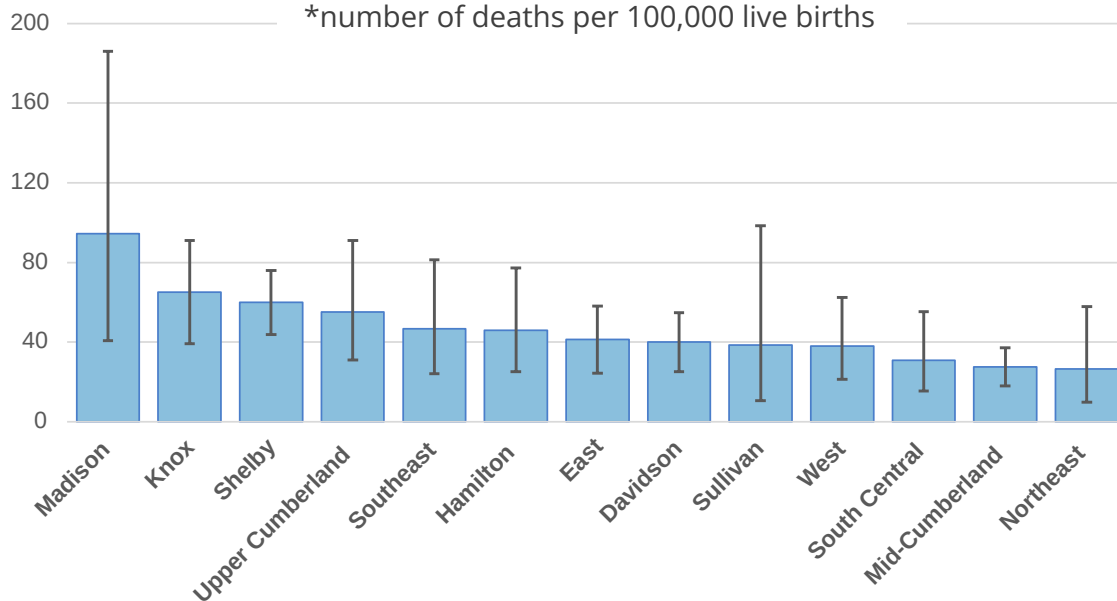
*number of deaths per 100,000 live births



One way to assess the precision of a rate is to examine the confidence interval around that rate, which shows the range of values we expect the true estimate to fall between. The wider the confidence interval, the less precise the rate. The chart below shows regional pregnancy-related mortality rates and their confidence intervals, represented by the vertical lines on each bar. Although Madison has the highest rate, it also has a wide confidence interval. In fact, most of the rates' confidence intervals overlap, meaning the differences between them are not statistically significant. Despite their limitations, these data can help communities identify areas of need. Also, assessing events that are less rare, such as severe maternal morbidity, can help us better contextualize these comparisons.

Pregnancy-Related Mortality Rate by Region, 2017-2023*

*number of deaths per 100,000 live births



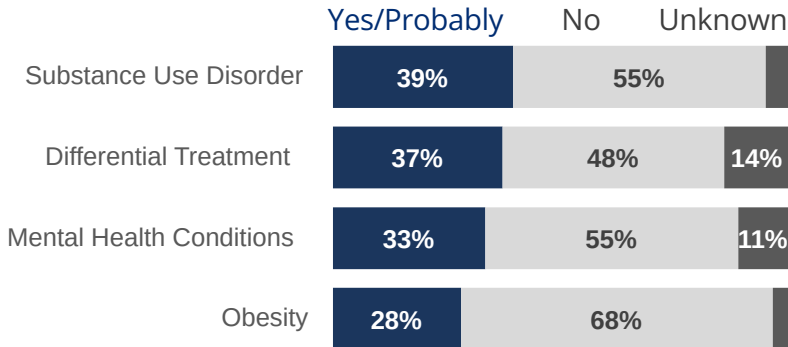


Pregnancy-Related Deaths

Circumstances Contributing to Pregnancy-Related Deaths

For every pregnancy-related death, the MMRC discusses and determines whether substance use disorder, mental health conditions other than substance use disorder, differential treatment, and obesity contributed to the death.

Circumstances Contributing to Pregnancy-Related Deaths, 2021-2023



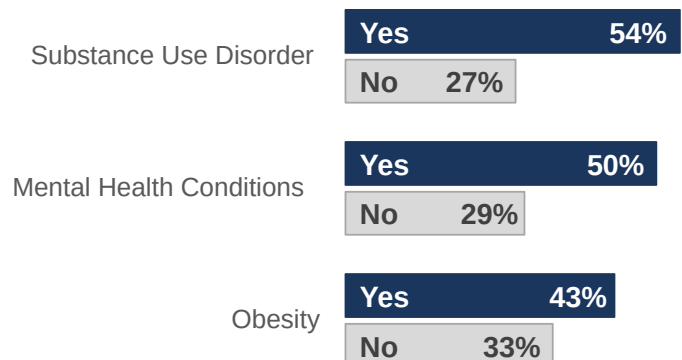
Substance use disorder and other mental health conditions were key contributing factors. This is consistent with these conditions also being leading causes of pregnancy-related deaths during 2021-2023. About 44% of pregnancy-related deaths had either substance use disorder or other mental health conditions as contributing circumstances, while 30% had both.

Substance use disorder as cause vs. contributor:

In all cases where the MMRC determines that substance use disorder (SUD) is involved, the committee evaluates if it is the cause of death or a contributing factor. SUD can contribute to other causes of death without being the main cause. For example, if a person dies by suicide and the MMRC determines the cause of death to be depression, if they also had co-occurring SUD, the MMRC may determine that the substance use exacerbated their depression, contributing to their death. In 2021-2023, substance use disorder was the cause of death in 22% of cases and contributed to an additional 17% of pregnancy-related deaths.

Differential treatment contributed to the death in 37% of pregnancy-related deaths. Differential treatment was most often race-based, but was also more common among those with substance use disorder, other mental health conditions, or larger body size.

Percentage of Deaths in which Differential Treatment Contributed Among Those With and Without Co-Contributing Factors, 2021-2023*



*Yes and Probably determinations were grouped together for all factors.



COMMITTEE RECOMMENDATIONS



Preventability

Preventability and Contributing Factors of Pregnancy-Related Deaths

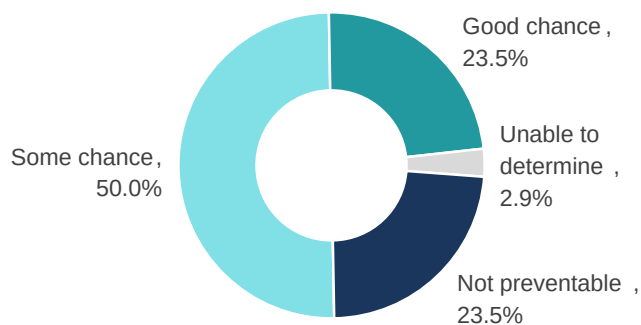
The MMRC considers a death preventable if it determines that there was *at least some chance* of the death being averted by one or more reasonable changes to patient, family, provider, facility, system, and/or community factors.

In 2023, there were 34 pregnancy-related deaths. Half were found to have some chance of being prevented, and 23.5% were found to have a good chance, resulting in a total of 73.5% of deaths deemed preventable. Another 23.5% of deaths were found not preventable, and the MMRC could not determine preventability for the remaining 3% (n=1).

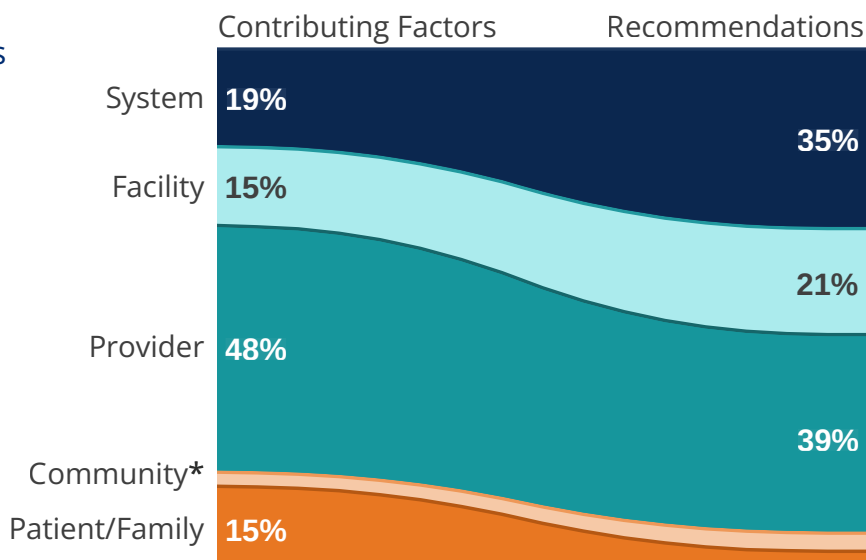
In reviewing pregnancy-related deaths, the MMRC identifies factors that contributed to or impacted outcomes. These factors span various levels, including system, facility, provider, community, and patient/family.

The MMRC is committed to making actionable upstream recommendations to address root causes. Although about half of the contributing factors occurred at the provider level, just 39% of recommendations focused on provider-level changes. On the other hand, the facility and system levels accounted for just 34% of the contributing factors but made up 56% of recommendations.

Likelihood of Preventability among Pregnancy-Related Deaths, 2023



Distribution of Contributing Factors and Recommendations by Level, 2023



*The Community level represents 3% of contributing factors and 4% of recommendations



Opportunities for Prevention

The Maternal Mortality Review Committee identified several common contributing factors of maternal deaths occurring in 2023, highlighting key opportunities for prevention. The most frequently cited factors included:

» Clinical Recognition and Management

Missed recognition of key risk factors, including preeclampsia and hypertensive disorders. Delays or gaps in evidence-based care, such as magnesium sulfate administration, seizure management, dialysis, or induction of labor. Inconsistent or absent protocols for hypertension, obstetric emergencies, imaging, and blood bank resources, along with missed specialty consultations and limited access to autopsies, further hindered understanding and prevention of these deaths.

» Preventive and Risk Reduction Strategies

Missed use of low-dose aspirin for patients at risk for preeclampsia and limited counseling on pregnancy risks related to chronic disease. Gaps in interconception care, such as cardiovascular risk counseling and follow-up after adverse pregnancy outcomes.

» Mental and Behavioral Health

Limited mental health screening and follow-up led to missed identification and treatment of perinatal mood and anxiety disorders. Intimate partner violence was often unassessed or inadequately addressed, and patients with psychiatric, substance use, or social challenges frequently lacked coordinated care.

» Substance Use and Harm Reduction

Missed opportunities for timely intervention for patients with substance use. The underlying causes and co-occurring conditions were often unaddressed, harm reduction strategies were inconsistently applied, and access to rehabilitation and community support was limited.

» Social Determinants and Structural Barriers

Housing instability, childcare needs, incarceration, and limited social support often disrupted maternal care. Fear of punitive policies, language and cultural barriers, bias, and inconsistent community resources further contributed to gaps in care and follow-up.

» Patient Engagement and Communication

Patient concerns were sometimes overlooked, and education on care plans, medications, and disease severity was inadequate. Some left against medical advice, and discussions about pregnancy options and family involvement were often missed.

» Systems and Program-Level

System-level barriers hindered prevention, including poor coordination with child welfare, gaps in care transitions, and inadequate follow-up for patients with chronic disease. The Maternal Mortality Review process was hindered by inadequate funding for family interviews and a limited number of autopsies.

The Maternal Mortality Review Committee developed over 100 specific, actionable recommendations to prevent similar outcomes. Recommendations centered around six key strategies: strengthening systems and programs, improving cardiovascular health, enhancing emergency obstetric care, advancing mental health and harm reduction, chronic disease and reproductive health, and addressing social and access-related barriers to care.



Recommendations

STRATEGY 1 Systems and Program Level

To optimize maternal outcomes through policies, protocols, and infrastructure within healthcare systems, payors, and public health systems.

- » **Tennessee** should provide appropriate funding for the Maternal Mortality Review team to conduct key informant interviews of family and friends as part of the review process, especially in cases of intimate partner violence (IPV), where this is the best practice for identifying recommendations to mitigate IPV-related deaths.
- » **Tennessee** should provide funding to facilitate ongoing provider training on maternal urgent warning signs and effective patient communication, such as the CDC's 'Hear Her' campaign or implicit bias training, to ensure that patient concerns are heard and validated.
- » **Tennessee** should allocate funding to the state medical examiner's office to ensure autopsies are completed for all deaths during pregnancy and up to one year postpartum.
- » **Insurance Providers** should improve the Pregnancy Care Management System by increasing provider awareness, standardizing referrals, and automatically referring patients who receive presumptive eligibility.
- » **Insurance Providers** should implement multi-modal education and support strategies for providers to improve knowledge of Medicaid formulary coverage and pharmacy processes.
- » **Child Welfare Systems** should include opportunities for pregnant and postpartum women with substance use disorder to complete a treatment plan that supports visitation and potential return of custody into a safe, drug-free environment.
- » **Jail Systems** should provide continuity of prenatal care and referrals during incarceration and upon release.
- » **Hospital Systems** should participate in Perinatal Quality Collaborative (PQC) initiatives and ongoing quality improvement projects.
- » **Hospital Systems** should implement evidence-based interventions to improve birth safety by enhancing shared decision-making between providers and patients and strengthening communication within the birth team.
- » **Hospital Systems** should provide clinicians with recurring training on labor management, including indications for induction of labor, the importance of active labor management, and how to incorporate risk reduction strategies into clinical decision-making.
- » **Forensic Pathologists** should complete an examination of the deep veins of the lower extremities to identify any embolic source when a pulmonary embolism is discovered at autopsy.



Recommendations

STRATEGY 2 Management of Hypertensive and Cardiovascular Diseases of Pregnancy

To improve the recognition, monitoring, and management of hypertensive and cardiovascular complications during pregnancy, labor, and postpartum. These strategies ensure timely interventions for high-risk conditions, appropriate medication use, and support for clinicians to provide evidence-based care.

- » **Hospital Systems** should implement universal screening for cardiovascular conditions in pregnancy and postpartum and provide appropriate referrals to specialist care, including cardiology consultation.
- » **Providers** should closely monitor patients with risk factors for signs and symptoms of preeclampsia and manage hypertensive disorders of pregnancy in accordance with current clinical guidelines, including recommendations from the American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine (SMFM) for the management of acute severe hypertension.
- » **Providers** should be aware of the link between cardiovascular disease and hypertensive disorders during pregnancy and to counsel patients during prenatal and postpartum visits on the importance of long-term follow-up for cardiovascular health.
- » **Providers** should be aware of the American College of Obstetricians and Gynecologists (ACOG) guidelines recommending the initiation of low-dose aspirin in patients at risk for preeclampsia between 12 and 28 weeks of gestation.
- » **Providers** should assess cardiac risk factors, contraindications, and the potential for adverse cardiac outcomes when selecting medications for pregnant and postpartum women, particularly those with underlying or suspected cardiovascular conditions such as cardiomyopathy, hypertensive disorders, and follow evidence-based management guidelines.
- » **Providers** should be aware of the signs and symptoms of peripartum cardiomyopathy and be equipped with the knowledge to diagnose and refer for specialized management and follow-up, when necessary.
- » **Providers** should ensure that all antepartum women admitted to the hospital receive deep vein thrombosis prophylaxis.
- » **Providers** should evaluate all patients who experience adverse pregnancy outcomes (APOs) during the postpartum period for cardiovascular disease (CVD) risk identification, in accordance with ACOG and American Heart Association (AHA) guidelines.



Recommendations

STRATEGY 3 Optimizing Obstetric Emergency Care

To improve outcomes in obstetric emergency care through enhanced awareness, knowledge, and process improvement.

- » **Tennessee** should provide funding for ongoing training for providers on recognition and management of obstetric emergency conditions.
- » **Hospital Associations** should collaborate with hospital administrators to evaluate the impact of restrictive neuroimaging policies during pregnancy.
- » **Hospital Systems** should regularly assess the impact of restrictive hospital policies on limiting neuroimaging during pregnancy and evaluate how these policies affect the quality and timeliness of maternal care.
- » **Hospital Systems** should have protocols/policies in place that flag delayed specialty consultations for patients with serious or potentially critical conditions during pregnancy or the immediate postpartum period.
- » **Hospital Systems** should develop and maintain an appropriate airway management algorithm tailored to the level of care it provides, ensuring it is readily accessible and reviewed regularly.
- » **Hospital Systems and Providers** should be fully aware of the available resources, including blood banking and transfusion capabilities, prior to performing procedures to inform clinical decision-making regarding surgical approach and technique.
- » **Providers** should have knowledge of red flag warning signs in the evaluation of headaches that necessitate a wider differential diagnosis and thorough evaluation.
- » **Providers** should order necessary imaging studies to assess a patient when warranted, regardless of pregnancy status.
- » **Providers** should receive ongoing education on the varying presentations of microangiopathic hemolytic anemias in pregnancy, including Acute Fatty Liver of Pregnancy (AFLP), Hemolysis, Elevated Liver enzymes, Low Platelets (HELLP), Thrombotic Thrombocytopenic Purpura (TTP), and Hemolytic Uremic Syndrome (HUS), and consider differential diagnoses and alternative treatments.
- » **Providers** of emergency medicine should be educated on the appropriate standards and dosages for using anti-seizure medications in pregnant women, particularly when managing eclampsia or other seizure-related complications in emergency settings.
- » **Providers** should closely monitor seizure medication levels and consider the use of spot electroencephalogram (EEGs) when indicated, particularly during periods of suspected seizure activity or changes in neurological status, to assess seizure irritability and ensure adequate seizure control in pregnancy.



Recommendations

STRATEGY 4 Mental Health, Substance Use, and Harm Reduction

To improve the identification, assessment, and management of mental health conditions, substance use, and psychosocial stressors during pregnancy and postpartum. These strategies include screenings, referrals, evidence-based treatment, trauma-informed care, and harm reduction initiatives.

- » **Tennessee** should increase provider awareness of the availability of intensive outpatient programs (IOPs) for patients with mental health conditions needing more support than traditional outpatient therapy.
- » **Tennessee** should invest in education to de-stigmatize mental health and substance use disorder (SUD) during pregnancy and consider adopting non-punitive, evidence-based approaches for pregnant women engaged in standard of care treatment for SUD.
- » **Tennessee** should provide funding to support the development of a perinatal psychiatry fellowship to expand the perinatal psychiatry workforce.
- » **Hospital Systems** should offer pregnant women with mental health conditions a case manager, therapy services, and psychiatric services when identified.
- » **Hospital Systems** should offer inpatient therapy for pregnant women with a history of substance use disorder for conversion to Medication Assisted Treatment (MAT).
- » **Hospital Systems** should ensure that patients who exhibit signs of lacking capacity for medical decision-making should be evaluated by the appropriate team to determine capacity.
- » **Hospital Systems** should ensure that any patient who screens with an Edinburgh Postnatal Depression Scale (EPDS) score above 13 during postpartum care is provided with appropriate follow-up, including referral to mental health evaluation/treatment.
- » **Hospital Systems** should implement policies and training programs on trauma-informed care practices.
- » **Hospital Systems** should implement policies for universal naloxone distribution and education to pregnant and postpartum women prior to hospital discharge.
- » **Rehabilitation Facilities** should educate the patient's family on proper naloxone use at discharge and on recognizing signs of relapse or intoxication.
- » **Prevention Coalitions** should educate the public on prevention and harm reduction strategies, including the use of naloxone and safe-use practices.

Recommendations

STRATEGY 4 Mental Health, Substance Use, and Harm Reduction

(Continued)

- » **Providers** should receive training in trauma-informed care and culturally congruent care during onboarding and ongoing professional development.
- » **Providers** should conduct mental health evaluations for all pregnant and postpartum women, beginning at the first prenatal visit and continuing through the postpartum period, with attention to individuals with chronic disease or substance use disorder.
- » **Providers** should provide a referral to an outpatient psychiatric provider prior to discharge of all patients hospitalized, during which a psychotropic medication is initiated to ensure continuity of care.
- » **Providers** should conduct comprehensive pain assessments and evaluate for opioid misuse in patients with chronic pain conditions.
- » **Providers of Medication-Assisted Treatment (MAT)** should adequately screen all patients for co-occurring mental health disorders at the time of intake and refer patients on MAT with continued positive Urine Drug Screen (UDS) for illicit substances to a higher level of care.





Recommendations

STRATEGY 5 Chronic Disease, Interconception Care, and Reproductive Health

To reduce risks and optimize outcomes by focusing on preconception, interconception, and pregnancy planning.

- » **Tennessee** should explore strategies to reduce barriers to desired postpartum sterilization caused by the federal 30-day consent requirement, including improving early prenatal counseling, enhancing patient education and documentation processes, and identifying feasible, legally compliant funding or care pathways to utilize state funding when possible.
- » **Hospital Systems** should provide care coordination services to all pregnant women with chronic disease to ensure timely follow-up throughout pregnancy and the postpartum period.
- » **Providers** should educate patients with high-risk preexisting conditions that are contraindications to pregnancy and refer to maternal-fetal medicine (MFM) specialists.
- » **Providers** should counsel all patients with chronic medical conditions about the risks of pregnancy with their condition(s) and provide contraception options during routine and follow-up visits, as well as before initiating or changing treatment.
- » **Providers** should deliver comprehensive preconception counseling, including education on modifiable risk factors and comorbidities.
- » **Providers** should counsel patients of childbearing age during routine visits about family planning, including Long-Acting Reversible Contraception (LARC) methods.
- » **Providers** should screen all patients with gestational diabetes for underlying type 2 diabetes during the postpartum period.
- » **Providers** should conduct appropriate assessments in all patients with a stillbirth, including evaluation for antiphospholipid antibody syndrome when indicated.
- » **Patients**, particularly those with pre-existing medical conditions, are encouraged to begin and maintain regular prenatal care throughout pregnancy to support their own health and the health of their baby.
- » **Patients** should see their healthcare provider during the interconception period for post-pregnancy counseling and contraception management.



Recommendations

STRATEGY 6 Social Drivers and Access to Care

To improve outcomes by addressing social, economic, and structural factors impacting maternal health, including housing, childcare, social support, and access to resources.

- » **Hospital Systems** should offer pregnant women opportunities for prenatal care as early as possible in pregnancy and provide care coordination for services throughout the prenatal and postpartum periods.
- » **Hospital Systems** should provide social support services that assist patients with sustainable emergency plans during pregnancy and postpartum and establish patient-centered processes to support individuals who feel overwhelmed when accessing care.
- » **Insurance Providers** should offer vouchers for childcare coverage to allow patients to attend healthcare appointments during pregnancy and postpartum.
- » **Insurance Providers** should provide consistent care management and timely follow-up for pregnant women who experience lapses in prenatal care, particularly during critical periods such as the first trimester and late pregnancy.
- » **Providers** should assess all pregnant and postpartum women's housing stability and social support and connect patients to available resources.
- » **Providers** should implement care coordination strategies during pregnancy and the postpartum period to support patient adherence to recommended care and follow-up.
- » **Providers** should offer telehealth appointments, when appropriate, as an alternative means of providing care during pregnancy and the postpartum period.
- » **Providers** should assess for limitations that may affect patients' ability to access or engage in care and provide appropriate services or accommodations at each stage of care.
- » **Providers** caring for patients with advanced kidney disease should initiate culturally responsive counseling and shared decision-making conversations about dialysis early in the disease course, with ongoing discussions at each stage of care, to build trust and address concerns related to the medical system.
- » **Communities** should partner with healthcare systems to promote connection to care during pregnancy and provide accessible resources.



RECOMMENDATIONS INTO ACTION





Maternal Health in Action

Strategic Initiatives

» Tennessee's Maternal Health Strategic Plan

In 2025, Tennessee launched its first Maternal Health Strategic Plan (MHSP), a comprehensive framework to guide statewide efforts in improving maternal health outcomes. The plan outlines a comprehensive set of goals, strategies, and objectives that seek to build on existing partnerships and strengths while addressing current challenges and gaps to improve maternal health statewide. The MHSP is anchored by four key focus areas: improve access to quality care, strengthen maternal health systems, strengthen maternal health workforce, and address key influences on maternal health.

[Maternal Health Strategic Plan](#)



To implement the MHSP, the department has reorganized its Maternal Health Task Force (MHTF) into subcommittees that are aligned with the four focus areas of the strategic plan. Subcommittees have selected strategies to implement in the first year of the strategic plan. This work aligns with MMRC's objectives to implement evidence-based interventions and policies that protect and promote the health of all pregnant and postpartum individuals across Tennessee.

» Launch of Tennessee's Severe Maternal Morbidity Report

In 2025, Tennessee published its Severe Maternal Morbidity (SMM) Report to systematically track and analyze life-threatening complications during pregnancy and childbirth. This report uses hospital discharge data and other data sources to identify cases of severe maternal complications, providing a foundation for targeted prevention strategies.

The SMM report helps the state monitor trends, identify risk factors, and inform quality improvement efforts across hospitals and birthing centers. By translating these data into actionable insights, the initiative aligns with MMRC goals to prevent maternal morbidity and mortality and improve maternal health outcomes statewide.

[SMM Report](#)





Maternal Health in Action

Statewide

» Strengthening Postpartum Education

In 2024, the Maternal Mortality Review Committee identified the need for additional community education about maternal mortality and early warning signs and featured the committee's recommendation in the 2024 annual report.

The Tennessee General Assembly responded by passing 2025 Public Chapter 99 to improve maternal health education and awareness of post-birth warning signs. Beginning July 1, 2025, all hospitals and birthing centers that provide labor and delivery services are required to give mothers and their caregivers or family members information about post-birth warning signs, including symptoms and available resources, prior to discharge following a birth.

[Public Chapter 99](#)



[Urgent Maternal Warning Signs](#)



The Tennessee Department of Health published information on the department's website about Urgent Maternal Warning Signs. Additionally, TDH hosted a webinar to raise awareness about the new legislation, share available resources, and help prepare facilities for educating their patients prior to discharge. TDH's Maternal Health Innovation program developed an Urgent Maternal Warning Sign flyer and magnet, which were distributed to hospitals, birth centers, and OB practices to improve awareness about the warning signs.

» Expanding Maternal Health Screening

In 2025, the Tennessee General Assembly enacted 2025 Public Chapter 46, expanding infectious disease screening in pregnancy. This legislation ensures that all pregnant women receive timely testing for syphilis, rubella immunity, hepatitis B, and hepatitis C early in pregnancy, with automatic reflex testing for HCV RNA when indicated.

[Public Chapter 46](#)



The law also requires repeat syphilis testing between 28–32 weeks of gestation and again at delivery, along with mandatory reporting of positive results to local health departments. Screening at additional time points in pregnancy provides additional opportunities for diagnosis and treatment to decrease the risk of transmission to the baby.



Maternal Health in Action

Statewide

» Expanding Access to Immediate Postpartum Contraception

In 2024, MMRC recommended that the Department of Health initiate an educational campaign to raise awareness about long-acting reversible contraception (LARC).

In 2025, the Department of Health partnered with TennCare and the American College of Obstetricians and Gynecologists to host a webinar series on immediate postpartum (IPP) contraception, providing technical assistance to delivery hospitals and birth centers to expand access to IPP LARC for patients who desire this immediate contraceptive option following delivery. This series had 120 providers in attendance, supporting increased provider knowledge and capacity to offer IPP contraception following delivery.

» Launching a Closed-Loop Referral System

In 2024, MMRC encouraged health systems to provide closed-loop referrals to community support services, including housing, transportation, and childcare, as necessary to reduce disparities due to social drivers of health.

[Tennessee
Community Compass](#)



TennCare launched Tennessee Community Compass, a statewide Closed Loop Referral System (CLRS) powered by Findhelp. The platform connects TennCare members to community-based resources addressing Health-Related Social Needs (HRSN) such as housing, transportation, and childcare. Key components include an embedded HRSN assessment within provider systems, a public community resource directory, referral and tracking capabilities for community-based organizations, and data collection to measure outcomes.





Maternal Health in Action

Statewide

» Tennessee Initiative Perinatal Quality Care

TIPQC, established in 2008 through a grant from the Governor's Office, is Tennessee's statewide collaborative for perinatal quality improvement. TIPQC brings together hospitals, healthcare providers, payers, families, and communities to drive meaningful change, promote health equity, and enhance the quality of care for Tennessee families throughout pregnancy, delivery, and the postpartum period.

TIPQC

TIPQC continues to advance maternal health across Tennessee through collaborative, evidence-based quality improvement initiatives.



- **The Cardiac Conditions in Obstetric Care (CCOC)** initiative focuses on improving the detection, management, and outcomes of cardiac conditions, one of the leading causes of preventable pregnancy-related deaths. Fifteen hospitals are currently implementing cardiac screening, with the goal of expanding to 90% of obstetric hospitals by June 2026.
- **Best for All Learning Collaborative**, involves 23 hospital teams working to enhance respectful, equitable, and patient-centered care through standardized screening, policy development, and improved patient satisfaction.

Supporting Initiatives

- The Blood Pressure Cuff Kit Initiative has distributed 4,770 cuff kits to patients through hospitals and doulas, to enable remote monitoring for at-risk patients.
- The Post-Birth Warning Signs Education program has trained 46 hospitals and distributed nearly 278,000 magnets to raise awareness of urgent maternal warning signs.
- Ongoing statewide simulation trainings, including the use of MamaNatalie® Birthing Simulators, continue to enhance real-life provider response skills. Throughout the four training sessions, TIPQC trained 78 healthcare professionals from 35 different organizations and hospitals across the state.
- Doula education and support efforts included regional trainings on hypertension, preeclampsia, and trauma-informed care. During the five training sessions, TIPQC provided education to 42 healthcare professionals from 31 different organizations and hospitals throughout the state.



Maternal Health in Action

Statewide

» Tennessee Hospital Association

Founded in 1938, the Tennessee Hospital Association (THA) is a nonprofit membership organization that supports and advocates for hospitals, health systems, and other healthcare organizations across Tennessee.

Sepsis Awareness Education

- THA has highlighted the impact of sepsis on maternal mortality during its virtual sepsis collaborative meetings by sharing real-world stories featured in the media. The sepsis collaborative includes more than 170 hospital and health system staff, representing 90 hospitals and systems across the state.

2025 Sepsis Bootcamp

- In 2025, THA hosted a two-day Sepsis Bootcamp that included a presentation on maternal sepsis by Dr. Dexter Reneer, Maternal-Fetal Medicine specialist. Dr. Reneer's session addressed symptoms and care considerations for pregnant and postpartum women presenting with or developing sepsis, and concluded with two illustrative case studies, one survival and one fatality, to underscore the importance of early recognition and intervention.
- During the Bootcamp, Sepsis Alliance posters, including Pregnancy, Childbirth, and Sepsis, were distributed to all 107 attendees to support continued education and awareness within their facilities.

THA



Maternal Mortality Reduction Project

Tennessee Department of Health provided grant funding for THA to conduct a Maternal Mortality Reduction Project. The project provided education and training to the emergency department staff of 20 non-delivering hospitals on important obstetric conditions. Staff were trained on the identification and management of preeclampsia/eclampsia and postpartum hemorrhage. Additionally, staff were educated about screening for substance use disorder, mental health conditions, and intimate partner violence. This initiative included distribution of educational materials for clinical staff, patients, family, and community members. To increase awareness of the importance of obstetric education of non-delivery hospital staff, THA staff shared information on the TIPQC Healthy Mom Health Baby podcast, and through targeted outreach.

TIPQC Podcast



Contact Us

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<https://www.tn.gov/health/health-program-areas/fhw/maternal-mortality-review.html>

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More on Maternal Health in Tennessee

For other projects, success stories, and resources, visit Tennessee Department of Health's [Maternal Mortality Review page](#).

Scan QR code below for a list
of maternal health resources:



Dept. of Health Authorization #N43JF3-1,
Electronic only, December 10, 2025.
This public document was promulgated at zero cost.

