A MULTI-YEAR LOOK AT MATERNAL MORTALITY:

2019-2023 Pregnancy-Associated Mortality Review
Published 2026

MISSOURI DEPARTMENT OF HEALTH & SENIOR SERVICES

Pregnancy-Associated Mortality Review

Acknowledgments

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Suggested Citation: Missouri Pregnancy Associated Mortality Review 2019-2023 Annual Report. Missouri Department of Health and Senior Services. (June 2026).

Funding: This work has been supported by the Enhancing Reviews and Surveillance to Eliminate Maternal Mortality Grant through the United States Centers for Disease Control and Prevention (CDC) under the terms of cooperative agreement number: DP240053.

A Note from the Authors

The Missouri Department of Health and Senior Services (DHSS) and the Pregnancy-Associated Mortality Review (PAMR) Board want to send their deepest condolences to the families and friends of the 340 women who passed away while pregnant or within a year after their pregnancy from 2019 to 2023. We dedicate this report to the memory of these women and will keep working to prevent such losses in the future. To protect the privacy of these women and follow legal rules, we do not share detailed case counts for any category with five deaths or fewer. DHSS also thanks the PAMR Board for their hard work in reviewing each pregnancy-associated death. We appreciate our partners who are helping to implement recommendations to reduce maternal mortality in Missouri. More data is available on the PAMR data dashboard or by visiting Health.Mo.Gov/PAMR. A glossary of terms is also available. If additional information is needed, please follow DHSS' data request process.

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Executive Summary

Each year, the Department of Health and Senior Services (DHSS) reviews the deaths of women in Missouri who were pregnant or had been pregnant within the past year. DHSS gathered information about these pregnancies and deaths to share with the Pregnancy Associated Mortality Review (PAMR) Board. Each case was then carefully studied by the board to learn more about maternal mortality in Missouri. This report shares the board's findings and recommendations, providing stakeholders with actionable insights.

Key Findings

On average, 68 women in Missouri died while they were pregnant or within one year after their pregnancy each year from 2019 to 2023. The most deaths happened in 2020, with a total of 85 deaths recorded that year.

From 2019-2023 (340 deaths total):

- The pregnancy-related mortality ratio (PRMR) was 31.2 deaths per 100,000 live births.
- The PRMR for Black women was 61.9 deaths per 100,000 live births, 2.5 times the PRMR for white women at 25.0 deaths per 100,000 live births. These rates are similar to the 2024 and 2025 reports.
- The PRMR for Medicaid enrollees was 2.9 times the ratio of those with private insurance.
- The PAMR Board determined that 79 percent of pregnancy-related deaths were preventable. This is very similar to the rate in previous reports.
- The top three leading causes of death did not change. The leading causes of pregnancy-related death were cardiovascular diseases, mental health conditions and infection.
- The PAMR Board determined that all pregnancy-related deaths due to mental health conditions, including substance use disorder (SUD), were preventable.

Key Recommendations

The PAMR Board reviewed cases from 2019 to 2023 and grouped its recommendations for preventing maternal mortality into three categories:

- Recommendations that are new and/or those that have not been started;
- Recommendations that are currently being implemented;
- Recommendations that have been completed and should be maintained to continue progress.

Recommendations to Start Implementing

Local housing authorities should:

- Implement systemwide policies that prioritize housing for pregnant and postpartum women.

Government agencies, in partnership with financial institutions and philanthropic funders, should:

- Invest in urban infrastructure (grocery stores, medical care access, banks and playgrounds) to increase avenues for fostering healthy interpersonal and family relationships with a goal of reducing violence and improving maternal health.

State agencies, in partnership with community-based organizations, should:

- Implement community violence intervention (CVI) programs with a focus on reducing homicides among pregnant and postpartum women.

Recommendations Currently Being Implemented

All healthcare providers should:

- Implement SBIRT (Screening, Brief Intervention, and Referral to Treatment) for mental health concerns like depression, anxiety and SUD at the initial visit, later in pregnancy, postpartum, and as indicated.
- Collaborate with community-based organizations to educate women of childbearing age about preconception health and contraception options to optimize a woman's health prior to pregnancy.
- Educate high-risk patients and women with chronic health conditions on health risks and refer to specialty providers, when appropriate.

Healthcare facilities should:

- Utilize social workers, community health workers, peer support specialists or recovery coaches and doulas during pregnancy and postpartum, to increase continuity of care for referrals, care coordination, communication and addressing social determinants of health.

- Standardize practices and procedures across the healthcare system by utilizing quality improvement tools such as the Alliance for Innovation on Maternal Health (AIM) patient safety bundles. Specifically:
    - Cardiac Conditions in Obstetrics Care;
    - Severe Hypertension in Pregnancy;
    - Perinatal Mental Health Conditions;
    - Obstetric Hemorrhage;
    - Care for Pregnant and Postpartum People with Substance Use Disorder.
- Establish policies and procedures to assess risk factors and need for transfer to a higher level of care at every encounter.

Community-based organizations (CBOs) should:

- Collaborate with healthcare facilities and providers to reduce stigma surrounding maternal mental health and SUD and provide assistance with resources for these conditions.
- Collaborate with healthcare facilities and providers to educate their community on intimate partner violence (IPV) and provide resources and assistance for those affected by IPV.

Insurance companies, including MO HealthNet, should:

- Ensure pregnant women understand their insurance benefits.
- Ensure equal reimbursement for psychiatric services to allow insurance coverage regardless of ability to pay.
- Fully cover inpatient substance use treatment/titration for perinatal patients.
- Fully reimburse nurse home visits and home monitoring equipment, such as blood pressure cuffs.

Coroners and medical examiners should:

- Perform autopsies on women who were pregnant at the time of death or within the last year.

Maintain Progress with Fully Implemented Recommendations

The Missouri Legislature should continue to:

- Provide funding for the statewide Perinatal Quality Collaborative (PQC).
- Fund the statewide Maternal Health Access Project (MHAP) to aid healthcare providers in providing evidence-based mental healthcare, including SUD treatment, to Missouri women.
- Extend Medicaid coverage to one year postpartum for all conditions (including medical, mental health and SUD), even if the woman did not

start treatment before delivery, to aid women whose condition is exacerbated in the postpartum period.
- Fund Medicaid expansion.

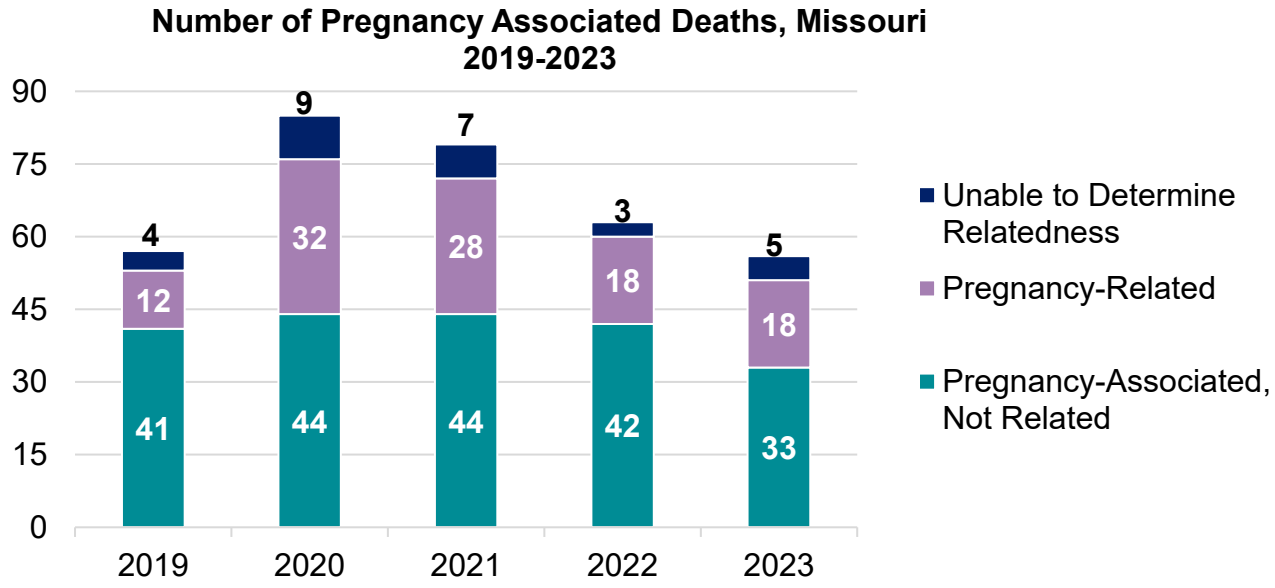
Insurance companies, including MO HealthNet, should continue to:

- Evaluate and improve the enrollment process and procedures to facilitate early entry into prenatal care.

PAMR Board Decisions

The PAMR Board reviewed each case to determine whether the death was related to pregnancy and to identify the cause. To learn more about the PAMR process, visit the DHSS PAMR website.

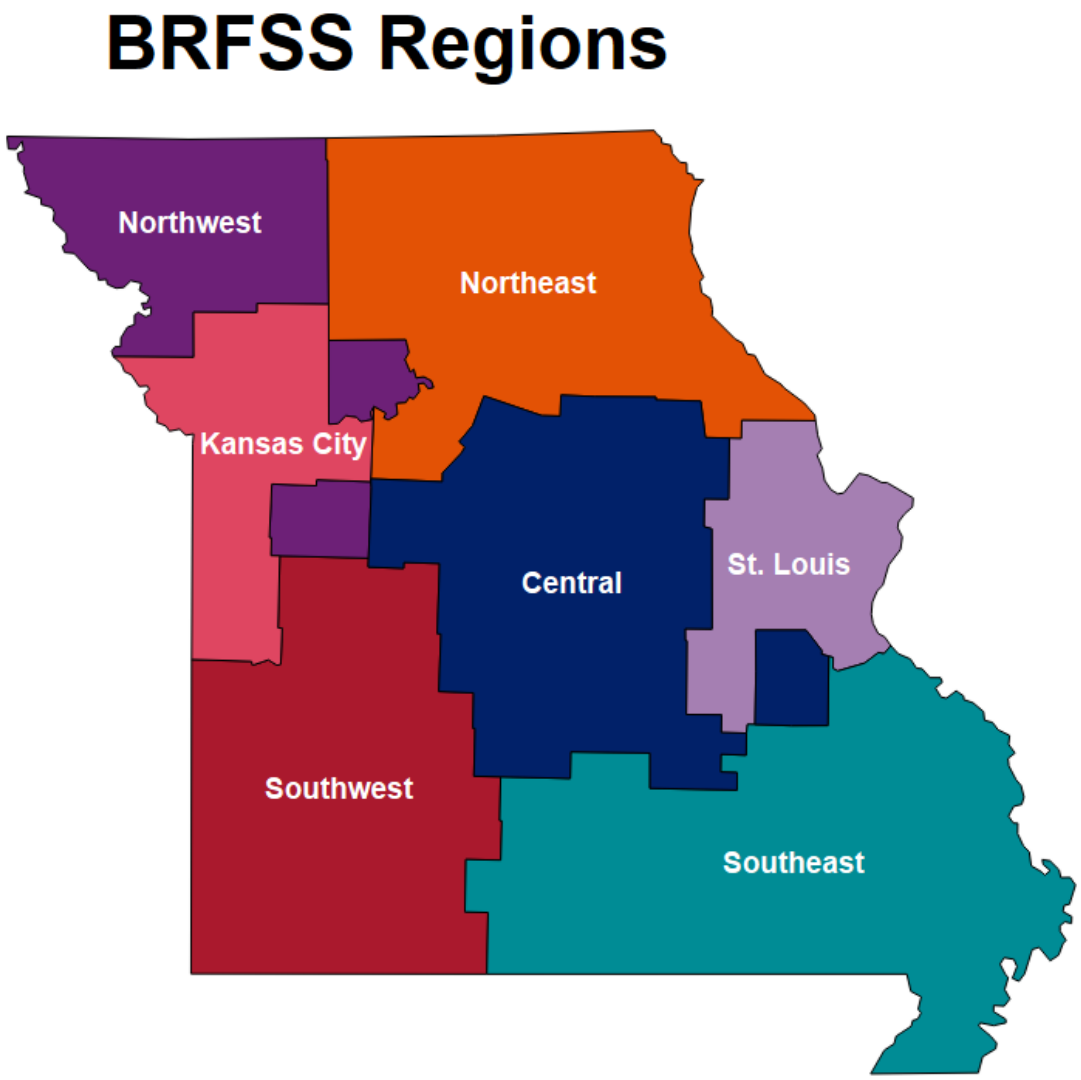
A death is considered pregnancy-related if it occurred during or within one year of pregnancy, from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy (e.g., a woman dies a month after delivery because a heart condition was made worse by pregnancy). A death is considered pregnancy-associated, not related, if it occurred during or within one year of pregnancy from an unrelated condition (e.g., a pregnant woman dies in an earthquake).



Deaths by Region

Missouri is divided into seven regions to observe health data using the Behavioral Risk Factor Surveillance System (BRFSS). Since some counties have very few pregnancy-related deaths, grouping counties into regions helps make the data easier to understand.

- The Northeast Region had the highest rate of pregnancy-related deaths at 42.8 deaths for every 100,000 live births.
- The Southeast Region had the lowest rate at 25.2 deaths per 100,000 live births.
- Please note, it is common to see shifts in the highest/lowest rankings over time, but these shifts do not necessarily reflect statistically significant differences.



Pregnancy-Related Deaths by BRFSS Region, 2019-2023		
BRFSS Region	**Count**	**Rate per 100,000 Live Births**
Central	12	29.9
Kansas City Metro	22	29.2
Northeast	6	42.8
Northwest	X	*
Southeast	8	25.2
Southwest	19	34.2
St. Louis Metro	40	34.3
"X" means the information is private (when there are 5 or fewer). When the count is <25, the rate is not dependable.		

Pregnancy-Related Deaths

Leading Causes

To understand the information and take the right actions, the main reasons why some women die during pregnancy were analyzed. This next section describes details for the 108 pregnancy-related deaths from 2019 to2023.

Pregnancy-Related Underlying Causes of Death (2019-2023)	Count	Percent
Cardiovascular Disease	25	23%
• Cardiomyopathy	9	
• Other Cardiovascular Disease (Other Cardiomyopathy/NOS, Other Cardiovascular/NOS, including CHF, Eclampsia, Chronic Hypertension, etc.)	16	
Mental Health Conditions	24	22%
• Depressive Disorders, Anxiety Disorders, etc.	17	
• Substance Use Disorder	7	
Infection	21	19%
• COVID-19	8	
• Other Infections (Postpartum genital tract infection, sepsis, pneumonia, etc.)	13	

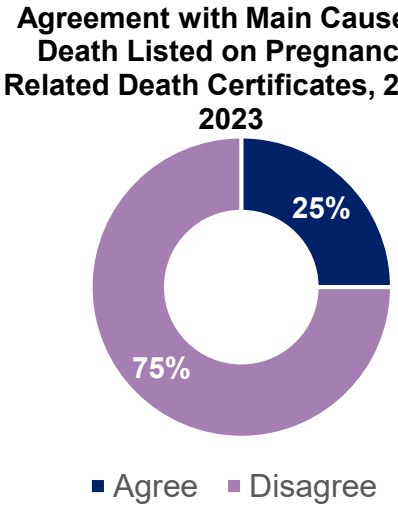
Hemorrhage (Uterine Rupture, Placental Abruption, Ruptured Ectopic, Uterine Atony, Laceration/Intra-Abdominal Bleeding, etc.)	10	9%
Amniotic Fluid Embolism	8	8%
Other Causes (Injury, Cerebrovascular Accident, Embolism, Cancer, Collagen Vascular/Autoimmune Diseases, Conditions Unique to Pregnancy, Gastrointestinal Disorder, Pulmonary Condition, etc.)	20	19%

Causes of Death by Race/Ethnicity				
Cause	White	Black	Hispanic	Other^
Cardiovascular Disease	16	7	X	X
Mental Health Condition	18	X	X	X
Infection	10	8	X	X
Amniotic Fluid Embolism	8	X	X	X
Other Causes (Hemorrhage, Injury, Embolism, Cancer, Cerebrovascular Accident, Collagen Vascular/Autoimmune Diseases, Conditions Unique to Pregnancy, Gastrointestinal Disorder, Pulmonary Condition, etc.)	15	15	X	X

"X" = data suppressed for confidentiality (count ≤5).
^Other includes Asian, Native Hawaiian, Pacific Islander, American Indian, Alaska Native and multiracial.

Data Adequacy

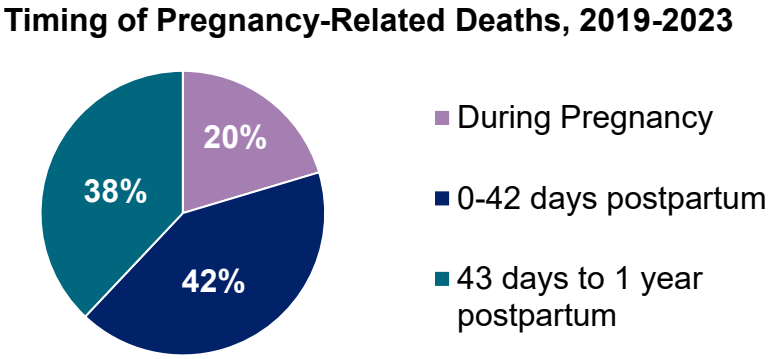
Data adequacy is about whether we have enough data and if the data is complete. When reviewing the available information, the PAMR Board considers whether there is enough data and whether the data is accurate. The PAMR Board disagreed with the recorded cause of death for pregnancy-related deaths only when the evidence was sufficient to justify disputing the information on the death certificate.

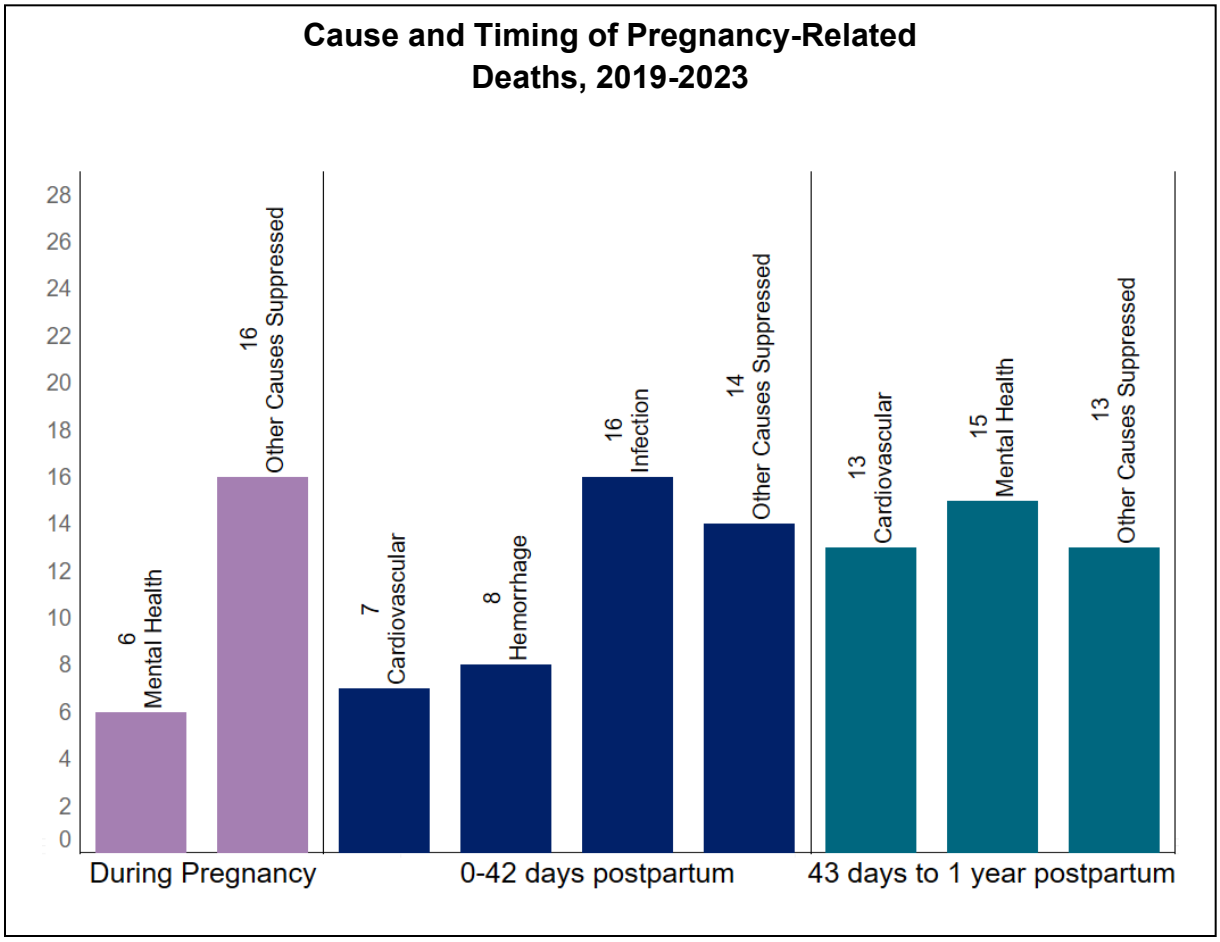


When the board disagreed with the recorded cause of the pregnancy-related death:

- Only 36% had an autopsy
- Almost half (48%) were determined to have died of cardiovascular disease.

Timing of Pregnancy-Related Deaths





Contributing Factors

The PAMR Board looked at what plays a part in why some women die during pregnancy and up to 365 days postpartum. They found many issues that contributed to these deaths, which are summarized in the chart below. These issues are called contributing factors. To better understand and report on these factors, the PAMR board grouped them by level. There are five levels: patient/family, provider, facility, system and community. Each maternal death may be affected by more than one contributing factor and/or level of contributing factor. After identifying contributing factors, the board makes recommendations on who has the ability to change the consequences of that factor. The most common and urgent recommendations are at the beginning of this report.

Class of Contributing Factor	Count	Main Ideas
Patient/Family Level Factors -These factors include issues that occur at an individual level. The individual is defined as a woman who is pregnant or has recently had a baby, along with family members who help with their care and choices.		
Knowledge	26	Lack of knowledge of risk factors and warning signs requiring immediate follow-up. Support is needed for improved understanding of chronic/genetic conditions, harm reduction, and health literacy.
Mental Health Conditions	24	Postpartum depression, anxiety, bipolar disorder, family history of suicide, OCD, PTSD, borderline personality disorder, prior suicide attempts. No medication treatment or inadequate medication guidance. Lack of mental health screening and/or harm reduction measures. Additional access to mental health services needed.
Substance Use Disorder (Alcohol and other drugs)	21	Fentanyl, methamphetamine, marijuana, opioids, and alcohol use.
Chronic Disease	19	Lack of knowledge of preconception health and pregnancy risks in individuals with chronic disease. Improved support needed for management of chronic conditions.

Provider Level Factors -These factors include issues that take place during interactions with providers. A provider is a trained person who gives care, treatment, or advice to pregnant and postpartum patients.		
Assessment	38	Failure to complete Screening, Brief Intervention, and Referral to Treatment (SBIRT) for mental health. Lack of workup and treatment for cardiovascular conditions. Failure to conduct a risk assessment and screen for domestic violence. Lack of quantitative blood loss assessment. Failure to recognize the need to transfer to a higher level of care.
Clinical Skill/Quality of Care	18	Failure to treat hypertensive disorders of pregnancy (evidence-based care) and/or inadequate consideration of risks related to chronic health conditions. Suboptimal treatment for infections. Inadequate follow up for mental health history, stopped/changed patients' medication because of pregnancy, failure to provide harm reduction measures.
Continuity of Care/Care Coordination	16	Failure of providers to coordinate prescriptions and/or stopped/changed patients' medication because of pregnancy. Lack of connection between providers and/or support services. Failure to complete SBIRT for mental health. Lack of continuity of care during the postpartum period. Need to utilize multidisciplinary consult/coordination with patient, family, provider, child protective services, and support services.
Discrimination	15	Treatment decisions and recommendations were inconsistent with best practices. Dismissed symptoms as anxiety and/or baby blues. Delays in care, undertreatment, lack of access to consistent care, inadequate care coordination, and mistrust in providers.
Knowledge	10	Treatment decisions, recommendations, and prescription management were inconsistent with best practices.
Facility Level Factors - These factors include issues that take place at a facility. A facility is defined as a place where pregnant and postpartum patients receive care.		
Policies and Procedures	7	Lack of access to advocate/family member and/or interpreter when making medical decisions. Barriers to care. Treatment was inconsistent with evidence-

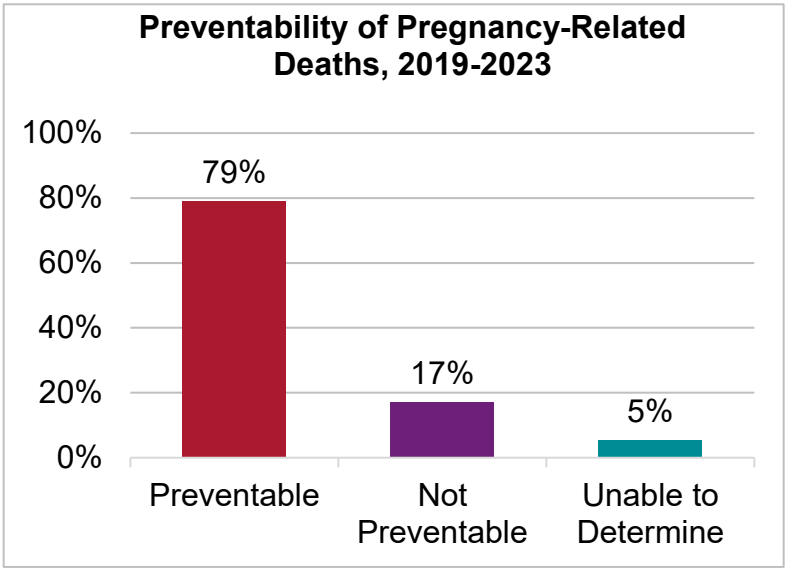
		based practices. Failure to recognize the need to transfer to a higher level of care.
Access/Financial	3	Failure to evaluate access to prescriptions and contraception.
Continuity of Care/Care Coordination	3	Inadequate coordination across facilities/providers, leading to knowledge gaps and delays in care. Inadequate assessment of barriers to care and access to/knowledge of support services.
System Level Factors -These factors include issues that take place across a system and impact large groups of people. This includes hospitals, insurance companies and community programs that help pregnant women before, during and after pregnancy.		
Access/Financial	11	Barriers to accessing care (No insurance or self-pay and couldn't afford care and/or prescriptions, lack of reliable transportation, no access to home medical equipment).
Continuity of Care/Care Coordination	4	Lack of and/or poor case coordination, fragmented healthcare delivery (patient seen at multiple clinics by multiple physicians, leading to vague/inaccurate records). Need for care coordinators and/or advocates.
Policies and Procedures	4	Lack of policies for building codes, midwifery standards, and continuity of postpartum care.
Community Level Factors - These factors include issues that take place across a community. A community is a group of people sharing a common place or interest, such as neighborhoods, hobbies or experiences.		
Environmental	4	Community vital sign indicators of poor social stability (e.g., higher violent crime rates, racial diversity/segregation, poverty, households with no car, and overcrowded housing).
Access/Financial	3	Community vital sign indicators of poor social stability (e.g., higher uninsured rates, less access to behavioral health, higher number of households with no car, and distance to providers).

Preventability of Pregnancy-Related Deaths

The PAMR Board reviewed pregnancy-related deaths and found that 79% could have been avoided with better care, more timely checkups, and stronger support from family and friends.

The PAMR Board found:

- All deaths due to mental health conditions, including SUD, were preventable.
- Most deaths from other causes were preventable.



Summary of Major Accomplishments

2021 PAMR Report

- First report on maternal mortality published and shared with stakeholders.
- Ongoing collaborations with partners to prevent maternal mortality continued.

2022 PAMR Dashboard and MO PQC

- First nationwide dashboard on maternal mortality published.
- Missouri Perinatal Quality Collaborative (MO PQC) established.
- Initiatives were launched for addressing substance use in maternal-infant dyads, severe hypertension in pregnancy, and obstetric hemorrhage.
- At the time of publication, 53 of 59 birthing facilities are participating in the MO PQC .
- Published Missouri Maternal and Neonatal Levels of Care.
- Implemented five new maternal health programs (2022 to 2025):
  - **Cora Faith-Walker Doula Training Program**- Trained 432 doulas, 44 doula train-the-trainers, and 325 medical providers
  - **Doula Services**- 536 doula provided births

    - **BABY & ME – Tobacco Free™ telehealth**- Over 256 pregnant women enrolled
    - **Maternal Autopsy Reimbursement**
    - **Prenatal Care Clinic**- 555 group prenatal and postpartum appointments provided.
- Completed a statewide maternal mortality awareness campaign via social media and radio.

2023 Investment in Maternal Health

- Governor Parson invested $4.3 million to improve the quality and access of health services for women during pregnancy and postpartum. This funding is supporting:
    - 94 percent of Missouri births through the MO PQC efforts.
    - Perinatal Psychiatry Access Program to bring mental health and substance use support to underserved areas of Missouri.
    - 42 provider trainings since 2023.
    - Created the MO PQC's Optimizing Postpartum Care Task Force.
    - Maternal-Child Health data access.
- The Missouri Legislature approved an extension for Medicaid postpartum coverage. This supports over 40 percent of Missouri postpartum moms.

2024 Enhanced Maternal Health

- Distributed over 15,000 PAMR materials about pregnancy-related deaths by working with communities and organizations.
- Managed contracts for preventing maternal mortality, which included safety measures to address the main causes of deaths during pregnancy.
- Created healthcare provider training: Responding to Domestic Violence with Pregnant and Postpartum Patients.
- Established contracts to create two new centers for helping mothers with substance use. They are called BRAVE and EMBER.
- The Missouri Department of Social Services, MO HealthNet Division, allows for reimbursement of doula services.
- The MO PQC's Optimizing Postpartum Care Task Force worked on a report called Postpartum Pathways, focused on enhancing care for mothers following childbirth.
- The MO PQC launched the "Ask Me 5" campaign, aimed at promoting questions and discussions surrounding maternal health.

2025 Continuing Efforts

- Maintained maternal mortality prevention contracts, including implementing patient safety bundles from leading causes of pregnancy-related mortality.
- Received IRB approval for informant interview protocol.
- Implemented quality improvement process strategies identified with the DHSS Lean Six Sigma team.
- The MO PQC hosted a series of Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) trainings across the state to educate nurses on best practices for obstetric emergencies.
- The MO PQC expanded Ask Me 5 efforts to recruit and train Ask Me 5 ambassadors to spread Ask Me 5 awareness among providers.
- The MO PQC published its first progress report highlighting efforts in maternal and infant health from 2023-2025.
- The MO PQC hosted its first maternal and infant clinical symposium to bring together stakeholders across the state invested in improving maternal-infant health outcomes.
- The MO PQC's Optimizing Postpartum Care Task Force published its "The One-Year Postpartum Pathway" report to spotlight the importance of comprehensive postpartum care and provide guidance on best practices through one year post-delivery to prevent maternal morbidity and mortality.
- University Health's EMBER team hosted its first annual convening to bring together clinicians, community advocates, administrators, social workers and lawmakers to discuss evidence-based care for pregnant patients with SUD and substance-exposed infants.
- Distributed 4,500 maternal wellness kits to clinical and non-clinical organizations. Kits included items to reduce infections and mortality, for pregnant and postpartum moms at risk of SUD/opioid use disorder (OUD), such as personal care items, a first-aid kit, intranasal naloxone, oral health supplies, prenatal vitamins, a zipper bag for transporting items, and information on free mental health resources.

Conclusion

Preventing maternal deaths in Missouri is complex. Health disparities, the opioid crisis and lack of access to healthcare all impact the health of moms across the state. Healthcare providers, communities, social drivers of health and healthcare systems all play a part in maternal health. Studying maternal mortality cases is the first step in helping Missouri moms have healthy pregnancies and postpartum outcomes. By reviewing each maternal death, our PAMR board ensures every mom's story is heard.

The PAMR Board works to make changes in communities and systems to help improve the health of women in Missouri. Fewer maternal deaths mean that more moms see a baby's first smile, cheer as their little ones take their first steps, and share in the joy of their child's first birthday. The PAMR Board is dedicated to continuing its efforts in prevention to provide more moments like these for families.