A MULTI-YEAR LOOK AT MATERNAL MORTALITY:

2018-2022 Pregnancy-Associated Mortality Review
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MISSOURI DEPARTMENT OF HEALTH & SENIOR SERVICES

Pregnancy-Associated Mortality Review

Acknowledgments

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Pregnancy Associated Mortality Review Board

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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 350 women who passed away while pregnant or within a year after their pregnancy from 2018 to 2022. 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. The Office on Women's Health and its partners are making it a priority to get quality data to the public quickly. While the same level of information is available, we have shortened our report to include key highlights of pregnancy-related deaths. You can find more data on the PAMR data dashboard or by visiting our website at Health.Mo.Gov/PAMR. A glossary of terms is also available. If you need other information, please follow DHSS' data request process.

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Executive Summary

The Department of Health and Senior Services (DHSS) studied the deaths of women in Missouri who were pregnant or had been pregnant in the past year. They gathered information about these pregnancies and deaths to share with the Pregnancy Associated Mortality Review (PAMR) Board. The board carefully examined the information to learn more about these cases. You can find the board's findings and recommendations in the report.

Key Findings

On average, 70 women in Missouri died while they were pregnant or within one year after their pregnancy each year from 2018 to 2022. The most deaths happened in 2020, with a total of 85 deaths recorded that year.

From 2018-2022 (350 deaths total):

- The pregnancy-related mortality ratio (PRMR) was 32.3 deaths per 100,000 live births.
- The PRMR for Black women was 2.5 times the ratio of white women. This is a continued decline from the previous three reports.
- The PAMR Board determined that eighty percent of pregnancy-related deaths were preventable.
- Mental health conditions were the leading underlying cause of pregnancy-related deaths, followed by cardiovascular diseases.
- The PAMR Board determined that all pregnancy-related deaths due to mental health conditions, including substance use disorder (SUD), were preventable.
- Women living in micropolitan counties had the highest ratio of pregnancy-related deaths (38.7 per 100,000 live births).

Key Recommendations

Here are the recommendations about preventing maternal mortality from the PAMR Board based on cases reviewed from 2018 to 2022.

Recommendations are grouped into three categories:

- Recommendations that are new and/or ones that have not been started.
- Recommendations that are currently being worked on.
- Recommendations that have been completed and should continue to be followed.

Recommendations to Start Implementing

Local housing authorities should:

- Implement system-wide 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 Started But Not Completed

All health care 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 to optimize a woman's health prior to pregnancy.

Health care 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 health care 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.

- Provide simulation-based training to all hospital staff to reduce implicit bias and promote equitable maternal care.

Community-based organizations (CBOs) should:

- Collaborate with health care facilities and providers to reduce stigma surrounding maternal mental health and SUD and provide assistance with resources for these conditions.
- Collaborate with health care 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:

- Evaluate and improve the enrollment process and procedures to facilitate early entry into prenatal care.
- Ensure pregnant women understand their insurance benefits.
- Ensure parity 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.

Maintain Progress with Fully Implemented Recommendations

The Missouri Legislature should continue to:

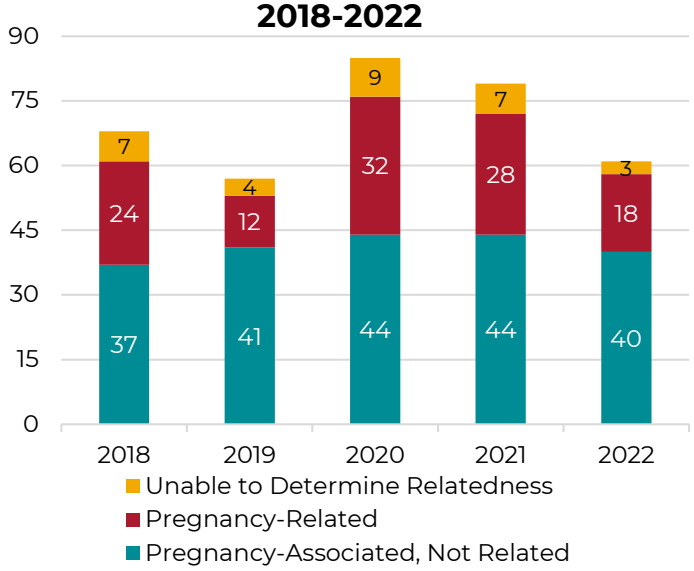
- Provide funding for a statewide Perinatal Quality Collaborative (PQC).
- Establish and fund a statewide Perinatal Psychiatry Access Program to aid health care providers in providing evidence-based mental health care, including SUD treatment, to Missouri women.
- Extend Medicaid coverage to one year 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.
- Continue to fund Medicaid expansion.

PAMR Board Decisions

The PAMR Board looked at all cases to figure out if the deaths were related to pregnancy and what caused them. If you want to learn more about how PAMR works, you can visit the DHSS PAMR website.

A death is considered pregnancy-related if a death 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. A death is considered pregnancy-associated, not related if a death occurred during or within one year of pregnancy from an unrelated condition (i.e., a pregnant woman dies in an earthquake).

Number of Pregnancy Associated Deaths, Missouri 2018-2022

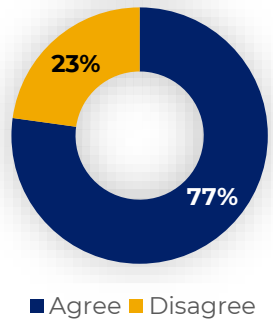


Data Evaluation

The PAMR Board disagreed with the cause of death for pregnancy-related deaths only when the evidence was sufficient to justify disputing the information on the death certificate. Of the cases where the board disagreed:

- Only 38% had an autopsy.
- More than one in two (54%) were determined to have died of cardiovascular disease.
- More than two in five (46%) occurred between 43 days and one year postpartum.

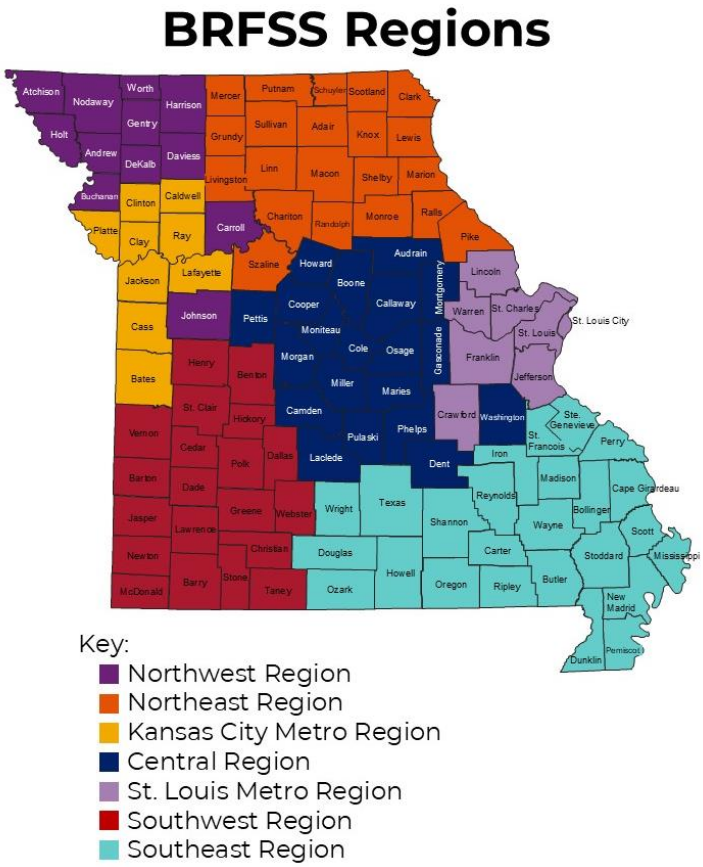
Agreement on Main Cause of Death Listed on Death Certificates, 2018-2022



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 them into regions helps make the data clearer.

- The Northeastern Region has the highest rate of pregnancy-related deaths at 42.05 deaths for every 100,000 live births.
- The Central Region has the lowest rate at 24.45 deaths per 100,000 live births.



Pregnancy-Related Deaths by BRFSS Region, 2018-2022		
BRFSS Region	**Count**	**Rate per 100,000 Live Births**
Northwest	X	*
Northeast	6	42.05
Kansas City Metro	26	34.10
Central	10	24.45
St. Louis Metro	42	35.09
Southwest	20	35.75
Southeast	8	24.81

"X" means the information is private (when there are 5 or fewer).
When the count is <25, the rate is not dependable.

Leading Causes of Pregnancy-Related Deaths

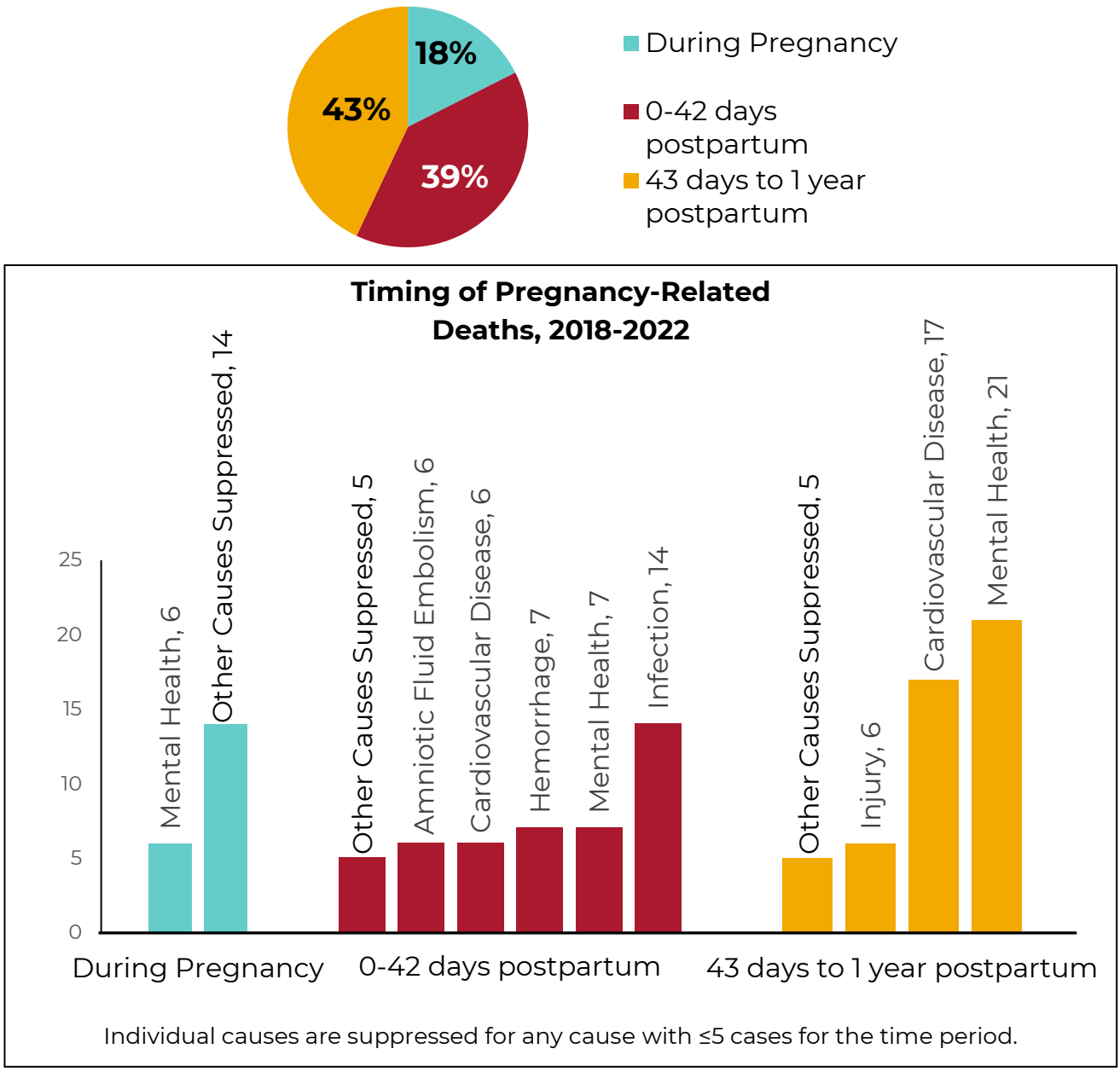
To understand the information and take the right actions, a closer look was taken at the main reasons why some women die during pregnancy.

Pregnancy-Related Underlying Causes of Death	Count	Percent
Mental Health Conditions	34	30%
Depressive, Anxiety Disorders, etc.	20	59%
Substance Use Disorder	14	41%
Cardiovascular Disease	28	25%
Cardiomyopathy	13	46%
Other Cardiovascular Disease (Hypertensive Disorders of Pregnancy, Cardiomegaly, Cardiac Hypertrophy, Non-acute Myocarditis, Coronary Artery Disease, Myocardial Infarction, Valvular Heart Disease, etc.)	15	54%
Infection	17	15%
COVID-19	8	47%
Other Infections (sepsis, pneumonia, postpartum genital tract infections, chorioamnionitis, etc.)	9	53%
Amniotic Fluid Embolism	9	8%
Injury (Homicide)	8	7%
Hemorrhage (Uterine Rupture, Uterine Atony, Laceration/Intra-Abdominal Bleeding, Placental Abruption, Ruptured Ectopic, Placental Accreta, etc.)	8	7%
Other Causes (Embolism, Cerebrovascular Accident, Conditions Unique to Pregnancy, Gastrointestinal Disorder, Pulmonary Condition, etc.)	10	9%

Causes of Death by Race/Ethnicity				
Cause	White	Black	Hispanic	Other^
Mental Health Condition	24	6	X	X
Cardiovascular Disease	16	9	X	X
Infection	8	7	X	X
Amniotic Fluid Embolism	8	X	X	X
Injury (Homicide)	X	6	X	X
Other Causes (Hemorrhage, Embolism, Cerebrovascular Accident, Conditions Unique to Pregnancy, Gastrointestinal Disorder, Pulmonary Condition, etc.)	10	7	X	X

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

Timing of Pregnancy-Related Deaths



Means of Pregnancy-Related Death

All accidental deaths, homicides (murders), and suicides are looked at closely to find out how the injury that caused the mother's death happened. This is called the means of fatal injury. The means of fatal injury include different categories, such as poisoning or overdose, using guns, car accidents, explosives, and strangulation. You can check the PAMR data dashboard for more information.

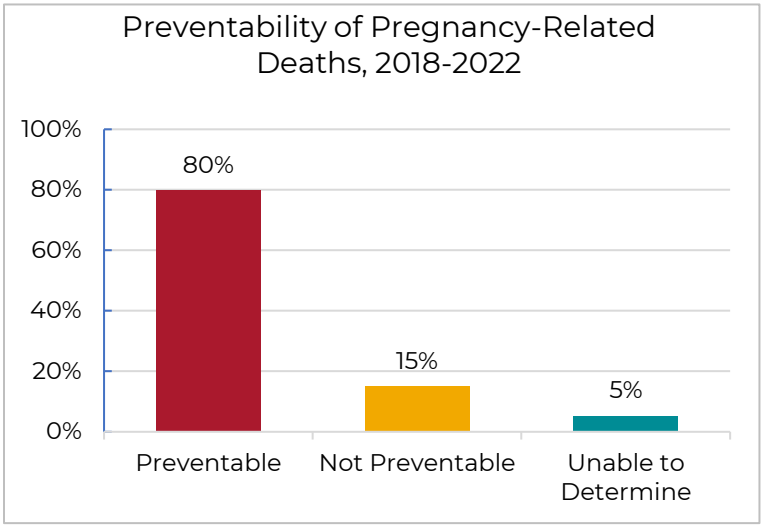
Circumstances Contributing to Pregnancy-Related Deaths

The PAMR Board talks about and decides if issues like drug use, mental health concerns (not related to drugs), discrimination and/or obesity played a role in deaths related to pregnancy. You can find more details on this topic in the PAMR data dashboard.

Preventability of Pregnancy-Related Deaths

The PAMR Board looked into deaths related to pregnancy and found that **80% of them could have been avoided** with better care, more check-ups, and stronger support from family and friends. There were different reasons for these preventable deaths. The PAMR Board found:

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



Contributing Factors

The PAMR Board looked at what plays a part in why some women die during and after pregnancy. 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 the factors by level. There are five levels: patient/family, provider, facility, system and community. 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 take place at an individual level. The individual is defined as a person who is pregnant or has recently had a baby, along with family members who help with their care and choices.		
Mental Health Conditions	27	Postpartum depression, anxiety, PTSD, and bipolar disorder, suicidal ideations, no medication treatment, access to guns.
Substance Use Disorder (Alcohol, and other drugs)	26	Fentanyl, methamphetamine, marijuana, and alcohol use.
Knowledge	23	Lack of knowledge of risk factors and warnings signs requiring immediate follow up. Improvements to health literacy needed. Lack of postpartum visit attendance, not taking prescribed medications.
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	42	Failure to complete SBIRT for mental health. Lack of workup and treatment for cardiovascular conditions. Failure to assess and refer for domestic violence. Lack of quantitative blood loss and recognition of sepsis.
Discrimination	19	Chalked up symptoms as “normal for pregnancy” for example cardiovascular symptoms were noted as patient having anxiety. Treatment decisions and recommendations were inconsistent with best practices.
Clinical Skill/Quality of Care	15	Failure to treat hypertensive disorders of pregnancy (evidence-based care), inadequate follow up for elevated Edinburgh Postnatal Depression Scale (EPDS) and/or stopped patients’ depression medication because of pregnancy. Suboptimal treatment for infections.

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 standardized, evidence-based practices for perinatal care, inappropriate patient transfers (i.e., recovered on postpartum floor with unstable vital signs or started induction of labor when a higher level of care was needed.)
Continuity of Care/Care Coordination	5	Lack of hospital-initiated substance use program (Engaging Patients in Care Coordination [EPICC]) and inadequate coordination with primary care for patient follow-up (i.e., "patient to follow up with doctor in 3 days" when patient did not have a doctor).
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 (Medicaid not active, no insurance or self-pay and couldn't afford prescriptions, lack of reliable transportation).
Continuity of Care/Care Coordination	7	Lack of or poor case coordination, fragmented health care delivery (patient seen at multiple clinics by multiple physicians leading to vague/inaccurate records).
Mental Health Conditions	6	Inadequate mental health treatment providers and facilities, stigma around mental health diagnosis. Lack of provider knowledge on safety of mental health treatment during pregnancy.
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.		
Knowledge	4	Lack of education on intimate partner violence and mental health treatment. Lack of understanding of health before, during and after pregnancy, and risk factors requiring immediate medical attention.
Environmental	3	Community vital sign indicators of poor social stability (higher violent crime rates, poverty and overcrowded housing).

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) was 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 (2022-2025):
    - 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% 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.
    - Establishment of MO PQC's Optimizing Postpartum Care Task Force.
    - Maternal-Child Health data access.

- The Missouri Legislature passed an extension for Medicaid postpartum coverage. This supports over 40% 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 a health care provider training, Responding to Domestic Violence with Pregnant and Postpartum Patients.
- Set up contracts to create two new centers for helping mothers with substance use. They are called BRAVE and EMBER Care.
- 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.

Conclusion

Maternal mortality in Missouri is a complicated issue. It involves problems like health disparities, lack of access to health care and the ongoing opioid crisis. Understanding this problem reveals many other systemic issues and challenges to improving the way we treat and help moms during pregnancy and postpartum.

In response, the PAMR Board has made recommendations to reduce maternal mortality and improve women's health, especially during their reproductive years and afterward. We aspire to ensure more moms can witness and celebrate precious milestones in their children's lives.

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, alongside DHSS, is committed to continuing to examine cases of maternal mortality and making suggestions to prevent avoidable deaths. Our ultimate goal is to enable families to cherish these invaluable moments together.