PREVENTING MATERNAL MORTALITY IN MONTANA

Report & Recommendations from 2020 Mortality Data

MONTANA DPHHS

DEPARTMENT OF PUBLIC HEALTH & HUMAN SERVICES

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Acronym Glossary

Acronym	Full Name
ACEs	Adverse Childhood Experiences
AI/AN	American Indian and Alaska Native
CDC	Centers for Disease Control and Prevention
CFSD	Child and Family Services Division
DPHHS	Department of Health and Human Services
DVT	Deep Vein Thrombosis
ERASE MM	Enhancing Reviews and Surveillance to Eliminate Maternal Mortality
FICMMP	Fetal, Infant, Child, and Maternal Mortality Prevention Act
ICD-10	International Statistical Classification of Diseases, 10th Revision code
IHS	Indian Health Services
LCSW	Licensed Clinical Social Worker
MFM	Maternal-Fetal Medicine Specialist
MMRC	Maternal Mortality Review Committee
MMRP	DPHHS Maternal Mortality Review and Prevention Program
MOMS	Montana Obstetrics and Maternal Support
NCHS	National Center for Health Statistics
NVSS	National Vital Statistics System
OB/GYN	Obstetrician/Gynecologist
OVR	Office of Vital Records
PMADs	Perinatal Mood and Anxiety Disorders
PMSS	Pregnancy Mortality Surveillance System
SUD	Substance Use Disorder
UHIC	Urban Indian Health Clinics
UM RIIC	University of Montana Rural Institute for Inclusive Communities
WHO	World Health Organization

Executive Summary

Background of the Montana MMRC

The Montana Legislature paved the way for maternal mortality review in Montana through the county-led Fetal, Infant, Child, and Maternal Mortality Prevention (FICMMP) Act in 2013. The state-led review of maternal mortality began with the support of the Montana Obstetrics and Maternal Support (MOMS) program in 2019. The first Montana Maternal Mortality Review Committee (MMRC) allowed Montana to review pregnancy-associated deaths or deaths that occur during or within one year of pregnancy regardless of cause.

As of 2021, the Centers for Disease Control and Prevention (CDC) now supports the Montana MMRC in contributing to a national dataset on maternal mortality. This dataset includes recommendations for preventing future pregnancy-related deaths - defined as deaths occurring during pregnancy or within one year of the end of pregnancy due to pregnancy complications, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

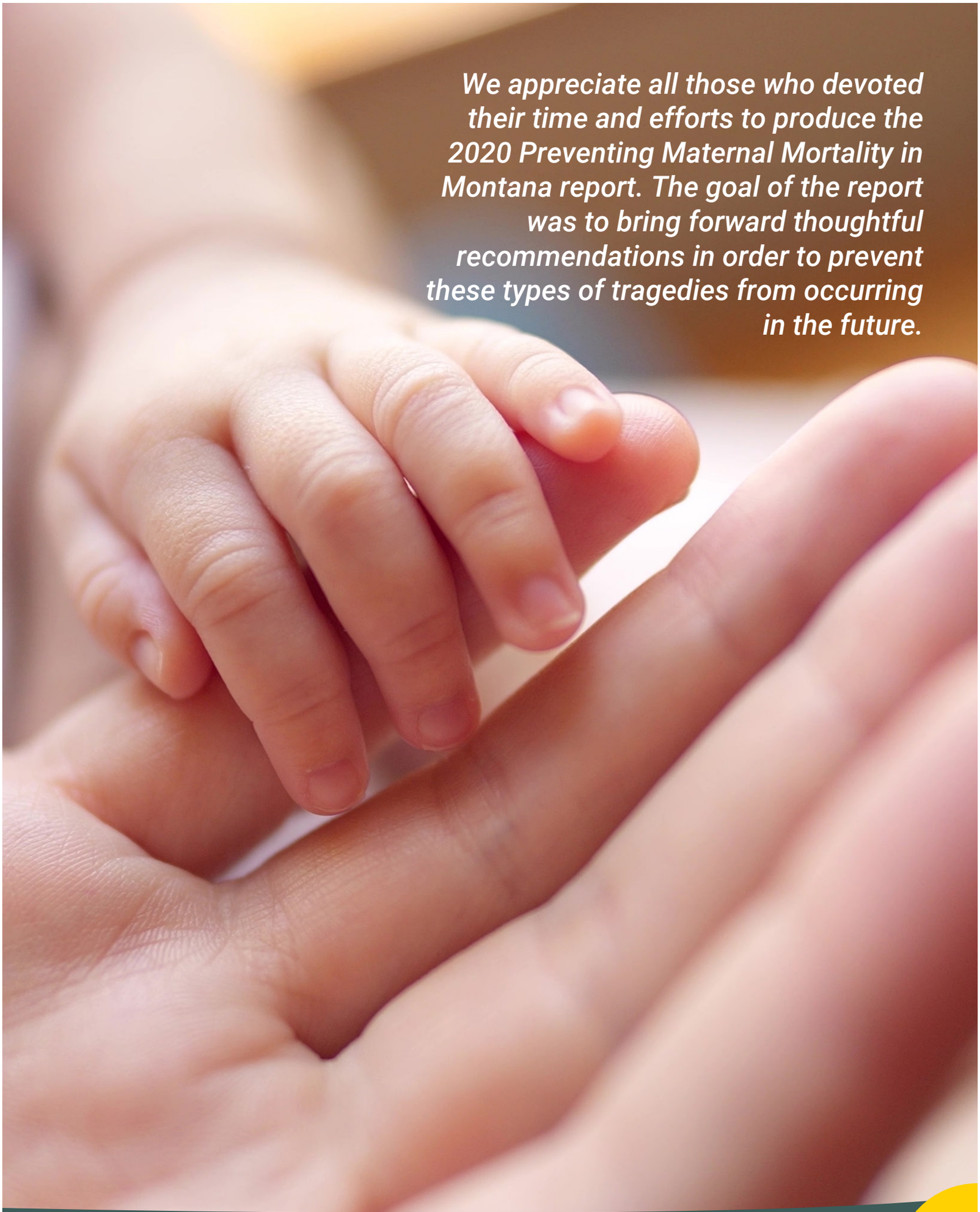
The CDC defines an MMRC as a "multidisciplinary committee that convenes at the state or local level to comprehensively review deaths that occur during or within a year of pregnancy" [1]. The Montana MMRC consists of a multidisciplinary team of clinicians and non-clinicians with important roles in the lives of pregnant women. The Montana MMRC established this multidisciplinary structure to ensure power-sharing, elevate a variety of perspectives, and ensure a holistic and high-quality review process.

2020 Key Findings

The Montana MMRC reviewed 11 pregnancy-associated deaths from 2020 and determined that five deaths were pregnancy-associated, but not related. Of the six remaining deaths, the Montana MMRC determined that three were pregnancy-related and they were unable to make a determination on three of the deaths with the information available to them. For these six deaths, the committee made the determination that each of these deaths was preventable. The committee then made actionable recommendations for those six preventable deaths.

Recommendations

The Montana MMRC developed and endorsed 52 recommendations for preventability through their review of the 2020 cases. Six themes were identified: Care coordination/Continuity of Care, Historical/Intergenerational Trauma, Justice System/Child & Family Services, Mental Health/Substance Use Disorder, and Social Support/Community. Within each of the themes, the Montana MMRC made recommendations at the patient/family, provider, facility, system, and/or community level.



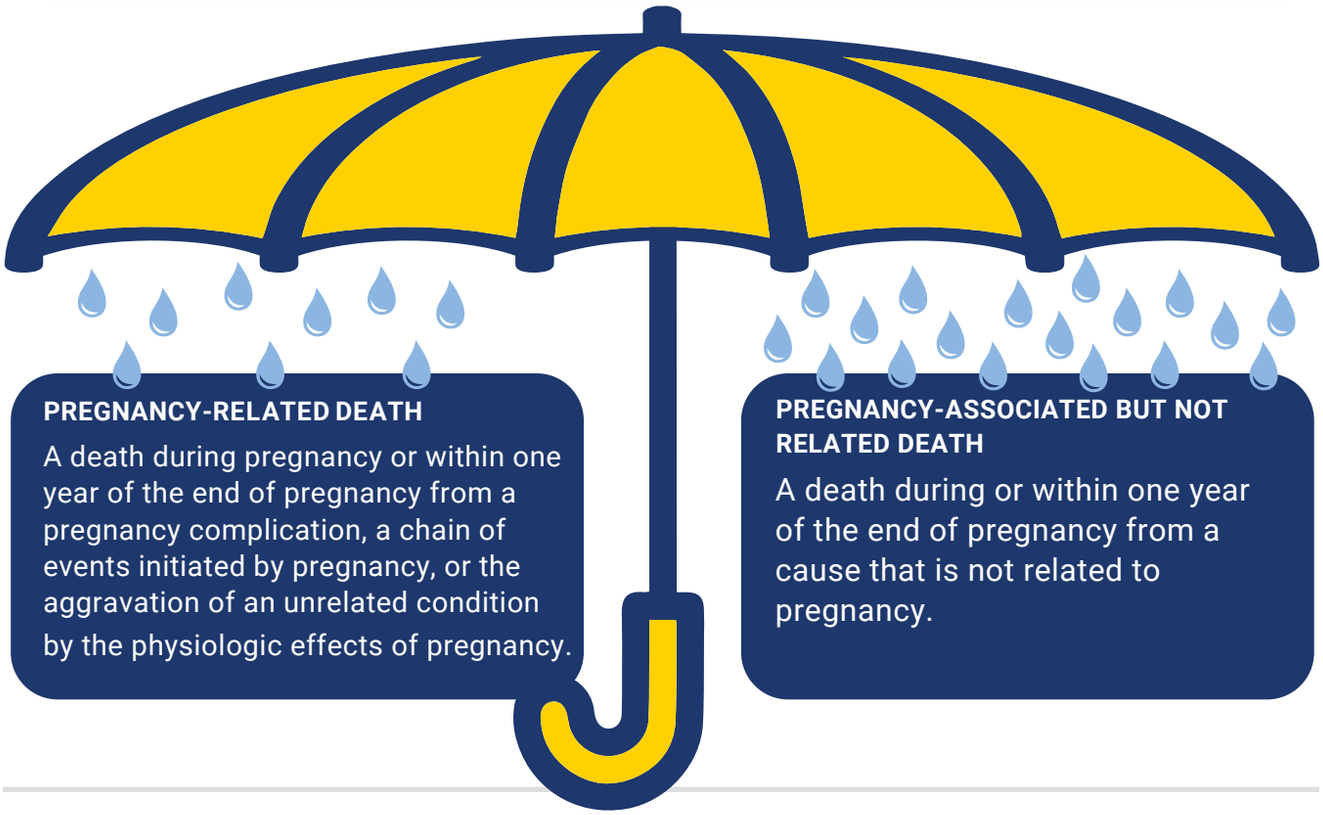
We appreciate all those who devoted their time and efforts to produce the 2020 Preventing Maternal Mortality in Montana report. The goal of the report was to bring forward thoughtful recommendations in order to prevent these types of tragedies from occurring in the future.

Key Definitions

Currently, there are several metrics agencies use to report on maternal and pregnancy-related deaths. Frequently, these metrics will be used interchangeably, but they are quite different in what they are measuring, and the data used in those measurements, so they are not comparable. The National Center for Health Statistics (NCHS) and the Pregnancy Mortality Surveillance System (PMSS) use vital statistics data for their metrics, while MMRCs provide a more comprehensive process to inform their metrics that also allows for review of specific factors that contributed to the death. The following definitions are those most frequently used by the Montana MMRC:

PREGNANCY-ASSOCIATED DEATH

A death during or within one year of pregnancy regardless of the cause. These deaths make up the universe of maternal mortality; within that universe are pregnancy-related deaths and pregnancy-associated, but not related deaths.



PREGNANCY-RELATED DEATH

A death during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

PREGNANCY-ASSOCIATED BUT NOT RELATED DEATH

A death during or within one year of the end of pregnancy from a cause that is not related to pregnancy.

UNDERLYING CAUSE OF DEATH

The disease or injury that initiated the chain of events leading to death or the circumstances of the accident or violence which produced the fatal injury.

PREVENTABILITY

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

Other Maternal Mortality-Related Definitions

Although not included in this report, the metrics used both in the United States and internationally for maternal and pregnancy-related deaths are defined below. It is important to note that the World Health Organization (WHO) and the NCHS define a maternal death as during and within 42 days of the end of pregnancy, while the Montana MMRC reviews all deaths during pregnancy and within one year of pregnancy.

PREGNANCY-RELATED DEATH (PMSS)

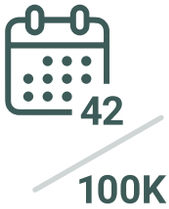
A death while pregnant or within one year of the end of pregnancy regardless of the outcome, duration, or site of the pregnancy – from any cause related to or aggravated by the pregnancy or its management. While the PMSS definition is similar to the MMRC definition of pregnancy-related death, it generally does not include deaths due to injury [2].

PREGNANCY-RELATED MORTALITY RATIO

The CDC defines the pregnancy-related mortality ratio as the number of pregnancy-related deaths (as defined above) for every 100,000 live births. The birth data used to calculate pregnancy-related mortality ratios are obtained from the National Vital Statistics System (NVSS) [2].

MATERNAL DEATH

The WHO defines maternal death as, “a female death from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy or childbirth or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy [3].” The NCHS also uses this definition.



MATERNAL MORTALITY RATIO

The WHO defines maternal mortality ratio as “the number of maternal deaths during a given time period per 100,000 live births during the same time period [3].” The maternal mortality ratio is used for international comparisons between countries.

About the Montana Maternal Mortality Review Committee

Mission, Vision, and Goals of the Montana MMRC

MISSION

The mission of the Montana MMRC is to identify pregnancy-associated deaths, determine pregnancy-relatedness, identify cause and contributing factors to deaths, and recommend preventions at the individual, provider, facility, system, and community level to reduce these deaths, promote change, and improve systems of care.

VISION

The Montana MMRC's vision is to eliminate preventable pregnancy-related deaths, reduce maternal morbidities, and improve population health for women of reproductive age in Montana.

GOALS

The goals of the Montana MMRC is to:

- **Perform thorough record abstraction** in order to obtain details of events and issues leading up to an individual's death.
- **Perform a multidisciplinary review of cases** to gain a holistic understanding of the issues.
- **Determine the annual number of pregnancy-related deaths** (pregnancy- related mortality).
- **Identify trends and risk factors** among pregnancy-related deaths in Montana.
- **Recommend improvements to care** at the individual, family, community, provider, facility, and system levels with the potential for reducing or preventing future events.
- **Prioritize findings and recommendations** to guide the development of effective preventive measures.
- **Recommend actionable strategies for prevention** and intervention.
- **Disseminate the findings and recommendations** to a broad array of individuals and organizations.
- **Promote the translation of findings and recommendations** into quality improvement actions at all levels.

Background

In 2013, the Montana Legislature added maternal mortality review to Montana's county-led FICMMP Act. In 2019, the Health Resources and Services Administration funded the MOMS program at Montana DPHHS. The MOMS grant seeded funding to create the Montana MMRC in 2021, and the CDC followed with funding to support the Montana Mortality Prevention Program's (MMRP)'s management of Montana's MMRC with the Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) grant. See **Figure 1** for the timeline of the creation of the Montana MMRC.

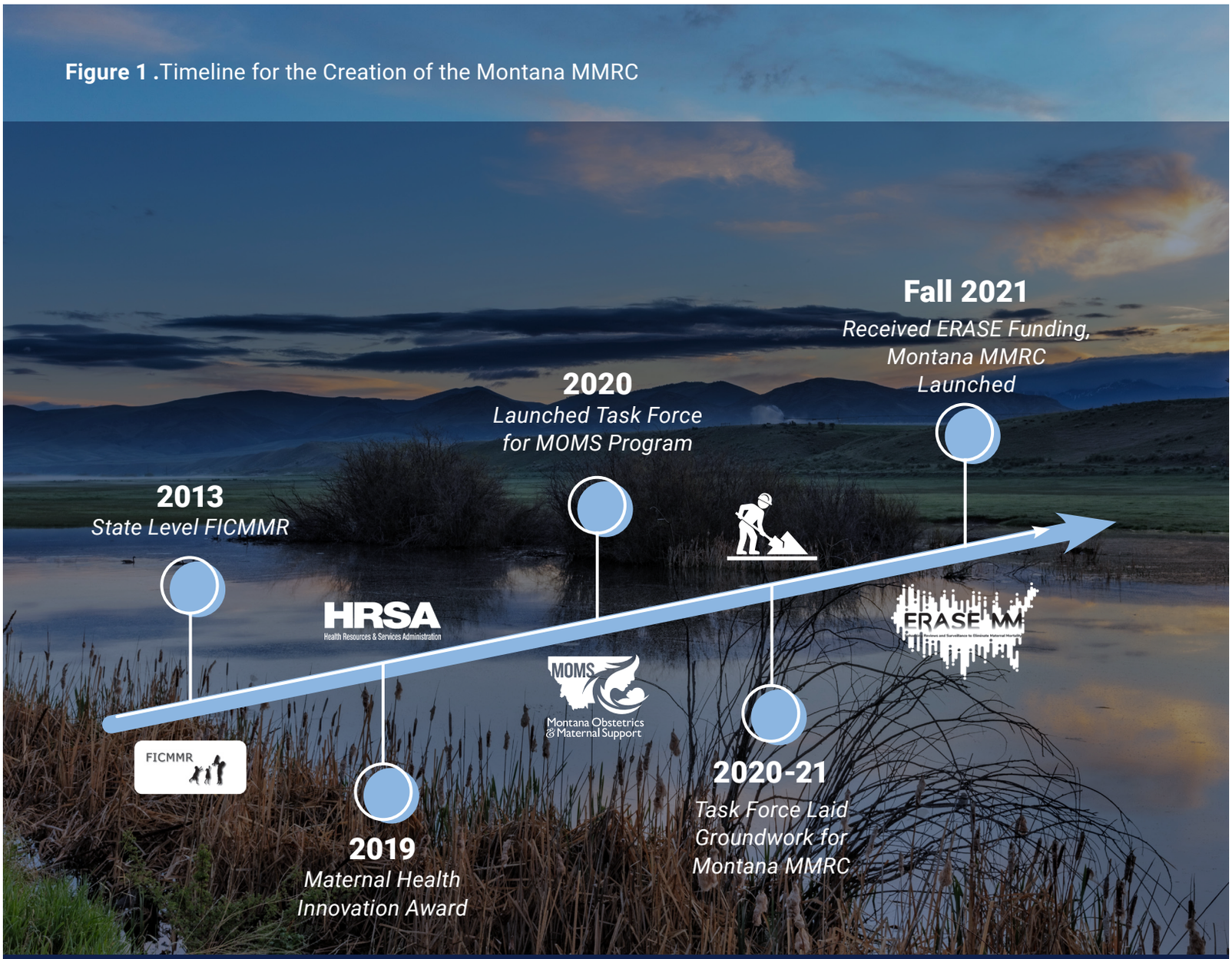
Through its statewide MMRC, Montana contributes to the CDC's national data set on maternal mortality, receives technical assistance on the proper conduct of mortality reviews, and ensures that reviews are conducted consistently with recommendations disseminated to statewide stakeholders with the power to implement changes to prevent future deaths.

In the first months of development, members were recruited using the CDC's guidelines of creating multidisciplinary committees. In October 2021, the Montana MMRC held its first meeting, an orientation and training that brought together the multidisciplinary committee to prepare for its first reviews to begin in the summer of 2022. The Montana MMRC follows CDC guidelines to have a mix of clinical and nonclinical members including obstetrician/gynecologists (OB/GYNs), maternal-fetal medicine (MFM) specialists, family physicians, obstetric nurses, public health nurses, midwives, doulas, members of law enforcement and legal services, substance use professionals, licensed clinical social workers (LCSWs), epidemiologists, Indian Health Services (IHS), Urban Indian Health Clinics, and Tribal Health Departments, people with lived experience, and community members (among others).

DPHHS administers the Montana MMRC and provide staffing support in the form of nurse abstraction, grants management, and epidemiological support. The DPHHS MMRP staff will also begin conducting interviews with family members and friends of the decedent to support committee fact-finding and mortality review.

DPHHS contracts with the Rural Institute for Inclusive Communities at the University of Montana (UM RIIC) to facilitate Montana MMRC meetings, and provide technical assistance and training for committee members and the DPHHS MMRP staff. Ultimately, both DPHHS and the UM RIIC team are there to help support the committee meet its mission, vision, and goals.

Figure 1 . Timeline for the Creation of the Montana MMRC



Case Identification

The Office of Vital Records (OVR) identifies pregnancy-associated deaths using birth and death certificates. The OVR within the DPHHS Epidemiology and Scientific Support Bureau identifies maternal death records through the pregnancy checkbox being marked on the maternal death record and through computerized data linkages between death records and birth and fetal death records. The Maternal and Child Health Epidemiologist confirms that the death is pregnancy-associated in one or more of the following ways: by checking the accuracy of the pregnancy checkbox, through linkage of maternal death and child death or fetal death records, and by searching for pregnancy diagnosis codes or causes of death that are pregnancy-related using the International Statistical Classification of Diseases, 10th Revision (ICD-10) code.

Once cases are identified, the MMRC nurse abstractor at DPHHS gathers additional information about the death by obtaining medical, social service, legal, and public records for the death to provide to the MMRC. This can comprise of medical records which may contain prenatal, emergency, hospital, or specialist records, as well as IHS records, autopsy and toxicology reports, sheriff's office records, court records, obituaries, and social media postings. Future case reviews will also include information gathered from interviews conducted by DPHHS. Having these interviews will provide an opportunity to include information from the important people in the life of the decedent.

Montana MMRC Process

The Montana MMRC convenes their meetings either virtually or in a hybrid format (both in-person and virtually simultaneously). To allow more members the opportunity to attend the in-person format, the location of in-person meetings is rotated around the state of Montana. During the period covered by this report, meetings were held in community spaces such as at Aaniiih Nakoda College and Montana State University - Billings.

For 2020 cases, the Montana MMRC convened virtually in December 2022 and February 2023 and in a hybrid setting in June 2022 and April 2023. The Montana MMRC had their first case review meeting in June 2022. This meeting ultimately consisted of learning processes and best practices, building trust among members, and determining that more information was required about the deaths to make relatedness determinations and recommendations. The committee conducted full case reviews during December 2022, February 2023, and April 2023.

Table 1. Training & 2020 Case Review Schedule

When	Location	# of Members Present	What Was Accomplished
October 2021	Virtual Only	24	Montana MMRC Training
June 2022	Hybrid (Virtual & Helena)	23	Initial discussion of cases, learning processes
December 2022	Virtual Only	19	Review of 3 Cases
February 2023	Virtual Only	22	Review of 3 Cases, Discussion on factors leading to care variations
April 2023	Hybrid (Virtual & Billings)	18	Discussion on Intimate Partner Violence & Substance Use Disorder; Review of 5 Cases

Process of the Montana MMRC Meetings

As part of their responsibilities, Montana MMRC members review narratives of the decedent's life before the meeting and submit preliminary findings about each death in a survey reviewed by the UM RIIC team. The UM RIIC team uses these preliminary findings to assist with case review facilitation during meetings.

During meetings, the case review begins with a review of the events which led to the death of the individual. To contribute to the national data set on maternal mortality managed by the CDC, for each death, the committee must make determinations on key questions. Over time, the process of how the committee has made these determinations has changed to allow for meaningful discussions, but also to give each death the consideration it deserves.

If the committee determines that the case is pregnancy-related, they then discuss whether they believe the death could have been prevented with one or more reasonable changes to factors in the decedent's life. These decisions then inform the recommendations for preventing future deaths in Montana. The committee also made the decision that for any case where they were unable to make a pregnancy-relatedness determination, they would complete a full review. So those cases where a determination was unableto be made still had a preventability determination and recommendations. Recommendations developed by the committee must be specific and actionable based on contributing factors of the death.

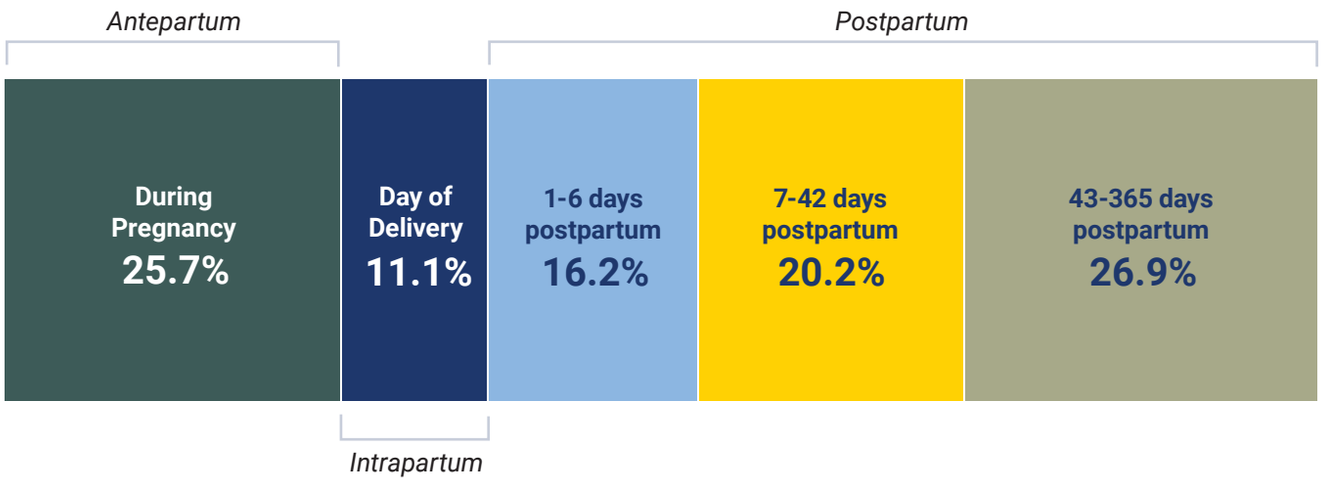
In addition to case review, each of these meetings consisted of an educational component relevant to the deaths being discussed. Educational components consisted of discussions on interpersonal violence in the perinatal period, person-first language, and care variations across groups. This education contributed to significant growth within the committee, where they are now having open, thoughtful discussions about how these topics may have contributed to deaths.

MMRC Nationwide Findings

Although the Montana MMRC is still new, MMRCs in other states have been in existence since the 1930s to address maternal mortality and develop recommendations for prevention [4]. The CDC recently published a report using 2020 data on 525 pregnancy-related deaths from the MMRCs in 38 states within the US. [5]. For the first time, this report from the CDC includes data from the Montana MMRC.

Although these data are national, aggregate findings and not specific to Montana, they can provide useful information in guiding recommendations for preventing pregnancy-related deaths in the future. A key finding was that nearly half of the pregnancy-related deaths (47.1%) occurred between 7 and 365 days postpartum, as seen in **Figure 2** [5].

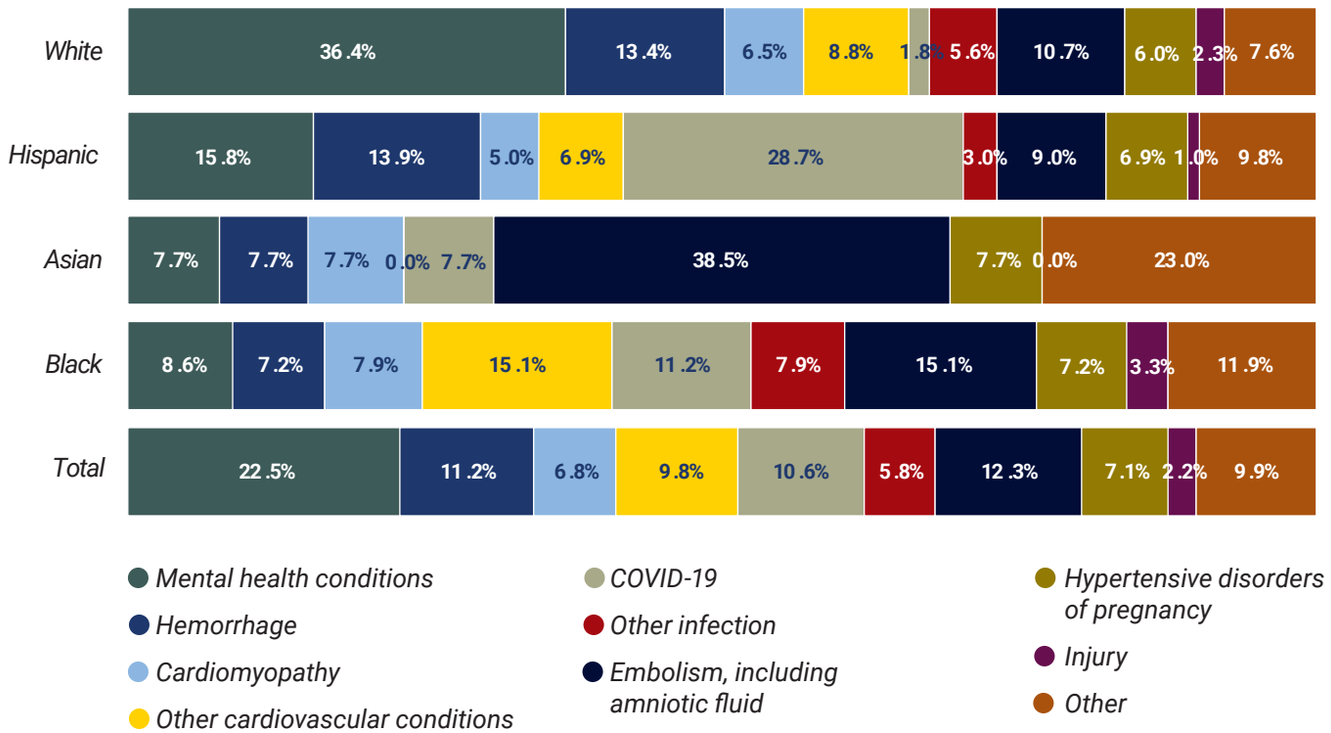
Figure 2. Distribution of Pregnancy-Related Deaths by Timing of Death [5]



The report also found that the underlying cause of death for pregnancy-related death varied by race and ethnicity, with mental health conditions being the most common underlying cause of death among non-Hispanic White individuals, cardiovascular conditions among non-Hispanic Black individuals, and infection among Hispanic individuals as seen in Figure 3. Rankings for American Indian or Alaska Native individuals were not available in this report due to the small number of 2020 pregnancy-related deaths reported by the MMRCs [5]; however, in a previous report published by the CDC on American Indian and Alaska Native individuals using data from 36 MMRCs (not including Montana) from 2017-2019, they found that mental health conditions were the most common underlying cause of death [6].

Among all races and ethnicities, the top six underlying causes of death for 2020 pregnancy-related deaths identified by MMRCs included mental health conditions, cardiovascular conditions, infection, hemorrhage, embolism, and hypertensive disorders of pregnancy [5]. Among all the pregnancy-related deaths within the 2020 report, MMRCs determined that 83.5% were preventable [5]. Of those individuals who identified as American Indian or Alaska Native with a pregnancy-related death in the 2017-2019 report, MMRCs determined that 93% were preventable [6].

Figure 3 Underlying Causes of Pregnancy-Related Deaths, Overall & By Race & Ethnicity [5]



2020 Key Findings

Within Montana, the MMRC reviewed 11 pregnancy-associated deaths from 2020. The committee reviewed these deaths in the winter of 2022 and spring of 2023. Of the 11 deaths, the committee determined that five were pregnancy-associated, but not related. Of the six remaining deaths, the Montana MMRC determined that three were pregnancy-related and they were unable to make a determination on three of the deaths with the information available to them. For these six deaths, the committee made the determination that each of these deaths was preventable, with 83% having some chance of being prevented and 17% having a good chance of being prevented. The committee then made actionable recommendations for those six preventable deaths.

Figure 4 . Flowchart of 2020 Montana MMRC Case Determinations

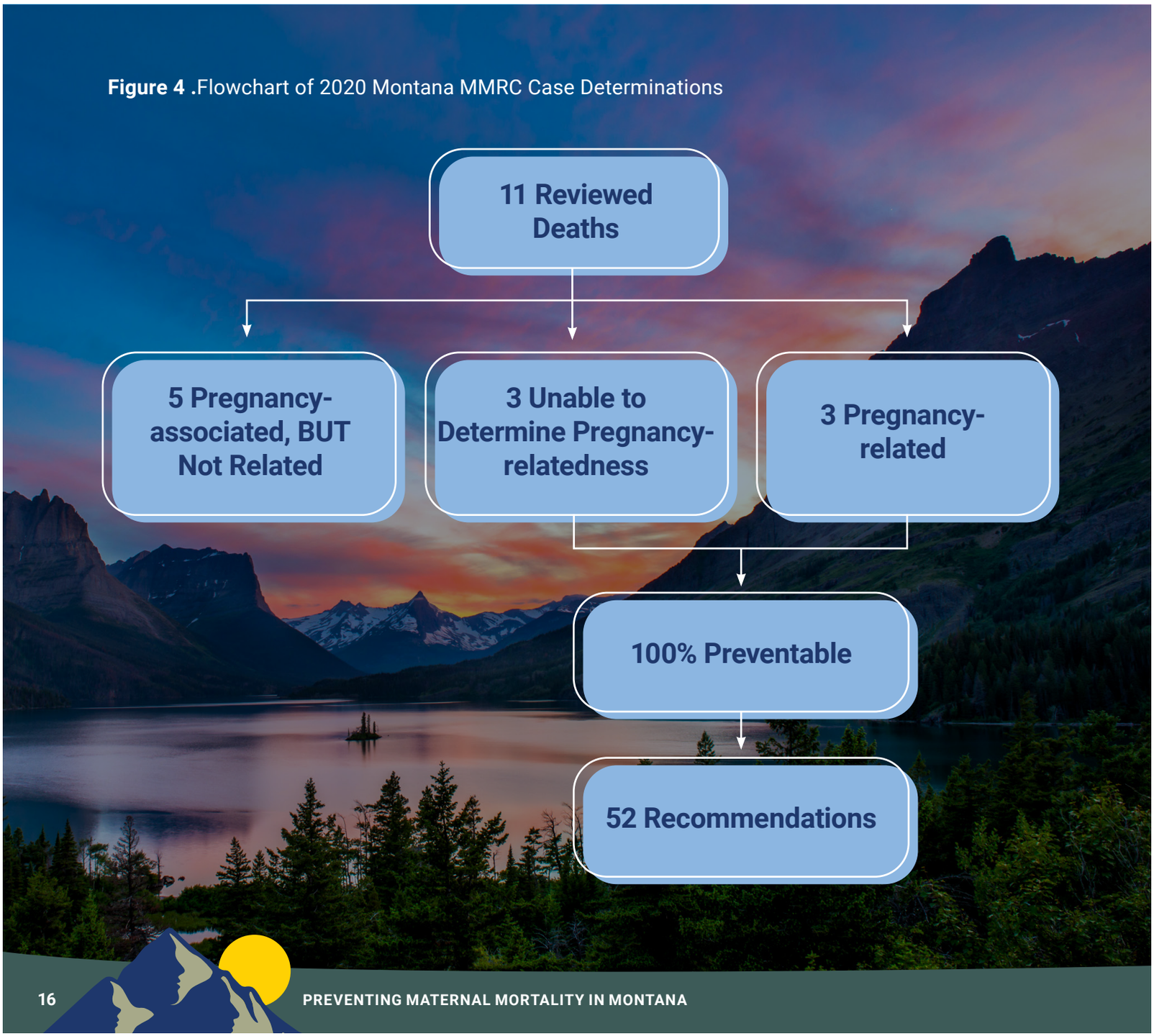
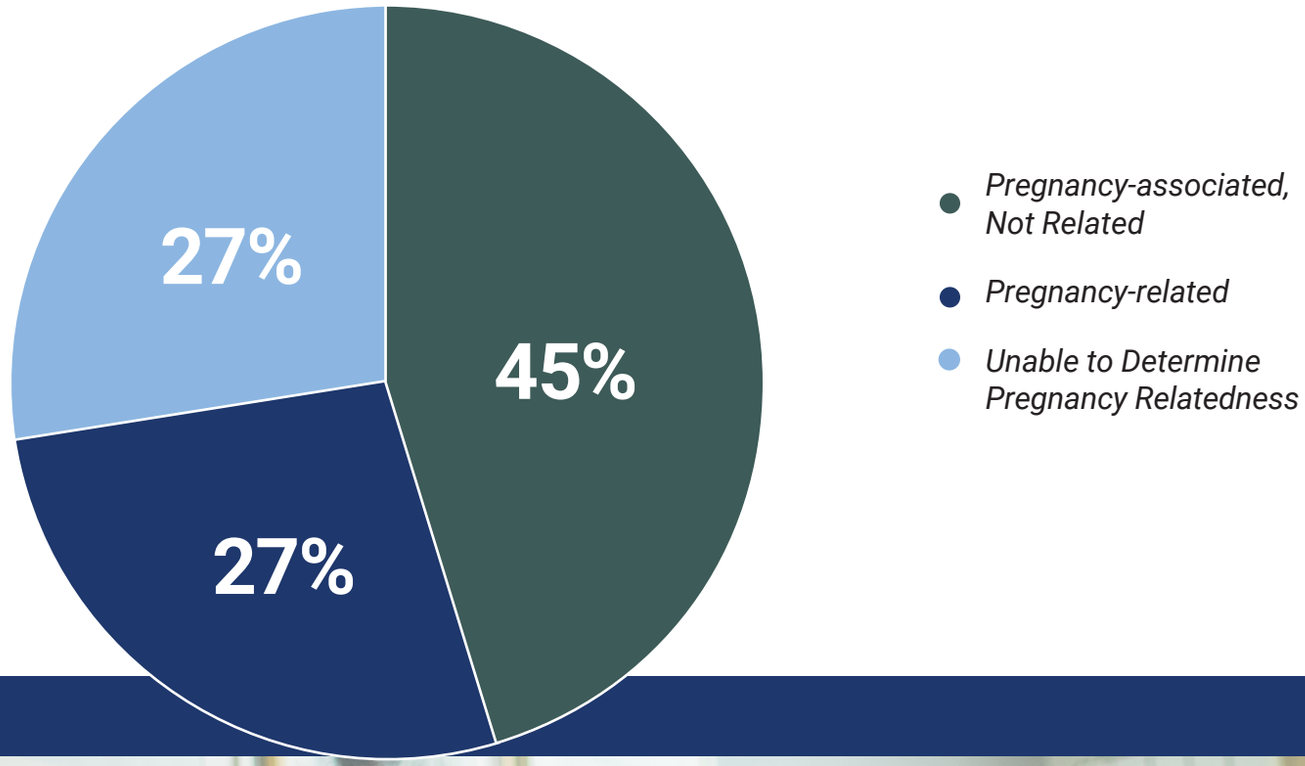


Figure 4 . Distribution of Montana MMRC 2020 Pregnancy-Relatedness Case Determinations

Montana MMRC 2020 Case Determination (N=11)



2020 Reviewed Pregnancy-Associated Deaths

Among the 2020 pregnancy-associated deaths that the Montana MMRC reviewed, most individuals were married, had public insurance, and were white. Nearly all deaths that were reviewed had received prenatal care within the first trimester and died in the postpartum period, specifically within 43 – 365 days postpartum. Among deaths reviewed, there was no common cause of death. Due to the potential for identifiability, we could not explore relationships between different demographic variables (cross-tabulated data).

Table 2 Demographics of the 2020 Pregnancy-Associated Deaths Reviewed by the Montana MMRC.

Demographics (N = 11)	n (%) *
Age	
Age (median [IQR])	31 [25.5 – 33]
Race	
White	8 (72.7)
American Indian/Alaska Native	3 (27.3)
Education	
Less than H.S. Diploma or H.S. Diploma	5 (45.4)
Some College	4 (36.4)
Associate's Degree	2 (18.2)
Marital Status	
Married	7 (63.6)
Single	4 (36.4)

Table 3 Medical Information of the 2020 Pregnancy-Associated Deaths Reviewed by the Montana MMRC.

Medical Information (N = 11)	n (%) *
Insurance Status	
Public Insurance	7 (63.6)
Private Insurance	2 (18.2)
Self-Pay	1 (9.0)
Unknown	1 (9.0)
Prenatal Care Initiation	
1st Trimester	8 (72.7)
None	3 (27.3)
Time of Death	
During pregnancy	2 (18.2)
Day of Delivery	0 (0.0)
1-6 Days Postpartum	0 (0.0)
7-42 Days Postpartum	1 (9.0)
43-365 Days Postpartum	8 (72.7)
Cause of Death/Manner of Death**	
Mental Health or Substance Use Disorder	3 (27.3)
Motor Vehicle Accident	2 (18.2)
Suicide or Homicide	2 (18.2)
Embolism - Thrombotic (Non-Cerebral)	1 (9.1)
Epilepsy/Seizure Disorder	1 (9.1)
Vascular Aneurysm/Dissection	1 (9.1)
Other Malignancies/NOS	1 (9.1)

* *NOTE: Data are n (%) unless otherwise stated as median [IQR]. IQR – Interquartile Range, representing the 25th percentile and 75th percentile of the 2020 decedents; Not all categories add to 100% due to rounding.*

** *Disclaimer: Pregnancy-associated, but not related, deaths fall outside of the scope of the Montana MMRC, so a full committee review is not completed, and a PMSS-MM coded cause of death cannot be assigned.*

Montana MMRC Findings for Pregnancy-Related Deaths

As this is the initial report of the Montana MMRC and only consists of findings from the review of 2020 pregnancy-associated deaths, we do not provide specific counts on the characteristics of those deaths that the committee determined were pregnancy-related to ensure privacy. Presenting their data as counts could potentially lead to the identification of individuals; alternatively, we provide these generalized summaries of those pregnancy-related deaths below to protect those who have died, while still offering some of our initial findings.

PRENATAL CARE

- Two-thirds (66.7%) of people who had a pregnancy-related death did not have documented prenatal care during pregnancy.

CAUSE OF DEATH AND CONTRIBUTING FACTORS

- Sixty-six percent of pregnancy-related deaths had an underlying cause of death due to substance use disorders.
- For pregnancy-related deaths, the committee determined that mental health conditions (66.7%) and substance use disorder (66.7%) were both circumstances that contributed to the death
- The committee also determined that discrimination was a circumstance that contributed (Yes or Probably) to the death in 66.7% of the pregnancy-related deaths.

TIMING OF DEATH

- As opposed to the pregnancy-associated deaths where most (72.7%) occurred in the late postpartum period (43-365 days postpartum), pregnancy-related deaths occurred in both the antepartum (33.3%) and postpartum periods (66.7%), with only 33.3% occurring more than six weeks after the end of pregnancy.

RACE

- American Indian/Alaska Natives made up 66.7% of the pregnancy-related deaths as compared to non-Hispanic Whites who accounted for 33.3% of pregnancy-related deaths. This represents a disproportionate burden of risk for the AI/AN community, comprising 6.2% of Montana's population and 9.5% of live births [7, 8].

OTHER DEMOGRAPHICS

- All pregnancy-related deaths occurred in people 30 years old or older.
- More than half of those who died from pregnancy-related deaths lived in rural areas (66.7%), had some college education (66.7%), and were employed (66.7%).

Recommendations

One of the key goals of ERASE MM and MMRCs is to provide recommendations for interventions to prevent future deaths. The Montana MMRC dedicates a significant portion of its attention to developing actionable recommendations to prevent future deaths based on the factors that they identify through their review that contributed to mortality in specific cases. The Montana MMRC follows CDC guidance regarding recommendation development and presents recommendations in a "[who] should [do what] [when]" format per these guidelines.

For the six 2020 deaths that the committee reviewed and deemed preventable, the Montana MMRC initially developed 73 broad recommendations. Through collaboration and discussion, the committee then refined these into 52 specific and actionable recommendations. The Montana MMRC makes recommendations at five different levels: Patient/Family, Provider, Facility, System, and Community based on the contributing factors of the deaths identified by the committee. There were many contributing factors identified by the committee, but they generally fell within the themes of Medical/Patient Care, Mental Health/Substance Use Disorder, Continuity of Care/Care Coordination, Historical/Intergenerational Trauma, Social Support/Community, and Justice System/ Child & Family Services. For each theme, the recommendations are then divided into areas of responsibility, those groups who can put each recommendation into action to improve maternal mortality outcomes.

The Montana MMRC acknowledges the time interval between recommendation development and the publication of this 2020 report. During this time, our partners and stakeholders have been diligently working hard to improve maternal health in Montana. Many recommendations have been implemented at the time of publication due to the ongoing support and collaboration of our partners.

1 Care Coordination/Continuity of Care

For 100% of the 2020 cases that the committee determined had at least some chance of being prevented, the Montana MMRC found that a lack of continuity of care was a contributing factor to the death and that improved care coordination could help to prevent future deaths. A lack of continuity of care can mean that care providers did not have access to an individual's complete records or did not communicate their status sufficiently. There might have been a lack of continuity between different types of providers, including primary care, emergency room, mental health, specialty, prenatal, and labor and delivery. Care might have been uncoordinated or not comprehensive among or between health care facilities or even unitswithin facilities.The Montana MMRC had the following recommendations to improve care coordination and continuity of care:

PROVIDER LEVEL RECOMMENDATIONS

- Multidisciplinary health care teams that include care coordinators should engage with and coordinate care with other providers involved in the care of pregnant patients to ensure continuity of care.
- Doulas, social workers, care coordinators, and/or other support team members should provide support and follow-up care of patients during the postpartum period, including information on how to access free and virtual postpartum support groups.

FACILITY LEVEL RECOMMENDATIONS

- Hospitals and clinics should implement integrated behavioral health (a whole health model), wherein physical and mental health services are offered in a team-based model, and support services, including care coordination and support groups, are included in the model, and hospitals and clinics should be reimbursed for implementing.
- Facilities should provide telehealth services for medical and behavioral health appointments when feasible to reduce potential barriers of the patient, including rural residency, transportation barriers, and social isolation.
- Health care facilities should implement processes to ensure continuity of care and appropriate follow-up for all patients, with additional processes in place for high-risk patients.

SYSTEM LEVEL RECOMMENDATIONS

- DPHHS should encourage patient health data sharing statewide forphysical and mental health care with patient consent to encourage a collaborative caremodel and reduce risks associated with incomplete medical records.
- Public and private insurance providers should provide reimbursement to support patients throughout the perinatal period through support such as case management, licensed doulas, community health workers, and resource groups.
- Public and private insurance providers should provide transportation services to those patients with barriers to accessing care.
- Public and private insurance providers should develop a reimbursement package that incentivizes strong care coordination, patient engagement, and continuity of care.

2

Historical/Intergenerational Trauma

The Montana MMRC determined that addressing both the causes and consequences of individual and historical level trauma is imperative to preventing maternal mortality. Many of the recommendations underscored the importance of ensuring that providers across the health care continuum are trained to provide trauma-informed care to all perinatal patients. The Montana MMRC continues to learn how to recognize trauma during case reviews and recommend appropriate ways to address its harmful implications. For the 2020 cases, the committee had recommendations related to trauma for more than a quarter of the cases (27.3%). These recommendations are below:

FACILITY LEVEL RECOMMENDATIONS

- Facilities should include patients and individuals with lived experience to contribute their perspectives.

SYSTEM LEVEL RECOMMENDATIONS

- All state, county, and city systems that involve community member interactions should require all employees to attend trauma-informed care training, resiliency training, and adverse childhood experiences (ACE's) upon commencement of employment and renewed as determined by state, county, and city systems.
- Multidisciplinary systems should reach out to families in the home when there is a history of intergenerational trauma to build trust and form relationships if the home is a safe environment for this to occur.
- DPHHS and the Office of American Indian Health should develop a cultural component to trainings that educate DPHHS staff and partners on the system of tribal, Indian Health Services, Urban Indian Health Centers, and private health care that serves Native American people in Montana. .
- DPHHS (or other appropriate governing body) should implement initiatives that improve trauma-informed care at each level of care for patients and community members.

3

Justice System/Child & Family Services

The justice system, including law enforcement, the courts, and other agencies, as well as supporting partners like CFSD, can play an important role in protecting the health and safety of families by connecting community members to resources and providing interventions when necessary. It is crucial that law enforcement agencies are knowledgeable about the factors contributing to maternal mortality and are prepared to refer individuals to resources that are tailored to their specific needs. Agencies of the justice system should be trained in trauma- informed approaches in order to facilitate trusting and supportive relationships with those who may be experiencing a perinatal mood or anxiety disorder, or substance use disorder.

PROVIDER LEVEL RECOMMENDATIONS

- DPHHS, health care organizations, and CFSD should educate providers and staff on how to thoughtfully conduct mental health and substance use screenings on patients in a way that dissipates and/or addresses fears of repercussions for those with a positive screen.

SYSTEM LEVEL RECOMMENDATIONS

- The State of Montana should recognize maternal mortality in all functions, systems, and policies that may affect a pregnant woman.
- Health care providers should follow up with patients who do not complete a treatment plan and require treatment.
- Montana's justice system should connect individuals to appropriate systems for their needs, including mental health court or substance use court.
- CFSD should develop practices that utilize preventative, trauma-informed approaches when working with families.
- CFSD should collaborate with the healthcare team to develop a Plan of Safe Care for the patient that addresses an individual's risk factors and social situation.

4 Mental Health/Substance Use Disorder

The Montana MMRC's recommendations stressed the importance of improving access to care for individuals with perinatal mood and anxiety disorders and substance use disorder. The recommendations primarily center around improving screening processes, referral protocols, and taking steps to ensure that treatment options are accessible and affordable. The recommendations also indicate a need for a higher level of integration of mental health/recovery services into the realm of maternal health care, with robust practices of collaboration and communication in place between the two highly interconnected entities often thought of as separate.

PROVIDER LEVEL RECOMMENDATIONS

- Providers should keep documentation of any medication changes or note shifts in mood, sleep, bonding, and support for patients during the perinatal period.
- Providers should institute universal mental health screenings for patients at all prenatal and postpartum appointments and establish open lines of communication with other community resources or services in order to ensure timely referrals to necessary supports.
- Providers should initiate a referral and a warm handoff to a behavioral health clinician during the same appointment when patients are scoring high on mental health or substance use screenings.

FACILITY LEVEL RECOMMENDATIONS

- Clinics should provide incentives for individuals to come into the clinic for care (e.g., contingency management).
- Facilities should have policies and procedures in place to facilitate ongoing engagement and continuity of care for those who have not made use of referrals that have been deemed important for the well-being of the patient.
- Facilities should use well-child visits as an important opportunity to assess the well-being of both the infant and caregiver and provide an avenue for the screening, identification, and treatment of substance use disorder or perinatal mood and anxiety disorders.
- Facilities should routinely evaluate and update the policies and practices in place for referrals, by assessing the efficacy and accessibility of their referrals, and then adapting them to better fit the patient's needs.

SYSTEM LEVEL RECOMMENDATIONS

- The health care system should integrate primary and mental health care providers to improve collaboration and communication for patients in need of services.
- Local, state, and national social work and counseling associations should implement mechanisms that would enhance follow-up and referral services and the ability to reengage patients lost to follow-up.
- Mental health care providers, primary care providers, OBGYNs, LCSWs, counselors, and other care providers should ensure continuity of care in the postpartum period, especially for those experiencing severe mental illness or substance use disorder.
- Systems should increase awareness among providers at all levels of care of the necessity of postpartum mental health/substance use disorder screenings for perinatal patients and have protocols in place to ensure compliance in administering them.

COMMUNITY LEVEL RECOMMENDATIONS

- Community agencies should increase community-level awareness around warning signs and potential action steps for suicide prevention and equip communities and families with the resources on how best to support their loved ones struggling during the perinatal period in an effort to prevent suicide and overdoses.
- State-wide policies should be introduced to ensure that treatment for substance use disorder is made available, accessible, and affordable for all who need it, regardless of their circumstances or ability to pay.

5 Patient Care/Medical Care

Several changes must be made at all levels of the medical care continuum to improve maternal health outcomes and prevent maternal mortality. There is a general need to better integrate providers and specialties across the maternal health care spectrum and have clear, standardized protocols in place to better aid the recognition, diagnosis, and treatment of complications in perinatal patients.

PROVIDER LEVEL RECOMMENDATIONS

- Maternity care providers should review signs and symptoms of postpartum complications with patients and provide education about what steps to take when those signs and symptoms are present (i.e., call the provider, go to the ER, call 911, etc.).
- Providers should follow the standard of care in assessment and management in ruling out deep vein thrombosis (DVT) in patients if indicated.
- Emergency room providers should consult with maternity care specialists like OB/GYN or MFM when the scope of care is outside their expertise and pregnant or postpartum patients present with nonspecific symptoms.
- Providers should offer treatment options when patients screen positive for an infection or disease when indicated and appropriate.
- Behavioral health providers should include discussions about family planning with all clients and ensure a plan is in place for those not wanting a pregnancy and those providers should have access to a provider with prescriptive authority to follow through with the prescriptions for birth control when needed or have a referral process in place to refer the patient.
- Providers should routinely counsel patients regarding contraception and family planning options.
- When a referral is made for a specialist, the specialist should reach out to the patient to schedule an appointment within a closed - loop referral system.
- Patients with a life-threatening illness should discuss family planning options with their provider.

FACILITY LEVEL RECOMMENDATIONS

- During triage or initial assessment, all facilities should assess patients for current or past pregnancies within the last year.
- Facilities should implement standards of care and routine education on signs and symptoms of life-threatening conditions for pregnant and postpartum patients like DVT, pulmonary embolism, and eclampsia.

SYSTEM LEVEL RECOMMENDATIONS

- Private and public insurance should cover genetic and contraceptive counseling for patients with high-risk genetic conditions/ family history of high-risk conditions.
- The case manager or care coordinator should ensure there is pregnancy prevention follow-up with high-risk patients.

COMMUNITY LEVEL RECOMMENDATIONS

- DPHHS or other health care licensing entities should initiate a statewide education effort to review DVT diagnosis with care providers.
- Community support networks should conduct outreach and follow-up for at-risk patients and community members.

6

Social Support/Community

Social support is an essential component of healthy and thriving communities, and the perinatal period is often considered to be a time when parents and families require a greater degree of social and community level support [8]. As such, it is critical that efforts to improve maternal health outcomes go beyond systems and facility level changes and engage the broader community in collective efforts to cultivate safe and healthy environments for families.

SYSTEM LEVEL RECOMMENDATIONS

- The Montana University System should financially and programmatically support training programs for care coordinators and community health workers and make those programs more visible and accessible to people within Montana communities if this funding doesn't preempt funding for another needed program.

COMMUNITY LEVEL RECOMMENDATIONS

- DPHHS and Department of Justice should increase education on safe storage and security of firearms in the home and provide free gun locks for every weapon in the home.
- The Montana Legislature should adopt restrictions on firearm access to those people who are at high risk for suicide or homicide.
- DPHHS should increase education and advocacy efforts on existing perinatal supports, resources, and programs around the state.
- Public health agencies should identify strategies to address isolation as a health risk factor through public education and communication, such as social media.

Policy Implications and Future Directions

For Maternal Health Care in Montana

Based on the recommendations that came out of the 2020 Montana case review there is a growing need for improved maternal health care and maternal support in Montana, especially among those with underlying mental health conditions, substance use disorder, and barriers to care. The recommendation that occurred most frequently for the reviewed cases from 2020 was to improve, incentivize, and reimburse care coordination services for patients. For this to be fulfilled, it will require buy-in from multiple agencies and stakeholders at the national, state, and county levels.

STRENGTHENING CONTINUOUS & COORDINATED POSTPARTUM CARE:

One of the key priorities to emerge from the Montana MMRC's review is the expansion and strengthening of access to continuous and coordinated postpartum support for Montanans. The postpartum period can be one of immense transition, difficulty, and uncertainty; a time where parents tend to require an elevated degree of support. Counterintuitively, it is also a time when care becomes more fragmented and inconsistent. Seeing as though the majority, approximately 47.1%, of pregnancy-related deaths occur between one day and a year after birth, it is imperative that the postpartum care structure be adapted to this uniquely vulnerable time [5].

In pursuit of this important aim, postpartum care must be both more continuous and frequent—one appointment six weeks after birth has proven to be woefully inadequate. Instead, the first checkup should be as early as 7 to 14 days postpartum. More prompt and numerous postpartum appointments can better equip providers to identify complications, screen for perinatal mood and anxiety disorders (PMADs), and connect individuals to other resources and services. Expanding the availability of home visitors, community health workers, doulas, and telehealth providers are critical tools for ensuring that those patients who face barriers to accessing their postpartum care appointments—such as rural residency, lack of transportation, paid leave, child care, or mental health challenges—are being properly supported.

Because postpartum care can often become disjointed, there must be a high level of coordination between all entities on the maternal health care continuum—including OBGYNS, MFMs, pediatricians, midwives, primary care providers, nurses, mental health care providers, doulas, community health workers, and any other necessary providers. There should be clear channels of communication and information sharing between providers, and protocols for referrals and consistent follow-up mechanisms must be established.

SUPPORT FOR PERINATAL MOOD DISORDERS AND SUBSTANCE USE DISORDER:

Another aspect of postpartum care that must be strengthened is the identification and treatment of substance use disorder (SUD) and PMADs. Devastatingly, accidental overdoses and suicides are among the leading causes of death during the postpartum period [9]. In light of this, there is a great need to expand and strengthen access to postpartum care and support in what can be a profoundly emotionally, psychologically, and physically turbulent time.

Provider, facility, system, and community level changes are needed to strengthen the tools providers have for the screening, recognition, referral, and treatment of those with PMADs and SUD. Providers should be aware of and prepared to refer patients with SUD to appropriate treatment, including peer-support resources and affordable and accessible medications for opioid use disorder treatment options. Providers across the health care spectrum must be trained to provide trauma-informed, non-judgmental, compassionate care to foster trusting relationships with patients who often face stigmatizing interactions within health care systems, and who may be disinclined to disclose their substance use out of fear of legal repercussions or losing custody of their children [10].

ADDRESSING THE CAUSES AND CONSEQUENCES OF INTERGENERATIONAL & HISTORICAL TRAUMA:

The role that trauma plays in maternal mortality is complex. Trauma can be experienced on several levels, from individual trauma stemming from abuse, assault, or neglect, to trauma experienced intergenerationally by families or by entire communities.Trauma can have enduring and profound impacts on an individual's psychological, physical, emotional, and spiritual well-being and is associated with chronic physical and mental health conditions throughout a person's life [11].

Trauma can also be a collective experience in addition to an individual one. Historical trauma refers to the cumulative, enduring consequences of historical oppression on the emotional, psychological, physical, cultural, and spiritual health of socially marginalized communities across generations [12]. In the case of Indigenous peoples in Montana, the immense harm caused by policies of forcible relocation and assimilation, for instance, continue to shape the livelihoods and material conditions of Indigenous communities today—driving health disparities and high rates of poverty, trauma, suicide, and substance use [15, 16]. It is imperative that providers recognize and take action to reduce the scope and severity of intergenerational trauma that exists in the communities they serve, including integrating culturally derived and appropriate interventions into their models of care [14]. Doing so is a necessary step to disrupting the transmission of trauma to future generations [15].

The perinatal period can be a particularly challenging time for thosewho have experienced trauma. For instance, a history of trauma can increase the risk for post-traumatic stress disorder during pregnancy and birth by twelve-fold [12, 13]. There is a growing body of evidence that demonstrates that those

with trauma histories are at an elevated risk of developing perinatal complications, such as gestational hypertension, diabetes, and anxiety or depression [18]. One systematic review and meta-analysis, indicating the highest level of evidence available, that sought to investigate the association between ACEs and adverse pregnancy outcomes found that individuals with high ACEs scores were 37% more likely to experience pregnancy complications, demonstrating the persistent, reverberating impact of trauma throughout a person's life, including the perinatal period [18]. These data reinforce the necessity of trauma-informed care to improve both the experiences and outcomes of pregnant and postpartum women with a history of trauma. Providers should be properly trained to provide care that takes steps to prevent re-traumatization and supports individuals in reclaiming their autonomy throughout their pregnancy, birth, and parenting journeys.

For the Montana MMRC

The Montana MMRC continues to grow and learn as the committee members establish trust amongst each other and develop best practice strategies. Several members have had the opportunity to observe other state MMRC meetings, attend additional training, and attend the national conference held by the CDC for MMRC committee members, nurse abstractors, facilitators, coordinators, analysts, and other key stakeholders.

In the future, the Montana MMRC will begin informant interviews to allow for a greater understanding of the person who died. This information will be incorporated into the case narratives, facilitated discussions, and recommendations. The Montana MMRC is also in the process of developing partnerships with key stakeholders to help implement recommendations that have developed from case reviews.

With their continued progress, the Montana MMRC's goal is to create long-lasting change and see fewer preventable deaths among the reviewed pregnancy-associated deaths and in the State of Montana.

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