2018-2022 Pregnancy-Related Maternal Mortality in Arizona Report

May 2026

ARIZONA
DEPARTMENT OF
HEALTH SERVICES

Errata Sheet

The following corrections and edits were made to the 2018-2022 Pregnancy-Related Maternal Mortality in Arizona Report on June 10, 2026.

> Page 25: The percentage of cases with mental health conditions as the primary underlying cause of death that had substance use disorder as a primary or secondary underlying cause of death has been corrected from 100% to 63.3%.

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Dedication

Dedicated to all who have been lost during pregnancy, delivery, or postpartum, this report stands as a testament to our commitment to understanding and preventing maternal mortality and to improving maternal health for all Arizonans.

Acknowledgments

The Arizona Department of Health Services (ADHS) would like to acknowledge Dr. Sarah Kellerhals and Kim Moore-Salas for their commitment and leadership as current co-chairs of the MMRC. ADHS would also like to acknowledge the members of the Arizona Maternal Mortality Review Committee (MMRC) who completed the 149 case reviews included in this report. Despite evolving guidelines and processes, the focus and dedication of the MMRC have resulted in thorough case reviews and well-crafted recommendations to prevent future maternal morbidities and fatalities in Arizona. A full list of MMRC members is available in **Appendix A**. The MMRC acknowledges the twenty-two Native Nations in Arizona who have stewarded this Land since time immemorial, and recognizes their People, culture, and history.

Submitted To

The Honorable Katie Hobbs, Governor, State of Arizona
The Honorable Warren Petersen, President, Arizona State Senate
The Honorable Steve Montenegro, Speaker, Arizona State House of Representatives
This report is provided as required by A.R.S. §36-3501.01 C.3.

Prepared by

Arizona Department of Health Services - Bureau of Assessment and Evaluation

Samantha Davidson, MS, Maternal and Child Health Epidemiologist
Aubri Perez, BS, Maternal Health Program Manager
Glenda M. Ramirez, MPH, Maternal and Child Health Epidemiologist
Vivienne Rubio, MSN, RN, Clinical Nurse Abstractor
Mary Glidden, MPH, Office Chief, Office of Fatality Review

For questions regarding this report, please email maternalhealth@azdhs.gov.

Acknowledgements to Reviewers

Devina Wadhera, PhD, Program Evaluation Administrator, Prevention Epidemiology and Evaluation Team
Martín F. Celaya, DrPH, MPH, Bureau Chief, Bureau of Assessment and Evaluation
Celia Nabor, MPA, Assistant Director, Prevention Services

Acknowledgements to Staff

Thank you to the ADHS Staff who supported the review of 2018–2022 cases and contributed to advancing system-level recommendations identified by the MMRC.

Disclaimers

Use of the Term: Maternal Mortality

In this report, the term "Maternal Mortality" (MM) is used interchangeably with "pregnancy-related deaths," which may differ from other organizations, such as the World Health Organization. Refer to the Glossary in **Appendix B** for more detailed definitions.

Definition of Race

Racial and ethnic designations used in this report are based on information recorded on birth and death certificates as provided by ADHS's Bureau of Vital Records. Race and ethnicity for maternal deaths was taken from maternal death certificates. If a woman was identified as both Hispanic and another race, she was classified as Hispanic. For data involving live births, the mother's race or ethnicity was based on what was recorded on the live birth certificates. Racial and ethnic designations used in this report are White non-Hispanic, Hispanic, Black or African American, American Indian or Alaska Native (including Aleut and Eskimo), and Asian or Pacific Islander (including Hawaiian).

Data Suppression

To protect confidentiality and ensure accurate reporting, ADHS suppresses numbers less than six but greater than 0. This applies to case numbers, ratios, and percentages. Case counts between six and 10 must be interpreted with caution due to the small sample size.

Previous ADHS Reports on Maternal Mortality

The methods used to report maternal mortality findings were derived from the Review to Action approach adopted by ADHS in 2018. Four previous reports align with these methods: the Maternal Mental Health- and Substance Use- Related Deaths in Arizona report (2016-2018), the Maternal Mortalities (2016-2017) and Severe Maternal Morbidity in Arizona report (2016-2019), the Maternal Mortality in Arizona report (2018-2019), and the 2016-2020 Pregnancy Related Maternal Mortality in Arizona Report. The first Arizona Maternal Mortality Review Program report (2012-2015) was published before the Review to Action methods were adopted. Therefore, maternal mortality findings between 2016-2022 should not be compared to those reported for 2012-2015.

Arizona Health Status and Vital Statistics Annual Reports

ADHS's Business Intelligence Office (BIO), Vital Statistic Program publishes the Arizona Health Status and Vital Statistics Annual Reports, which include maternal and infant health outcomes. The data reported here may differ from previously published data due to additional descriptive context and data obtained during the maternal mortality review process. Population-level data for all Arizona births are available in the Arizona Health Status and Vital Statistics Annual Report.

Prevention Recommendations

The prevention recommendations in this report were developed by the MMRC and informed by a literature review conducted by the Maternal Mortality Review Program. Thus, these recommendations do not necessarily reflect the official views of ADHS or the State of Arizona.

Intended Audience

This technical report analyzes the incidence and causes of maternal mortality in Arizona from 2018 to 2022. This report is primarily intended for those involved in advancing maternal health, including healthcare providers, community-based organizations, researchers, policymakers, and other relevant stakeholders. While the report is publicly accessible, it is not written for the general public. Individuals without a background in maternal health or clinical knowledge of pregnancy, labor, and delivery complications should use caution when interpreting these findings and recommendations.

How to Use This Report

This report describes the incidence of maternal deaths in Arizona and highlights various risk factors contributing to these mortalities. The key findings aim to inform the identification of future intervention targets and support the development of effective, evidence-based strategies to reduce adverse maternal health outcomes.

Publication Information

Contact the Maternal Mortality Review Program at maternalhealth@azdhs.gov or 602-354-1430 if you would like this report in an alternative format.

 This publication was supported by a Cooperative Agreement Number: 6 NU58DP007788-01-02 funded by the Centers for Disease Control and Prevention (CDC). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC or ADHS.

Suggested Citation

Davidson, S, Perez, A, Ramirez, GM, Rubio, V, Glidden, M. 2018-2022 Pregnancy-Related Deaths in Arizona. Phoenix, AZ: Arizona Department of Health Services; 2026.

Letter from Committee Co-Chairs

Dear Colleagues, Partners, and Community Members,

As Co-Chairs of the Maternal Mortality Review Committee, we write to share key insights from this year's review and to emphasize the opportunities to better support mothers and families. We also want to honor the lives of those who have passed and recognize the lasting impact on their families and communities- an impact that underscores the importance of this work. The findings in this report are both striking and motivating: the vast majority of the pregnancy-related deaths we reviewed were determined to be preventable, reinforcing that meaningful change is within reach.

One of the most powerful patterns is when these deaths occur. Too often, our attention is concentrated around delivery and the immediate postpartum period, yet most deaths occurred well into the first year after pregnancy. This underscores the importance of extending care, support, and follow-up beyond the traditional postpartum window and ensuring that patients remain connected to services during this vulnerable time.

We were also reminded that the drivers of maternal mortality extend beyond traditional obstetric complications. Mental health conditions accounted for the largest proportion of deaths, highlighting the urgent need to integrate behavioral health into routine perinatal care, reduce stigma, and improve access to timely treatment. At the same time, preventable deaths from infection and other medical causes point to ongoing gaps in recognition, coordination, and access to care.

These findings call for a comprehensive and sustained approach—one that strengthens clinical care, addresses social and structural factors, and prioritizes continuity across the full perinatal period. By increasing attention and investment, working collaboratively across disciplines and systems, we have a real opportunity to reduce preventable deaths and improve outcomes for all mothers.

Sincerely,

Sarah Kellerhals, MD & Kimberly Moore-Salas, IBCLC

Executive Summary

Key Findings on Pregnancy-Related Mortality: 2018-2022

From 2018-2022, there were 149 pregnancy-related deaths, with an average of 29.8 deaths each year. The pregnancy-mortality ratio (PRMR), which compares the number of pregnancy-related deaths to the number of live births, increased from 2018 to 2022. American Indian or Alaska Native (AI/AN) and Black or African American women were impacted the most by maternal mortality compared to other racial/ethnic groups. Women living in rural counties continued to be impacted more by maternal mortality compared to those living in urban counties. The highest PRMR was observed among the Medicaid payer group.

Through a multidisciplinary review, the Maternal Mortality Review Committee (MMRC) determined that 90.6% of the pregnancy-related deaths were preventable. Of these preventable deaths, the majority occurred in the postpartum period. The most common underlying cause of pregnancy-related deaths was mental health conditions, followed by infection.

Top 5 MMRC Recommendations to Eliminate Maternal Mortality

The MMRC identifies the following recommendations as the top five strategies to eliminate maternal mortality, based on their potential impact and feasibility in Arizona's current healthcare and policy landscape. These recommendations aim to address preventable delays in early recognition of risk, clinical response, and access to appropriate care.

1. Standardize facility protocols and healthcare provider training to improve recognition, referral, and timely treatment of high-risk perinatal conditions and emergencies, reducing preventable delays in diagnosis and escalation.

2. Implement standardized screening and clinical assessment across all healthcare settings, using trauma-informed approaches, to ensure early identification, accurate risk stratification, reliable documentation, and timely escalation of care for pregnant and postpartum women.

3. Ensure affordable, timely, and comprehensive access to perinatal care by expanding treatment capacity, improving geographic and physical accessibility, strengthening the perinatal workforce, and removing insurance coverage barriers and other structural barriers to care.

4. Standardize and implement evidence-based clinical protocols for high-risk perinatal conditions and obstetric emergencies across all care settings to reduce variability in care and prevent missed or delayed treatment.

5. Create clear, time-sensitive clinical access and transition pathways that reduce delays in triage, referral, transport, and escalation for early pregnancy confirmation, urgent symptoms, and specialty evaluation.

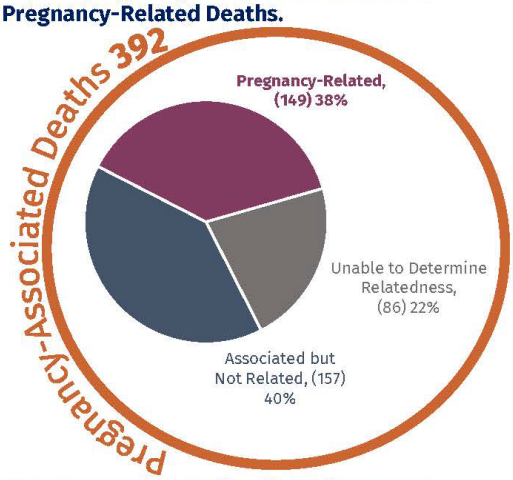
Infographic

Maternal Mortality in Arizona, 2018-2022

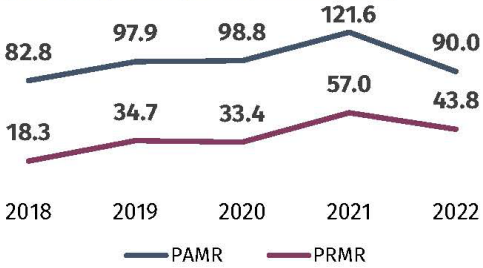
ARIZONA DEPARTMENT OF HEALTH SERVICES

MMRC Reviewed Deaths in Arizona of Women 15-49 Years of Age with a Pregnancy in the Previous 365 Days

Three (3) out of every 10 deaths of women within 365 days of pregnancy were determined to be Pregnancy-Related Deaths.



The PRMR and PAMR in Arizona increased between 2018-2021, and decreased between 2021-2022. (Deaths per 100,000 live births)



**Data includes maternal deaths ages 15-49 years.*

91% of Pregnancy-Related deaths were considered **PREVENTABLE**

Definitions

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, community, provider, facility, and/or systems factors.

Pregnancy-Associated:
The death of a woman during pregnancy or within one year of the end of pregnancy, regardless of the cause.

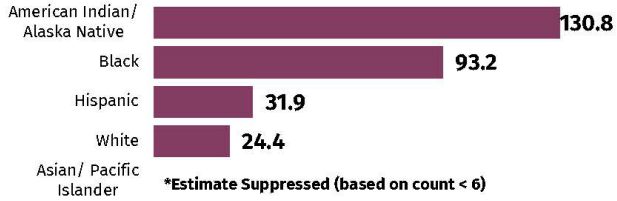
Pregnancy-Associated Mortality Ratio (PAMR):
The number of pregnancy-associated deaths per 100,000 live births. It is a ratio, rather than a rate, because the denominator contains only live births and not all pregnant women who are at risk of maternal death.

The most common primary underlying cause of death among Pregnancy-Related cases was mental health conditions.

- **30%** Mental Health Conditions
- **24%** Infections
- **16%** Other*
- **11%** Hemorrhage (Excludes Aneurysms or CVA)

**Includes Embolism - Thrombotic (Non-Cerebral), Cardiomyopathy, Metabolic/Endocrine, Neurologic/ Neurovascular Conditions (Excluding CVA), Collagen Vascular/ Autoimmune Diseases, Conditions Unique to Pregnancy, Hematologic Pulmonary Conditions (Excludes ARDS), Renal Diseases, and Unknown Cause of Death*

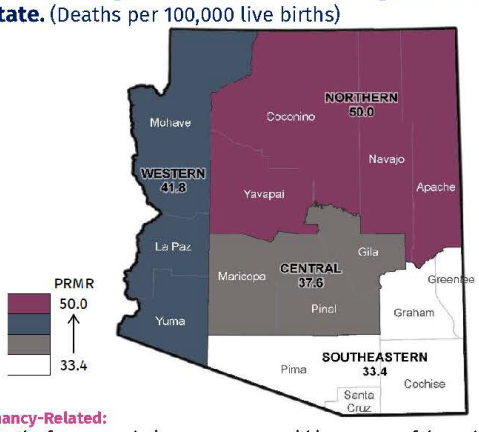
American Indian/Alaska Native and Black women experienced the highest Pregnancy-Related Mortality Ratio. (Deaths per 100,000 live births)



***Estimate Suppressed (based on count < 6)**

(Misclassification bias may be present for cases &/or live births with multiple racial/ethinic identities. Please interpret data with caution.)

The Pregnancy-Related Mortality Ratio in the Northern Region of Arizona was the highest in the state. (Deaths per 100,000 live births)



Pregnancy-Related:
The death of a woman during pregnancy or within one year of the end of pregnancy, from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Pregnancy-Related Mortality Ratio (PRMR):
The number of pregnancy-related deaths per 100,000 live births. It is a ratio, rather than a rate, because the denominator contains only live births and

For additional information, email maternalhealth@azdhs.gov

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Section 1: Overview of Maternal Mortality (MM)

Causes of MM extend beyond natural causes of death (e.g., hypertensive disorders, infections, cardiac conditions). Conditions related to maternal mental health (e.g., suicide), drug use (e.g., overdose), domestic violence (e.g., homicide), and other causes of death can also be related to and/or aggravated by pregnancy and can result in a maternal death. To this end, thorough and standardized case reviews conducted by the Arizona MMRC are critical in determining whether deaths among Arizona women within 365 days of pregnancy are pregnancy-related.

For the purposes of this report, Arizona uses an inclusive definition of **maternal mortality**, which includes any death that occurs during or within one year of pregnancy, regardless of the outcome, duration, or site of the pregnancy.

Pregnancy-associated: A death that occurs 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.[1]

Pregnancy-related: A death that occurs 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.[2] These are indicated by the magenta leaves in Figure 1.

Pregnancy-associated, but not related: A death during or within one year of pregnancy, from a cause that is not related to pregnancy.[2] These are indicated by the teal leaves in Figure 1.

Figure 1. Pregnancy-Associated Deaths

Source: Centers for Disease Control and Prevention. "Pregnancy- Associated Deaths."

Figure 1 demonstrates that while all deaths (shown as leaves on the tree) occurring within one year of pregnancy are considered pregnancy-associated, only a smaller portion are pregnancy-related.

Maternal health outcomes occur on a broad spectrum, ranging from uncomplicated pregnancies to life-threatening events. Refer to pages 22-23 of the 2020 report on Maternal Mortalities and Severe Maternal Morbidity in Arizona for a more detailed explanation of maternal outcomes. Additionally, pages 26-27 of the same report outline the various factors that influence maternal health outcomes before, during, and after pregnancy.

Arizona Department of Health Services' (ADHS) Efforts to Improve Maternal Health Outcomes

ADHS is committed to improving the health and wellness of all Arizonans and released its 2025–2029 Strategic Map outlining statewide goals to advance health outcomes. Key priorities include lowering infant and pregnancy-related mortality rates to 5.2 infant deaths per 1,000 live births and 22.4 pregnancy-related deaths per 100,000 live births. Since establishing these targets, Arizona has made meaningful progress, with infant mortality decreasing by 12.9%, surpassing the 5% reduction target; however, the pregnancy-related mortality rate was 33.4 per 100,000 live births in 2020, indicating the need for continued focus through the state's action plans.

In 2019, ADHS's Maternal Mortality Review Program (MMRP) was one of 24 states awarded through CDC's Preventing Maternal Deaths: Supporting Maternal Mortality Reviews (i.e. ERASE MM) grant. In 2024, ADHS received renewed funding through a second 5-year award. The funding supports efforts to understand and prevent pregnancy-related deaths by gathering data on the causes and circumstances of maternal deaths and developing prevention recommendations. The MMRP recently established an AI/AN Subcommittee to support focused, culturally informed review of AI/AN maternal deaths.

In 2019, ADHS's Maternal Health Innovation Program (MHIP) was awarded funding through the U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA), State Maternal Health Innovation grant. In 2023, ADHS received renewed funding through a second 5-year award. MHIP works closely with the MMRP and uses MMRC data and recommendations to guide strategic initiatives focused on improving maternal health outcomes and reducing disparities. As a result, Arizona is strengthening its maternal health system by enhancing data infrastructure, supporting implementation of patient safety bundles, and advancing targeted initiatives addressing maternal mental health, workforce development, Tribal maternal health, and systems of care.

The Maternal Health Task Force (MHTF) serves as a central component of MHIP, guiding statewide maternal health efforts through collaboration, planning, and implementation. In alignment with this work, the Perinatal and Infant Health Task Force (PIHT) was established in 2024 to address needs across the perinatal period, encompassing both maternal and infant health. In 2026, the MHTF and PIHT merged to form the Maternal and Infant Health Task Force (MIHT). This structure brings together cross-sector partners to strengthen coordination across maternal and infant health initiatives, improve efficiency, reduce duplication, and better support families across the continuum of care. The Task Force will continue to maintain specialized subcommittees and workgroups focused on priority areas, including maternal mental health, Tribal maternal health, and the Arizona AIM Steering Committee.

ADHS has also been tasked with establishing the Advisory Committee on Obstetrics, Gynecology, and Maternal Mental Health in Rural Communities, as outlined in House Bill 2332. Findings from this work are expected to inform and complement statewide maternal mental health efforts, including activities elevated through the Maternal Mental Health Task Force.

This work is guided by both the Stillbirth and Infant Mortality Action Plan (SIMAP) and the Arizona Maternal Health Action Plan. The SIMAP focuses on six key areas: 1) Reduce prematurity/preterm births; 2) Prevent birth defects; 3) Strengthen systems of care for mothers and infants; 4) Strengthen the workforce; 5) Improve surveillance of fetal-infant morbidities and deaths; and 6) Promote optimal fetal-infant health. The Arizona Maternal Health Action Plan outlines six priority areas: 1) Increase awareness and understanding of maternal health conditions and well-being; 2) Improve access to quality maternal health care; 3) Strengthen the capacity, competency, and coordination of Arizona's maternal health workforce; 4) Improve collection, analysis, and application of maternal health data; 5) Strengthen maternal health systems of care; and 6) Foster respectful and trustworthy community collaborations.

The Arizona AIM Collaborative, in partnership with the Arizona Hospital and Healthcare Association (AzHHA), implements patient safety bundles across all 41 birthing facilities in Arizona. Although data collection for the Severe Hypertension in Pregnancy bundle has concluded, established implementation efforts may continue at participating sites. In 2026, the AIM Collaborative continues to collect data on the implementation of the Obstetric Hemorrhage and Perinatal Mental Health and Substance Use Disorders bundles.

The Pregnancy Risk Assessment Monitoring System (PRAMS) is a joint research project between ADHS and the CDC to better understand mothers' experiences before, during, and after pregnancy. Each month, Arizona PRAMS surveys 1 in 30 new mothers in the state via mail and phone. The survey collects data on prenatal care, health insurance coverage, mental health and/or substance use during pregnancy, preconception and interconception care, and infant health to guide ADHS' maternal and infant health efforts.

The High Risk Perinatal Program (HRPP) is a statewide system of services dedicated to reducing maternal and infant mortality and morbidity. Strategies include early identification of women and children at high risk; education for health professionals, families, and communities; linkage of infants, toddlers, and pregnant women to risk-appropriate services; and establishment of standards of care.

The Arizona Health Start Program is a statewide initiative that provides comprehensive support to pregnant women, new mothers, and their families, particularly those facing socioeconomic challenges or at risk of poor health outcomes, to improve health outcomes.

ADHS is a key partner in administering the Rural Health Transformation Program (RHTP). ADHS will receive $5 million from the Centers for Medicare and Medicaid Services (CMS) through the Arizona Health Care Cost Containment System (AHCCCS) to implement strategies for improving rural maternal and fetal health. The Improving Rural Maternal–Fetal Health Grant is designed to reduce preventable maternal morbidity and mortality in rural and Tribal communities by strengthening evidence-based clinical care, enhancing workforce readiness, and expanding access to timely perinatal mental health and care navigation services. RHTP funding is expected to help maintain the Arizona Perinatal Psychiatry Access Line (APAL), a statewide provider consultation resource that expands access to perinatal mental health expertise and supports providers serving pregnant and postpartum women in Arizona.

For more information on ADHS' maternal health efforts, visit http://azdhs.gov/maternalhealth.

Section 2: Maternal Mortality in Arizona, 2018-2022

Overview of the ADHS Maternal Mortality Review Program

Authorization

The A.R.S. §36-3501 was amended in April 2011 to establish the Arizona MMRC as a subcommittee of the Child Fatality Review Program. Since its establishment in July 2011, the subcommittee convened by the Arizona MMRP has reviewed all identified maternal deaths in the state.

In 2025, Governor Katie Hobbs signed Senate Bill 1316 into law. This legislation formally establishes the MMRP to coordinate and facilitate the review of pregnancy-associated deaths and to assess their incidence, causes, and preventability through the MMRC. This bill also establishes committee appointments and mandates the submission of a biannual report due on May 15th of each even-numbered year. The full statute is available in **Appendix C**.

Structure & Committee Membership

The MMRP is implemented and coordinated by ADHS staff within the Bureau of Assessment and Evaluation. The team includes an office chief, a program manager, nurse abstractors, epidemiologists, and administrative staff. ADHS staff are responsible for identifying maternal mortalities, requesting records, developing case narratives, supporting MMRC case review meetings, and reporting maternal mortality data.

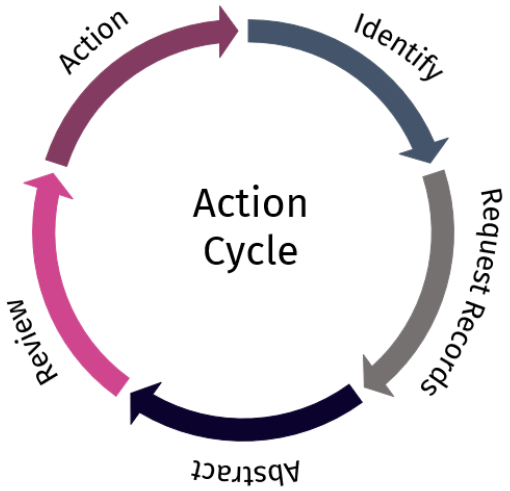
During the review of 2018-2022 maternal mortalities, Arizona's MMRC included 100 external members, representing a range of volunteer clinical and nonclinical disciplines. This membership included obstetric providers (obstetricians, midwives, nurse practitioners, and maternal-fetal medicine specialists); behavioral health professionals (mental health and substance use treatment providers); public health professionals; registered nurses and nurse specialists; academic and research professionals; advocacy and community-based organizations; health insurance providers and payers; case managers, community health workers, home visitors, doulas, and other outreach personnel; domestic violence, sexual assault, and human trafficking specialists; lactation consultants; state, county, and tribal agency representatives; individuals with direct or indirect maternal health experience and peer support specialists; forensic pathologists, medical examiners, and toxicologists; and emergency medical services and law enforcement personnel. **Appendix A** presents the complete list of MMRC members who participated in case reviews and recommendations developed for this report.

Methodology for Reviewing Maternal Deaths

Review to Action

To maintain consistency in MM reviews, the Arizona MMRP applies the same methodology to each review, from identification through dissemination of findings, as demonstrated in **Figure 2**. This process, formally referred to as Review to Action, is adapted from Berg, CJ (2012), and is used by the CDC and other ERASE MM- funded states.[4, 5] The Review to Action methodology is considered to be cyclical: as more cases are reviewed using this protocol, the consistency and reliability of the data and recommendations increase. Ultimately, this process presents a comprehensive overview of the risks and barriers faced by pregnant and postpartum women that can lead to maternal mortality, and highlights areas of opportunity to improve outcomes. For a full description and detailed flow chart of the Review to Action steps, refer to the previous Maternal Mortality and Morbidity in Arizona report.

Figure 2. Review to Action



Source: Adapted from Berg, C.J. (2012). From identification and review to action– maternal mortality review in the United States. Seminars in Perinatology, 36(1), 7-13.

Though the primary components of the Review to Action methodology remained consistent, some features evolved during the MMRC's review of 2018-2022 deaths, resulting in some instances of missing or incomplete data. Data completeness is indicated with the "n=" for each data metric. Missing data in this report were denoted using CDC maternal mortality reporting techniques. For additional details, see **Appendix J**, "Missing Data."

Analytical Methods

Mortality ratios were calculated by estimating the number of pregnancy-related deaths per 100,000 live births based on data from the Arizona Bureau of Vital Records. Ratios were calculated for all pregnancy-associated deaths, the subset of pregnancy-related deaths, and select sociodemographic characteristics.

Case identification included all deaths among women aged 10-60; however, no deaths were identified outside the 15-49 years age range. Therefore, the mortality ratios and percentage distributions presented in this report are based on the population aged 15-49. See **Appendix I** and **Appendix J** for details.

Percentage proportions were calculated to describe characteristics of maternal deaths, which were primarily identified by the MMRC.

Race or ethnicity was categorized using mutually exclusive groups, following the methodology established in the Arizona Health Status and Vital Statistics Annual Reports.[6-10] Additional methodological details are available in **Appendix J**.

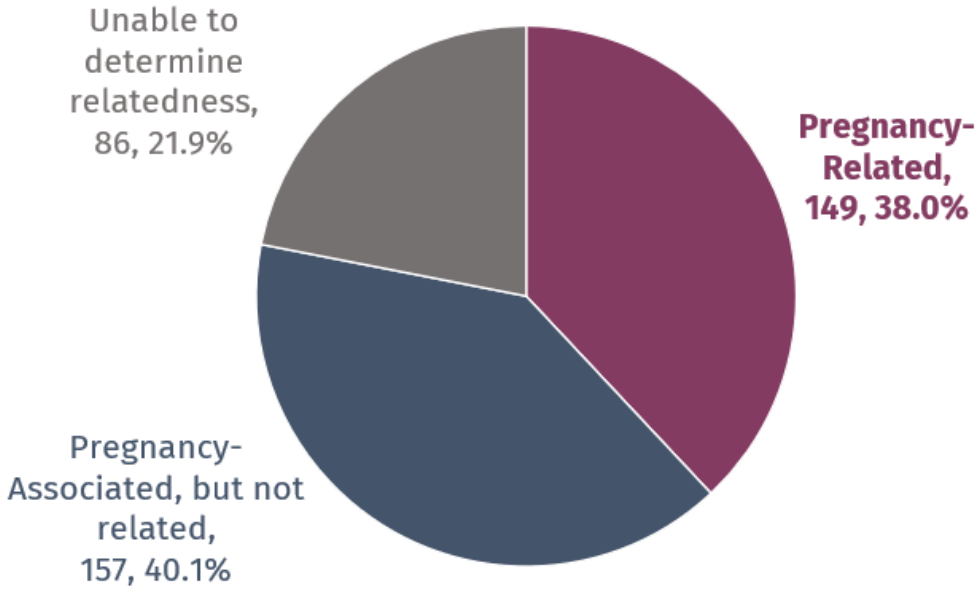
Findings for Maternal Deaths in Arizona, 2018-2022

Maternal Mortality: Risk and Pregnancy-Relatedness

Maternal Mortality by Pregnancy Relatedness

From 2018-2022, there were 392 pregnancy-associated deaths. Of these, 157 (40.1%) were determined to be not related to pregnancy, 149 (38.0%) were pregnancy-related, and for 86 (21.9%), pregnancy-relatedness was unable to be determined by the MMRC (**Figure 3**). This report primarily focuses on the 149 pregnancy-related deaths.

Figure 3. Pregnancy-Relatedness among 2018-2022 MMRC Reviewed Deaths (Percentage and Frequency) in Arizona Among Women 15-49 Years of Age with a Pregnancy in the Previous 365 Days (n=392)



Maternal Mortality Frequency by Year, 2018-2022

The frequency of pregnancy-related deaths ranged from 15 deaths per year in 2018 to 35 deaths per year in 2022, with a peak of 45 deaths occurring in 2021. On average, there were 29.8 pregnancy-related deaths each year. For death counts for all years, see **Appendix D**.

Overall Risk of Maternal Mortality, 2018-2022

The overall pregnancy-associated mortality ratio (PAMR) for 2018-2022 was 98.1 pregnancy-associated deaths per 100,000 live births. The overall pregnancy-related mortality ratio (PRMR) for 2018-2022 was 37.3 pregnancy-related deaths per 100,000 live births.

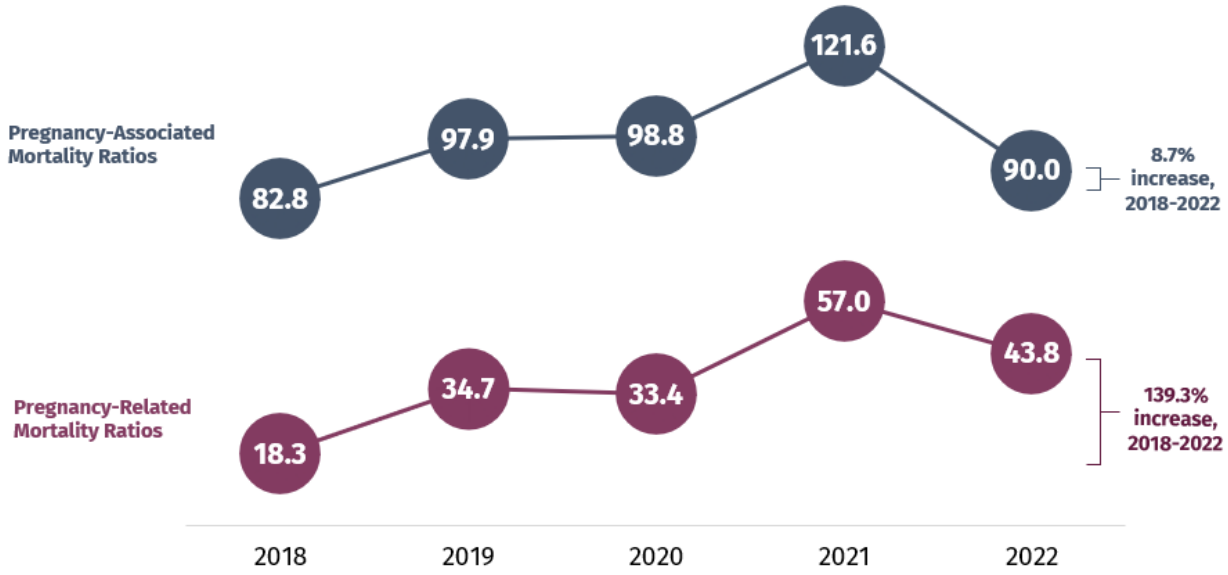
Maternal Mortality Risk by Year, 2018-2022

The PAMR and PRMR for 2018-2022 are shown in **Figure 4**. PAMR data for 2018 shows a ratio of 82.8 pregnancy-associated deaths per 100,000 live births, which steadily increased to 121.6 per 100,000 live births in 2021, but then sharply declined to 90.0 per 100,000 live births in 2022. This resulted in an 8.7% increase in the PAMR over five years.

PRMR data for 2018 show that for every 100,000 live births, there were approximately 18.3 maternal deaths. We observed an increase in the PRMR until 2021, reaching approximately

57.0 maternal deaths per 100,000 live births, followed by a slight decrease to 43.8 maternal deaths per 100,000 live births in 2022, resulting in a 139.3% increase over five years.

Figure 4. Maternal Mortality in Arizona: 2018-2022 Mortality Ratios of Women 15-49 Years of Age (per 100,000 live births)



Disclaimer: In 2018, per CDC guidelines, the age criteria for pregnancy-associated and -related deaths expanded from 15-49 years to 10-60 years. Although the age inclusion criteria were expanded for the case identification of deaths occurring in 2018 onward, no deaths were identified outside of the 15–49-year age range. With these findings in mind, all calculations were limited to the 15-49 years of age range in this report. Regardless of the changes in maternal age inclusion criteria, an overall increase between these two time periods was seen when assessing annual ratios. A similar increase was observed in maternal deaths at the national level,[11] see **Appendix E** for more information.

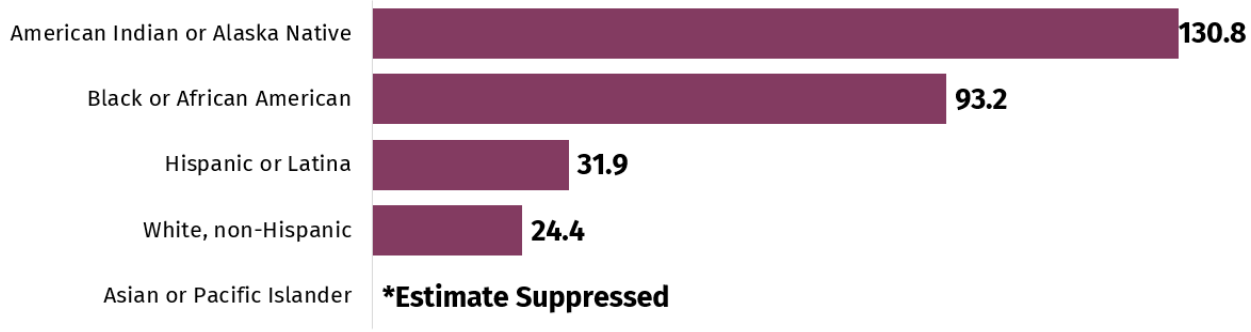
Maternal Mortality: Sociodemographic Characteristics

Maternal Race or Ethnicity

Figure 5 shows mortality ratios for pregnancy-related deaths by maternal race or ethnicity. The highest PRMR was observed among American Indian or Alaska Native women (130.8 deaths per 100,000 live births), which was about 5 times higher than the PRMR among White, non-Hispanic women (24.4 per 100,000 live births). Black or African American women had the next highest PRMR (93.2 per 100,000 live births), which was more than 3.5 times the PRMR for White, non-Hispanic women. Hispanic or Latina women had a slightly higher PRMR than White, non-Hispanic women (31.9 vs. 24.4 per 100,000). The PRMR among Asian or Pacific Islander women was suppressed due to small numbers (fewer than 6 cases).

Of the 148 cases where race or ethnicity information was available, 12 (8.1%) maternal deaths could be categorized as multiracial (not shown). Multiracial classification was based on the federal standards for maintaining, collecting, and reporting data on race (Office of Management and Budget). Under these standards, more than one race can be reported on vital records. Decedents with responses in more than one race category on the death certificate were classified as multiracial (“more than one race”). For the purpose of this analysis, racial and ethnic designations used in this report are based on information recorded on birth and death certificates as provided by ADHS’s Bureau of Vital Records. See Definition of Race for more information.

Figure 5. Pregnancy-Related Mortality Ratios by Race or Ethnicity Among Arizona Women 15-49 Years of Age (per 100,000 live births), 2018-2022 (n=148[†])



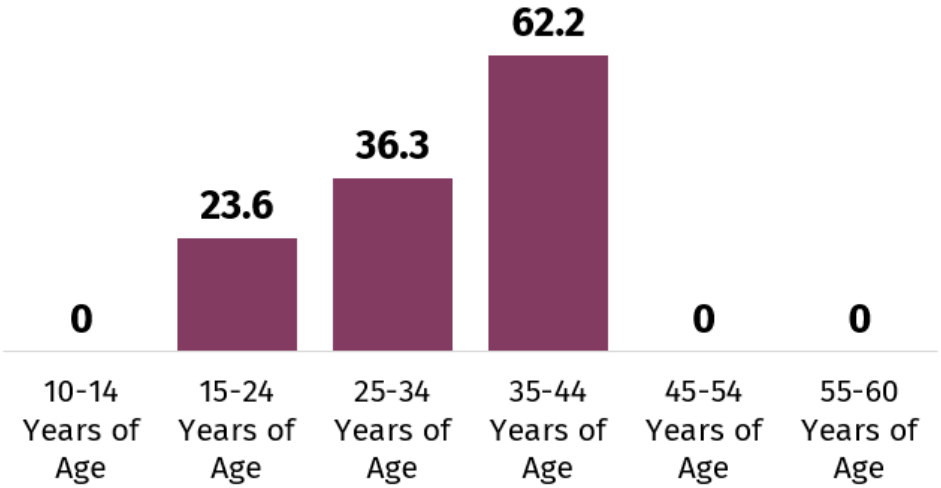
*Data is suppressed for numerator non-zero counts less than 6 and denominator reference populations of less than 100 persons in order to protect confidentiality. Additionally, if one cell in the previous scenario does not pass this test, the complementary proportion, related percentage, or ratio that together sum to a whole (or 100%) shall also be suppressed.
[†]Race or ethnicity was unavailable for n=1 decedent, and is not included in this figure.

Maternal Age

Generally, the risk for maternal mortality increases with advanced maternal age, which is typically identified as 35 years of age and above.[12] **Figure 6** shows mortality ratios for pregnancy-related deaths by maternal age in Arizona. Although case identification included women aged 10-60, no cases were identified between the ages of 10-14, 45-54, or 55-60 years. Thus, all pregnancy-related calculations in this report are limited to women aged 15-49. Please see the **disclaimer** (located below Figure 1) on age inclusion for more details.

Between 2018 and 2022, the highest PRMR was observed among women aged 35-44 years (62.2 deaths per 100,000 live births), followed by women aged 25-34 (36.3 per 100,000 live births), and those 15-24 years of age (23.6 per 100,000 live births).

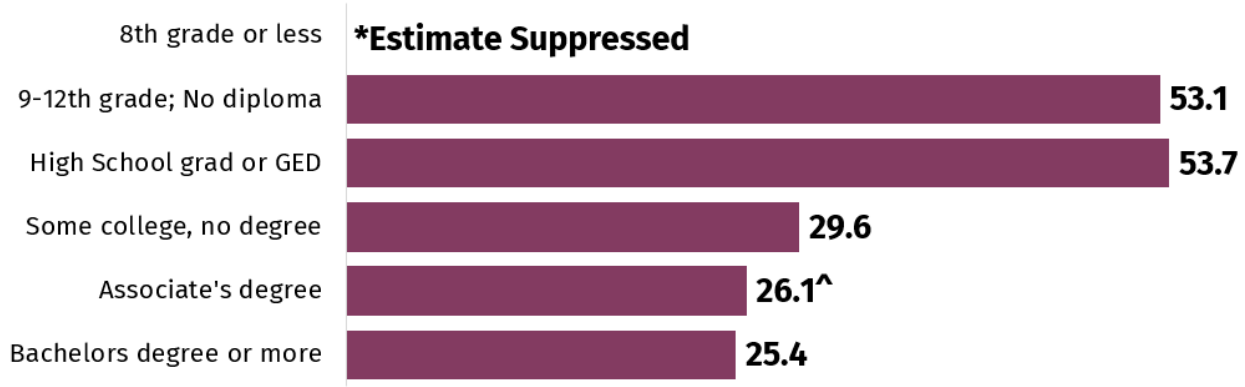
Figure 6. Pregnancy-Related Mortality Ratios by Age Among Arizona Women 15-49 Years of Age (per 100,000 live births), 2018-2022 (n=149)



Maternal Education

In general, we observed that the risk for maternal mortality increases with lower educational attainment. The highest PRMR was observed among women who completed high school or earned a GED (53.7 deaths per 100,000 live births), or less (53.1 per 100,000). The next highest PRMR was observed among those who attended some college but did not receive a degree (29.6 per 100,000), followed by those with an Associate's degree (26.1 per 100,000). The lowest PRMR was observed in women with a Bachelor's degree or higher (25.4 per 100,000). The mortality ratio for women with an 8th grade education or less was suppressed due to small sample sizes (fewer than 6 cases). Mortality ratios for pregnancy-related deaths by the woman's highest educational attainment can be seen in **Figure 7**.

Figure 7. Pregnancy-Related Mortality Ratios Among Arizona Women 15-49 Years of Age by Education (per 100,000 live births), 2018-2022 (n=149)

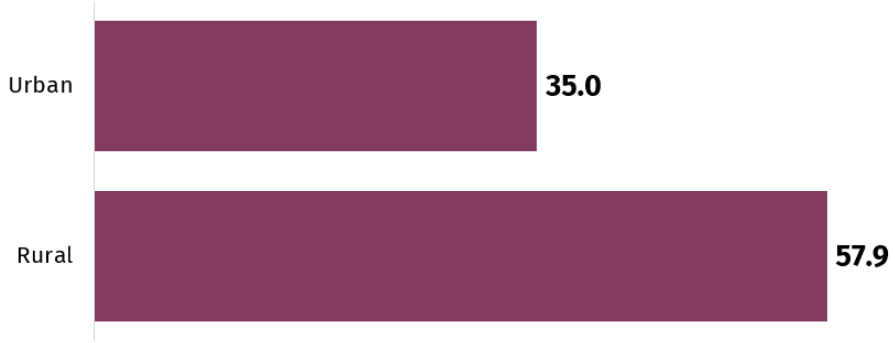


*Data is suppressed for numerator non-zero counts less than 6 and denominator reference populations of less than 100 persons in order to protect confidentiality. Additionally, if one cell in the previous scenario does not pass this test, the complementary proportion, related percentage, or ratio that together sum to a whole (or 100%) shall also be suppressed.
^Based on a case count greater than or equal to 6 but less than 10, therefore should be interpreted with caution.

Maternal Residence

Women living in rural counties had a higher PRMR (57.9 deaths per 100,000 live births) than those living in urban counties (35.0 per 100,000), as shown in **Figure 8**.

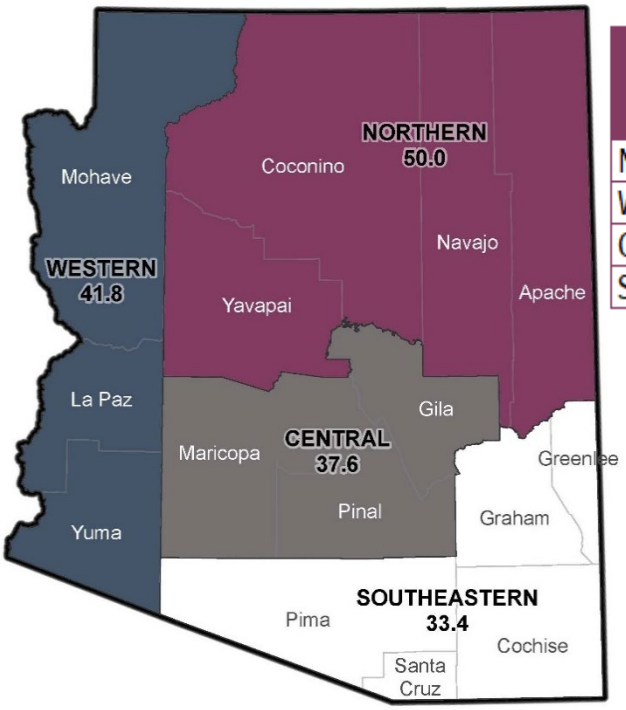
Figure 8. Pregnancy-Related Mortality Ratios Among Arizona Women 15-49 Years of Age by County Type of Residence (per 100,000 live births), 2018-2022 (n=148†)



Urban: Residing in Maricopa, Pima, Pinal, or Yuma Counties
Rural: Residing in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Mohave, Navajo, Santa Cruz, or Yavapai Counties
†Maternal Residence was unavailable for n=1 decedent, and is not included in this figure.

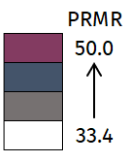
Mortality ratios for pregnancy-related deaths by the county region of residence (Central, Northern, Southeastern, and Western) can be seen in **Figure 9**. Northern Arizona (Apache, Coconino, Navajo, and Yavapai Counties) had the highest PRMR (50.0 deaths per 100,000 live births), followed by Western Arizona (La Paz, Mohave, and Yuma Counties) (41.8 per 100,000), Central Arizona (Gila, Maricopa, and Pinal Counties) (37.6 per 100,000), and Southeastern Arizona (Cochise, Graham, Greenlee, Pima, and Santa Cruz Counties) (33.4 per 100,000).

Figure 9. Pregnancy-Related Mortality Ratios Among Arizona Women 15-49 Years of Age by County Region of Residence (per 100,000 live births), 2018-2022 (n=148†)



Region	Pregnancy-Related Mortality Ratio
Northern	50.0
Western	41.8
Central	37.6
Southeastern	33.4

Pregnancy-Related Mortality Ratio (PRMR): Pregnancy-related deaths per 100,000 live births
†Maternal Residence was unavailable for n=1 decedent, and is not included in this figure.

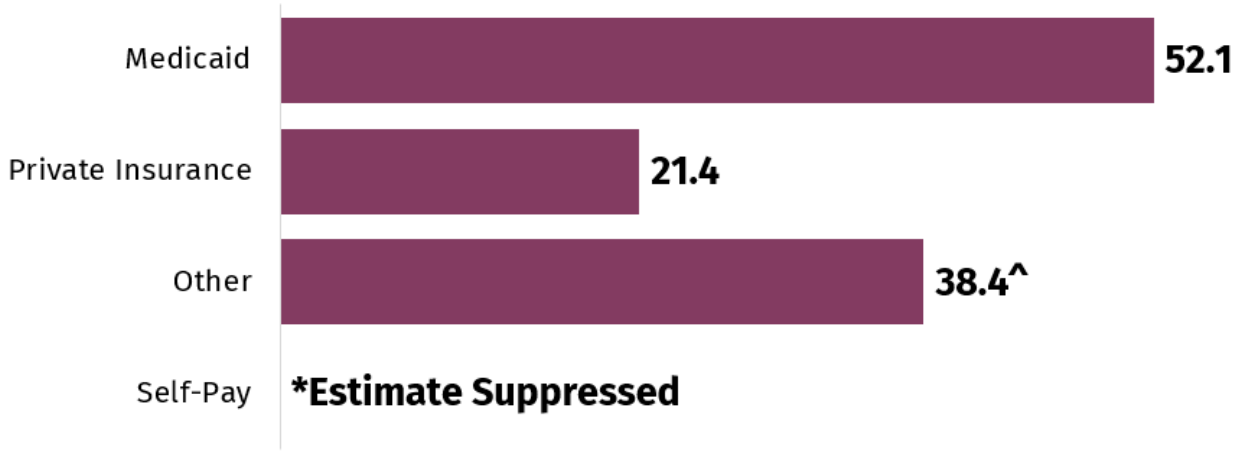


Payer of Birth

Figure 10 displays PRMRs by payer type, which is the primary source of payment for the delivery and/or pregnancy healthcare. The highest PRMR was observed among the Medicaid group (52.1 deaths per 100,000 live births), followed by Other (38.4 per 100,000), which includes the Indian Health Service (IHS), TRICARE/Civilian Health and Medical Program of the Uniformed Services (CHAMPS), and other types. The lowest PRMR was observed among those in the Private Insurance group, at 21.4 per 100,000 live births. The PRMR was suppressed for the Self-Pay group, due to low sample sizes (6 or fewer cases).

The majority of pregnancy-related deaths occurred among Medicaid recipients, who accounted for 66.7% of deaths. In comparison, 24.5% of deaths occurred among those with Private Insurance, 5.4% among Other payers, and a suppressible percentage among Self-Pay (see **Appendix D** for more information on the distribution of pregnancy-related deaths and live births by payer type).

Figure 10. Pregnancy-Related Mortality Ratios in Arizona Women 15-49 Years of Age by Payer (per 100,000 live births), 2018-2022 (n=147[†])



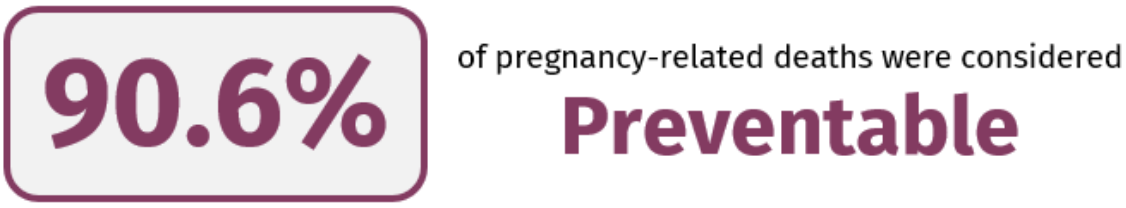
Self-Pay: No source of payment was identified at the time of admission
Other: Indian Health Service (IHS), TriCare/CHAMPUS, and other types
*Data is suppressed for numerator non-zero counts less than 6 and denominator reference populations of less than 100 persons in order to protect confidentiality. Additionally, if one cell in the previous scenario does not pass this test, the complementary proportion, related percentage, or ratio that together sum to a whole (or 100%) shall also be suppressed.
^Based on a case count greater than or equal to 6 but less than 10, therefore should be interpreted with caution.
[†]Payer was unavailable for n=2 decedents, and are not included in this figure.

Maternal Mortality: Committee Determinations and Other Descriptors of the Death

Preventability and Timing of Death

The MMRC determined that 90.6% (n=135) of pregnancy-related deaths were preventable (see **Figure 11**). The MMRC determined a death as preventable if it could have been avoided through one or more reasonable changes in patient care, family support, medical provider actions, facility protocols, systemic influences, or community-level initiatives.

Figure 11. Preventability of Pregnancy-Related Deaths Among MMRC Reviewed Pregnancy-Associated Deaths in Arizona of Women 15-49 Years of Age (Percentage), 2018-2022 (n=149)



The percentage of preventable pregnancy-related deaths by race or ethnicity as determined by the MMRC is presented in **Table 1**. All (100%) of the deaths among Black or African American women were deemed preventable, followed by 92.9% of deaths among White, non-Hispanic women, 90.6% among Hispanic or Latina women, and 85.7% among American Indian or Alaska Native women. The percentage of preventable deaths for Asian or Pacific Islander women was suppressed due to small sample sizes (fewer than 6 cases).

Table 1. Preventability of Pregnancy-Related Deaths Among MMRC Reviewed Pregnancy-Associated Deaths in Arizona of Women 15-49 Years of Age by Race or Ethnicity (Percentage), 2018-2022 (n=134[†])

Race/ Ethnicity	Preventable Pregnancy-Related Deaths (%)
American Indian or Alaska Native	85.7%
Black or African American	100.0%
Hispanic or Latina	90.6%
White, non-Hispanic	92.9%
Asian or Pacific Islander	*Estimate Suppressed

*Data is suppressed for numerator non-zero counts less than 6 and denominator reference populations of less than 100 persons in order to protect confidentiality. Additionally, if one cell in the previous scenario does not pass this test, the complementary proportion, related percentage, or ratio that together sum to a whole (or 100%) shall also be suppressed.
[†]Race or ethnicity was unavailable for n=1 decedent, and is not included in this figure.

The percentage of preventable pregnancy-related deaths by manner of death is presented in **Table 2**. All (100%) of the deaths ruled as accidents, suicides, and homicides were considered preventable, while 83.5% of natural deaths were considered preventable. For more information on the manner of death, see **Manner and Conditions of the Death**. The percentage of preventable deaths for cases pending investigation and deaths where causes were undetermined was suppressed due to small numbers (fewer than 6 cases).

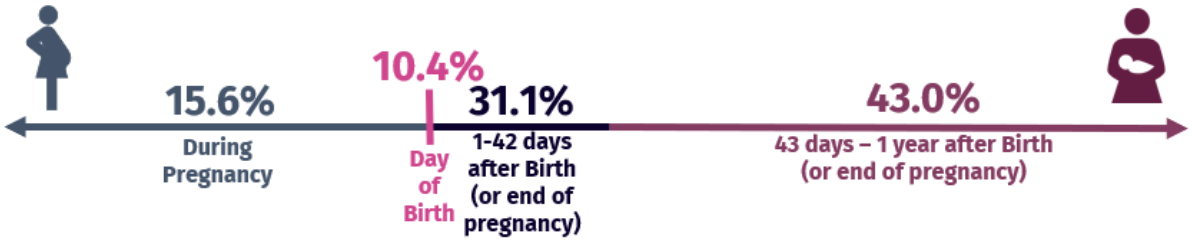
Table 2. Preventability of Pregnancy-Related Deaths Among MMRC Reviewed Pregnancy-Associated Deaths in Arizona of Women 15-49 Years of Age by Manner of Death (Percentage), 2018-2022 (n=134[†])

Manner of Death	Preventable Pregnancy-Related Deaths (%)
Accident	100.0%
Suicide	100.0%
Homicide	100.0%
Natural	83.5%
Pending Investigation	*Estimate Suppressed
Could Not be Determined	*Estimate Suppressed

*Data is suppressed for numerator non-zero counts less than 6 and denominator reference populations of less than 100 persons in order to protect confidentiality. Additionally, if one cell in the previous scenario does not pass this test, the complementary proportion, related percentage, or ratio that together sum to a whole (or 100%) shall also be suppressed.
[†]Manner of death was unavailable for n=1 decedent, and is not included in this figure.

Figure 12 illustrates the timing of preventable pregnancy-related deaths from 2018 to 2022 relative to different phases of pregnancy and the postpartum period. Most preventable pregnancy-related deaths occurred in the postpartum period (74.1%, n=100), with the most (43.0%, n=58) occurring between 43 and 365 days postpartum and 31.1% (n = 42) occurring within 42 days postpartum. Additionally, 15.6% of pregnancy-related deaths (n = 21) occurred during pregnancy, and the least number of deaths, 10.4% (n = 14), occurred on the day of delivery.

Figure 12. Timing of Preventable Pregnancy-Related Deaths Among MMRC Reviewed Pregnancy-Related Deaths in Arizona of Women 15-49 Years of Age (Percentage), 2018-2022 (n=135)



When examining timing of preventable deaths by Underlying Cause of Death, the most common cause of death during pregnancy was infection (not shown), on the day of birth was hemorrhage (excludes aneurysms or CVA), 1-42 days after birth was infection, and 43 days-1 year after birth was mental health conditions.

Perinatal Level of Care

The Arizona Perinatal Trust (APT) facilitates the Voluntary Certification Program (VCP), which assigns a certification level to participating facilities based on the services and level of care they provide to mothers and infants during and after labor and delivery. APT level designation is correlated with the facility's ability to serve high-risk patients. Of the 19 pregnancy-related deaths that occurred on the day of delivery, regardless of preventability, 17 had facility information available. Of those with facility information available, 35.3% occurred at a facility with an APT certification level of III or higher (**Table 3**). Deliveries at facilities with higher APT levels are more likely to be indicative of high-risk pregnancies or deliveries needing more intensive care services. For additional information on APT level designation criteria, visit https://azperinatal.org/certification/.

Table 3. Arizona Perinatal Trust (APT) Level of the Birth Facility Among Pregnancy-Related Deaths in Arizona that Occurred on the Day of Delivery, 2018-2022 (n=17)

	Pregnancy-Related Deaths on the Day of Delivery	
APT Level	n	%
Lower than III	7	41.2%^
III or higher	6	35.3%^
Non-APT	*Estimate Suppressed	*Estimate Suppressed

APT Level: The APT Level of the birth facility was used, except in the case(s) where a birth facility was unavailable, then the facility where the death occurred was used. APT Levels for each facility may change annually. For this analysis, the APT Level used was the level assigned to that facility for the year that the death occurred. For more information, visit the Arizona Perinatal Trust Website.

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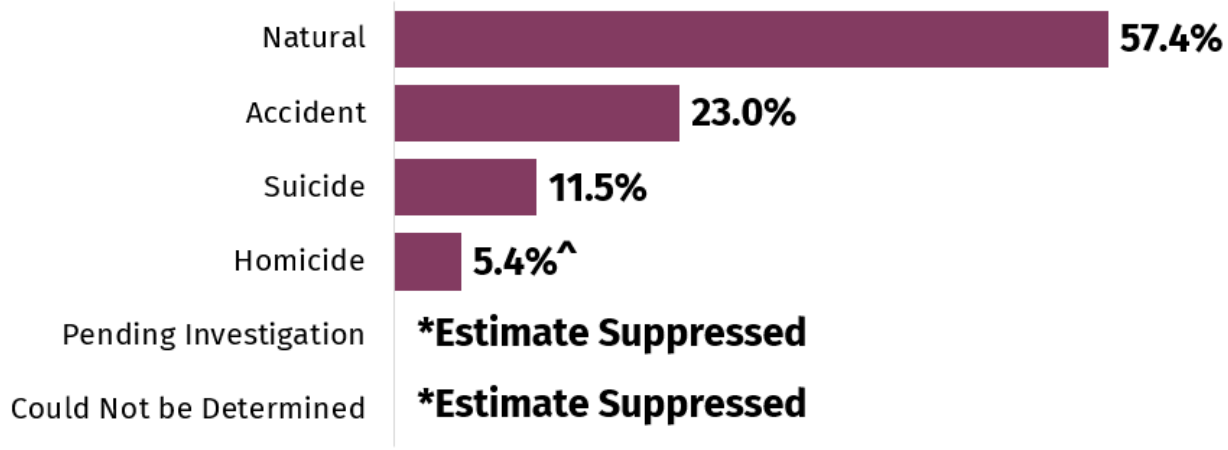
^Based on a case count greater than or equal to 6 but less than 10, therefore should be interpreted with caution.

Manner and Conditions of the Death

Figure 13 shows the distribution of pregnancy-related deaths by manner of death, *as recorded on the death certificate*. From 2018 to 2022, natural deaths accounted for 57.4% (n=85) of pregnancy-related deaths. "Natural" does not mean inevitable or expected, but refers to a manner of death resulting from medical causes.

Accidental deaths—including unintentional injuries such as motor vehicle accidents and unintended drug overdoses—accounted for 23.0% (n=34) of pregnancy-related deaths. Suicide accounted for 11.5% (n=17), while homicide accounted for 5.4% (n=8). Death counts for cases pending investigation, and deaths where causes were undetermined, were suppressed due to small numbers (fewer than 6 cases).

Figure 13. Manner of Death for Pregnancy-Related Deaths of Women 15-49 Years of Age (Percentage), Based on Death Certificates, 2018-2022 (n=148[†])



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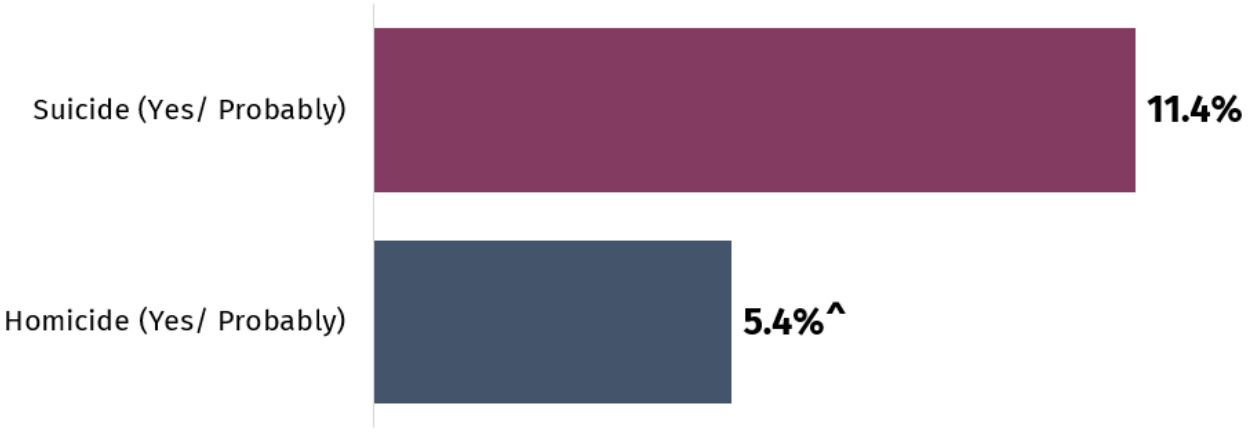
^Based on a case count greater than or equal to 6 but less than 10, therefore should be interpreted with caution.
[†]Manner of death was unavailable for n=1 decedent, and is not included in this figure.

Figure 14 shows the percentage of pregnancy-related deaths by suicide and homicide, *as determined by the MMRC.* Between 2018 and 2022, 11.4% (n=17) of pregnancy-related deaths were determined to be suicide or probable suicide, and 5.4% (n=8) of pregnancy-related deaths were determined to be homicide or probable homicide. Among all pregnancy-related deaths determined to be suicide, probable suicide, homicide, or probable homicide, 40.0% indicated firearm use as the means of fatal injury (not shown).

Figure 14. Suicide and Homicide among Pregnancy-Related Deaths of Women 15-49 Years of Age (Percentage), Based on MMRC Decisions, 2018-2022 (n=149)



^Based on a case count greater than or equal to 6 but less than 10, therefore should be interpreted with caution.

Primary Underlying Cause of Death

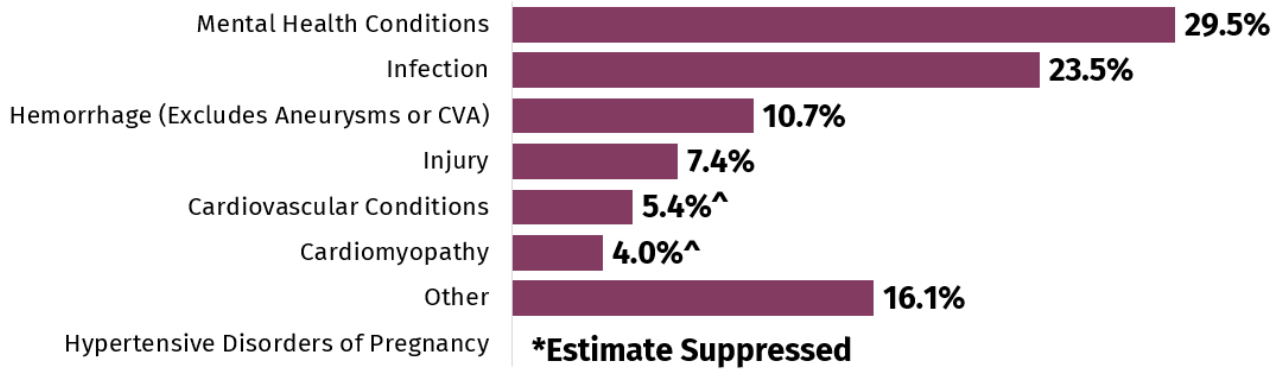
For pregnancy-related deaths, the MMRC assigned an underlying cause of death, defined as the disease or injury that initiated the chain of events leading to death or the circumstances of the accident or violence which produced the fatal injury. **Figure 15** shows pregnancy-related deaths by primary underlying cause.

The most common primary underlying cause of pregnancy-related deaths was mental health conditions (29.5%), followed by infection (23.5%), other causes (16.1%), and hemorrhage (10.7%). The remaining causes had one of the following conditions listed as the primary cause: injury, cardiovascular conditions, cardiomyopathy, and hypertensive disorders of pregnancy. Of the 44 cases that were identified to have mental health conditions as the primary underlying cause of death, 63.6% had substance use disorder indicated as either the primary or secondary underlying cause of death.

Of the 149 pregnancy-related deaths, 58 cases (38.9%) also had a secondary underlying cause of death. However, including the secondary underlying causes of death did not change the observed trends, so they are not discussed further in the report.

Of the 38 deaths with infection as a primary or secondary underlying cause of death, 31 (81.6%) occurred during the COVID-19 pandemic. Of those 31 deaths, 24 (77.4%) were related to COVID-19 infection (not shown). Of the 24 COVID-related deaths, a suppressible number (n<6) of women received the COVID-19 Vaccination. For more information on pregnancy-associated COVID-19 deaths that occurred during 2020-2021, you may request access to the issue brief on "Pregnancy-Associated Deaths and COVID-19 in Arizona: 2020-2021" from AEVAL@azdhs.gov.

Figure 15. Underlying Primary Cause of Death among Pregnancy-Related Deaths of Women 15-49 Years of Age (Percentage), 2018-2022 (n=149)



Other: Embolism - Thrombotic (Non-Cerebral), Cardiomyopathy, Metabolic/Endocrine, Neurologic/ Neurovascular Conditions (Excluding CVA), Collagen Vascular/ Autoimmune Diseases, Conditions Unique to Pregnancy, Hematologic Pulmonary Conditions (Excludes ARDS), Renal Diseases, and Unknown Cause of Death

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Table 4 shows the most frequent and second most frequent primary underlying causes of pregnancy-related deaths by race or ethnicity. For the 28 deaths among American Indian or Alaska Native women and 53 deaths among Hispanic women, infection was the most frequent

underlying primary cause of death. For the 22 deaths among Black or African American women, injury was the most frequently identified underlying primary cause of death; however, injury mechanisms were heterogeneous, with no single injury mechanism predominating. Among the 42 White, Non-Hispanic women, the most common cause was mental health conditions. Mental Health Conditions were either the most or second most frequent cause of death for all groups shown, and infection was either the most or second most frequent cause of death for 3 of the 4 groups shown. Data for Asian or Pacific Islander women were suppressed due to small numbers (six or fewer total deaths). Additional details about the underlying cause of death can be found in Appendix A of the MMRIA Committee Decisions Form.

Table 4. Primary Underlying Cause of Death among Pregnancy-Related Deaths of Women 15-49 Years of Age by Race or Ethnicity, 2018-2022 (n=148[†])

Race/ Ethnicity	Primary Underlying Cause(s) of Death	
	Most Frequent	Second Most Frequent
American Indian or Alaska Native	Infection	Mental Health Conditions
Black or African American	Injury	Mental Health Conditions
Hispanic or Latina	Infection	Mental Health Conditions
White, non-Hispanic	Mental Health Conditions	Infection
Asian or Pacific Islander	*Suppressed	

*Data is suppressed for numerator non-zero counts less than 6 and denominator reference populations of less than 100 persons in order to protect confidentiality. Additionally, if one cell in the previous scenario does not pass this test, the complementary proportion, related percentage, or ratio that together sum to a whole (or 100%) shall also be suppressed.
[†]Primary Underlying Cause of Death was unavailable for n=1 decedent, and is not included in this figure.

Contributing Factor

The MMRC also determines if obesity, discrimination, mental health conditions, or substance use disorder (SUD) contributed to the death. The CDC defines discrimination as treating someone less or more favorably based on the group, class, or category they belong to, resulting from biases, prejudices, and stereotyping.[13] It can manifest as differences in care, clinical communication, and shared decision-making. The MMRC refers to this definition while completing the MMRIA Committee Decisions Form during each case review.

Among pregnancy-related deaths, mental health conditions were identified as a contributing factor in 49.0% (n=73) of cases, followed by discrimination (45.0%, n=67), SUD (40.9%, n=61), and obesity (30.9%, n=46) (**Figure 16**).

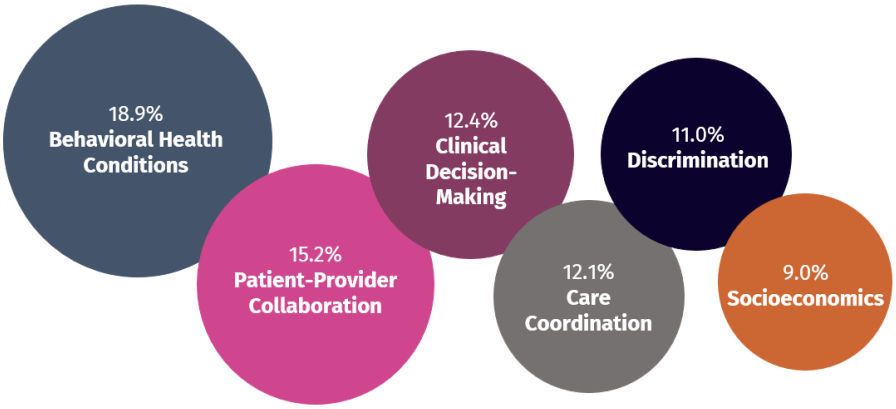
Figure 16. Contributing Factors Among Pregnancy-Related Deaths of Women 15-49 Years of Age (Percentage), 2018-2022 (n=149)

For the 61 pregnancy-related deaths that had substance use disorder indicated as a contributing factor, the MMRP received toxicology records where a positive result was noted with at least one substance identified for 42 women (not shown). Among the 42 cases, the most commonly identified substance was fentanyl (n=22; 52.4%), followed by methamphetamine (n=17; 40.5%). Almost two-thirds of the 42 cases had two or more substances identified through their toxicology results (n=26, 61.9%). Toxicology results detailed here exclude substances administered by a health care provider or available over the counter.

Section 3: Recommendations to Eliminate Maternal Mortality

Although this report examines pregnancy-related deaths that occurred between 2018–2022, this section includes recommendations generated during the 2021–2022 review cycle to reflect current case patterns and system conditions. During that cycle, the MMRC produced 645 recommendations in response to preventable contributing factors identified across cases. MMRP staff qualitatively synthesized these into 38 cross-cutting, actionable strategies to reduce duplication, highlight recurring themes, and translate case review findings into coordinated action.

Figure 17. Top 6 Contributing Factor Domains Among Recommendations to Prevent Pregnancy-Related Deaths of Women 15–49 Years of Age (Percentage), 2021–2022 (n=645 recommendations)



Contributing factors are issues identified during case review that the MMRC determined may have contributed to the death, and for which prevention opportunities exist. A single case often has multiple contributing factors. Percentages reflect the proportion of recommendations associated with each domain. Additional domains, full counts, and grouping methodology are provided in **Appendix G**.

The 38 recommendations reflect the interconnected clinical, structural, relational, and social drivers of maternal mortality. For clarity, they are organized into thematic categories that align with — but do not exactly mirror — the top contributing factor domains: Behavioral Health and Crisis Response; Clinical Recognition and Risk Management; Emergency Preparedness and Clinical Response; Care Coordination and Continuity Across Systems; Access, Coverage, and Social and Economic Supports; Trustworthy, Responsive, and Supportive Systems; and Accountability, Governance, and System Oversight.

Recommendations span multiple levels — system, facility, provider, community, and patient/family — and are generally presented in a top-down structure to emphasize upstream, systems-level changes while recognizing the need for coordinated action and shared accountability across all levels of implementation. Because the recommendations are based on contributing factors identified during the review of deaths that occurred in 2021-2022, they should be interpreted in the context of the systems, services, and information

available at the time of those deaths and reviews, and may not reflect activities or improvements implemented afterward.

Recommendations are numbered for reference only and are not presented in order of priority. An asterisk denotes the MMRC's top five priorities, identified based on potential impact and feasibility. Additional recommendation details derived from case reviews are provided in **Appendix H**.

For consistency, several terms are used throughout the recommendations.

Arizonans refers to Arizona residents in their civic role, including through civic engagement and the policies they advance.

Payers refers to Medicaid/AHCCCS and other health plans.

Funders refers to entities that may support implementation through financing, grants, reimbursement, or other investments, including payers, relevant public agencies, and philanthropic funders.

Public agencies refers broadly to governmental entities whose authority, programs, or resources may be relevant to a given recommendation, depending on whether the implementation activity falls within their scope. This may include state, county, city, local, and Tribal governmental entities, as well as public agencies responsible for health, behavioral health, child protective services and family support, housing, public safety, corrections, transportation, social services, regulation, or benefits administration.

Public health agencies refers to state, local, and, when applicable, Tribal health departments.

Healthcare systems refers broadly to health systems, hospitals, outpatient clinics, emergency departments, specialty clinics, behavioral health facilities, residential treatment facilities, and other healthcare delivery settings, as applicable.

Information Technology (IT) partners refers to health IT and data system leaders, Electronic Health Record (EHR) teams, Health Information Exchange (HIE) entities, technology developers, and other partners responsible for developing, maintaining, integrating, or supporting technology systems used for clinical care, referrals, communication, data-sharing, documentation, monitoring, and care coordination.

Child protective service (CPS) agencies refers to the Arizona Department of Child Safety (DCS) and, when applicable, Tribal child protective services. For context, among 2018–2022 pregnancy-related deaths, DCS involvement was documented in 9.4% of cases; however, this finding should be interpreted with caution because DCS records were not routinely requested for 2018–2019 cases.

Community partners refers broadly to non-governmental and community-rooted organizations, groups, service providers, and trusted messengers that work directly with community members. This may include Community-Based Organizations (CBOs), Non-Governmental Organizations (NGOs), Tribal and faith-based organizations, advocacy programs, shelters, peer-led groups, and other community-based service providers.

Behavioral Health, Trauma, and Crisis Response

Mental health and substance use care, trauma-informed response, and coordinated crisis protection

1. Strengthen prevention, identification, and protection mechanisms for domestic violence, sexual violence, trafficking, and firearm-related risk among women of reproductive age.[14-17]

- **Payers** should cover and reimburse screening, safety planning, crisis intervention, and survivor-centered services related to domestic violence, sexual violence, trafficking, and firearm risk.
- **Public health agencies and law enforcement** should support and strengthen prevention efforts, survivor safety approaches, and coordinated response protocols that prioritize the safety of pregnant and postpartum women experiencing violence, trafficking, or firearm-related risk and avoid punitive responses toward survivors seeking help.
- **Healthcare systems** should implement consistent, trauma-informed screening, documentation, and safety planning practices across care settings.
- **Clinicians and care teams** should conduct screening without partners present when indicated, assess immediate safety risks, and initiate timely connection to crisis and protective resources.
- **Domestic violence shelters and community partners** should provide survivor-centered services, safe housing, and ongoing support for women and families at risk.

2. Require timely, trauma-informed crisis response to violence, overdose, and suspicious deaths involving pregnant and postpartum women.[18-20]

- **County and city governments** should establish and resource multidisciplinary crisis response teams.
- **Crisis response teams** consisting of law enforcement personnel, behavioral health providers, social workers, peer support specialists, and translators/interpreters should provide timely, trauma-informed intervention and de-escalation and coordinate responses to violence and overdose involving pregnant and postpartum women.
- **Law enforcement agencies** should conduct thorough investigations and documentation of suspicious deaths involving pregnant and postpartum women.

3. Establish coordinated, non-punitive, trauma-informed response pathways across healthcare, CPS agencies, and community systems following trauma, violence, or loss. [21-24]

- **Payers and relevant public agencies** should support coordinated, trauma-informed response pathways following trauma, violence, or loss by aligning coverage, policies, referral processes, and follow-up expectations.
- **Healthcare systems** should implement non-punitive response protocols that ensure timely follow-up, warm handoffs, and continuity of care following trauma, violence, or loss.

- **CPS agencies** should initiate engagement and resource provision through a trauma-informed lens—particularly in cases involving displacement or custody changes—prioritizing child safety while supporting family stability and avoiding unnecessary system involvement when safety can be maintained.
- **Clinicians, social work, and case management teams** should initiate coordinated referrals, provide follow-up, and support continuity of services.
- **Foster care systems and community partners** should deliver aligned, trauma-informed supports that reduce retraumatization and promote recovery.

4. Reduce stigma and fear that deter care-seeking, disclosure, and treatment engagement during pregnancy and the postpartum period by reforming punitive policies, healthcare practices, and public messaging related to substance use, mental health conditions, and mandated reporting to child protective service agencies.[25-27]

- **Arizonans** should support reforms that remove punitive or fear-based practices that discourage care-seeking, disclosure, treatment engagement, and follow-up during pregnancy and the postpartum period, including reporting policies related to substance use during pregnancy that deter engagement with healthcare.
- **Public health agencies and community partners** should lead coordinated, evidence-based stigma-reduction and public education efforts related to perinatal mental health, substance use, overdose prevention, harm reduction, and when and how to seek urgent support.
- **Healthcare systems, CPS agencies, and law enforcement agencies** should align institutional practices with trauma-informed, patient-centered approaches that promote transparency, informed consent, consistent application of reporting and testing policies, and supportive responses when substance use, mental health, or safety concerns are identified.

5. Strengthen patient resilience and sustained chronic disease control during pregnancy and the postpartum period by addressing behavioral health needs, stigma, trauma, and social barriers that affect coping, adherence, and engagement in care.[28-32]

- **Payers** should cover and reimburse behavioral health services, chronic disease support programs, and community-based interventions that strengthen coping, adherence, and sustained engagement in care across pregnancy and the postpartum period.
- **Healthcare systems** should reduce stigma and bias through training and supportive care practices, and integrate behavioral health and social support into patient-centered chronic disease management within routine perinatal care.
- **Clinicians and care teams** should engage patients in non-stigmatizing, shared decision-making; assess behavioral health, substance use, trauma exposure, mobility limitations, and social barriers to adherence; and tailor chronic disease management plans to the patient's goals, context, and capacity.

- **Relevant public agencies and community partners** should support access to supportive programs and coordinate touchpoints that reduce social barriers and reinforce continuity for parents managing chronic conditions.
- **Public health agencies and community partners** should deliver education and community-based programs that build self-management skills, support healthy behaviors, and sustain engagement in care.

6. Expand access to trauma-informed, community-centered healing supports that honor spiritual, cultural, and community-based practices.[33-35]

- **Payers and healthcare systems** should expand access to trauma-informed, community-centered healing supports by integrating and reimbursing holistic and community-based services—such as doulas, peer support specialists, community health workers, and traditional healing practitioners—alongside clinical care.
- **Doulas, traditional healers, peer supporters, faith leaders, and other community partners** should deliver culturally grounded healing supports and connections that sustain recovery and wellbeing.

Clinical Recognition and Risk Management

Early identification, specialty consultation, and structured management and ongoing monitoring of high-risk perinatal conditions

7. Implement standardized screening and clinical assessment across all healthcare settings, using trauma-informed approaches, to ensure early identification, accurate risk stratification, reliable documentation, and timely escalation of care for pregnant and postpartum women.*[36-40]

- **Payers** should ensure coverage and reimbursement policies support routine screening, comprehensive clinical assessment, behavioral health referral, and timely follow-up care for pregnant and postpartum women across healthcare settings.
- **Healthcare systems and clinical leadership** should implement standardized, trauma-informed screening and assessment protocols across all points of care, ensure required documentation in the electronic health record, and maintain closed-loop referral and escalation processes.
- **Healthcare providers** should complete comprehensive assessments, apply risk stratification consistently, and act on abnormal findings with timely follow-up or escalation.
- **IT partners** should operationalize workflows, alerts, and longitudinal tracking to support completeness and continuity.
- **Professional licensing boards** should reinforce expectations through standards, guidance, training, and oversight.
- **ADHS** should continue to support implementation through training, technical assistance, and education of the high-risk perinatal consultation line.

8. Ensure timely access to specialty consultation and interdisciplinary expertise to support safe clinical decision-making for complex perinatal conditions.[41,42]

- **Healthcare systems** should establish and operationalize clear expectations and workflows for obtaining timely specialty consultation and interdisciplinary input for complex perinatal cases.
- **Specialty providers, professional boards, and relevant public agencies** should support adequate consultation capacity, staffing, and consultation infrastructure—such as specialty consultation lines, provider-to-provider consultation networks, and continuing education resources—to ensure timely specialty input is available across care settings.

9. Address the clinical complexity of chronic disease during pregnancy and the postpartum period through structured high-risk care planning, specialty referral, and longitudinal follow-up.[43-45]

- **Payers** should remove coverage, authorization, financial, and administrative barriers that delay specialty referral, high-risk care planning, equipment access, and longitudinal follow-up for medically complex pregnant and postpartum women.
- **Healthcare systems and facilities** (including hospitals, obstetric clinics, specialty clinics, and dialysis centers) should establish structured high-risk pathways, ensure appropriate staffing and equipment, and maintain longitudinal follow-up workflows across settings.
- **Clinicians and specialty** providers, including obstetricians (OBs), midwives, primary care providers (PCPs), maternal fetal medicine specialists (MFMs) and other relevant specialties, should co-manage medically complex cases using shared plans of care, ensure timely referral and escalation, and provide ongoing follow-up during pregnancy and the postpartum period.
- **Care coordination teams** (case managers, patient navigators) should provide trauma-informed navigation, ensure direct access to specialty care, and conduct warm handoffs prior to discharge or when care is disrupted.

10. Improve chronic disease management during pregnancy and the postpartum period by strengthening evidence-based treatment planning, medication optimization, specialty co-management, and shared clinical decision-making.[46-50]

- **Healthcare clinicians**, including OBs, midwives, PCPs, MFMs, and emergency department providers, as applicable, should deliver evidence-based chronic disease management during pregnancy and at least one year postpartum, including medication optimization and shared decision-making.
- **Specialists and pharmacists** should support co-management, medication safety, and therapy optimization for medically complex conditions.
- **Professional societies** such as the American College of Obstetricians and Gynecologists (ACOG) should maintain and update clinical guidance to support consistent, evidence-based management of chronic conditions affecting pregnant and postpartum women.

11. Strengthen longitudinal monitoring and tracking of chronic disease indicators before, during, and after pregnancy to prevent worsening symptoms, delayed response, and avoidable complications.[51-55]

- **Payers** should cover required diagnostics, specialty referrals, home monitoring equipment, telehealth, and longitudinal follow-up necessary for chronic disease monitoring before, during, and after pregnancy.
- **Healthcare systems** should implement standardized monitoring workflows, remote monitoring programs, and care coordination processes that support timely escalation.
- **Clinicians**, including OBs, midwives, PCPs, MFMs, neurologists, and cardiologists, should conduct condition-specific monitoring, provide clear patient education on warning signs and home monitoring when indicated, schedule close follow-up, and act on abnormal findings.
- **Public health agencies and professional societies** (e.g., ACOG) should reinforce monitoring expectations through guidance, education, and updated standards of care.

Emergency Preparedness and Clinical Response

Standardized preparedness, workforce capacity, and reliable response to perinatal emergencies

12. Standardize facility protocols and healthcare provider training to improve recognition, referral, and timely treatment of high-risk perinatal conditions and emergencies, reducing preventable delays in diagnosis and escalation.*[56-59]

- **Hospitals and other healthcare facilities**, in coordination with clinical leadership and aligned with national standards, should implement and maintain evidence-based protocols, staffing support, and recurring training to ensure timely recognition, escalation, and treatment of high-risk perinatal conditions and emergencies, appropriate for facility level and scope of services.
- **Professional bodies, training programs, and quality improvement teams** should establish standards, provide simulation training, and monitor performance.

13. Standardize and implement evidence-based clinical protocols for high-risk perinatal conditions and obstetric emergencies across all care settings to reduce variability in care and prevent missed or delayed treatment.*[60-62]

- **Healthcare facilities** should adopt, implement, and maintain evidence-based clinical protocols, patient safety bundles, and practices across all settings where pregnant and postpartum women receive care, including emergency departments, obstetric triage units, inpatient units, and outpatient settings.
- **The Arizona Perinatal Trust (APT)** should reinforce adherence to clinical standards through guidance, technical assistance, performance monitoring, and shared learning.
- **ADHS** should reinforce adherence by reviewing quality improvement processes, responding to complaints, and coordinating with medical boards as appropriate.

14. Ensure clinical and operational readiness across healthcare and institutional settings for obstetric, psychiatric, infectious, and public health emergencies involving pregnant and postpartum women.[63-66]

- **Healthcare facilities, emergency departments, and inpatient psychiatric centers** should maintain clinical and operational readiness through emergency preparedness plans, staffing readiness, and clear procedures for rapid response.
- **Public health agencies and corrections systems** should align emergency protocols, communication pathways, and surge capacity to ensure coordinated readiness across all settings serving pregnant and postpartum women.

15. Ensure availability, maintenance, and appropriate use of essential equipment and technology necessary to respond to life-threatening perinatal conditions, aligned with facility level and scope of services.[67-69]

- **Payers** should support access to necessary equipment and services through coverage and reimbursement policies that do not delay life-saving care.
- **Public health agencies** should support emergency preparedness, allocation planning, and coordinated distribution of essential perinatal equipment and supplies during public health emergencies, including guidance that prioritizes pregnant and postpartum populations when appropriate.
- **Healthcare systems** should ensure availability, maintenance, and appropriate clinical use of equipment consistent with facility level and scope of services.

16. Strengthen perinatal workforce readiness and clinical competency across healthcare and partner systems through coordinate financing, standardized training, credentialing and privileging, and competency monitoring to ensure safe, timely, and trauma-informed care across pregnancy and the postpartum period.[70-73]

- **Payers** should align reimbursement, consultation coverage, and incentive structures to support perinatal workforce sustainability, specialty consultation access, peer-based roles—such as perinatal peer support specialists, maternal mental health coaches, doulas, and community health workers—and the protected time for high-quality, team-based care.
- **Professional licensing boards, provider organizations, and professional societies** should strengthen perinatal workforce readiness by establishing and promoting clinical standards, practice guidance, competency expectations, continuing education opportunities, certification requirements, and professional accountability mechanisms across relevant healthcare professions.
- **ADHS, in collaboration with AzHHA,** should coordinate and promote statewide expectations for perinatal workforce training, simulation, and competency maintenance across healthcare and behavioral health systems.
- **Healthcare systems**, including clinical and hospital leadership, should ensure sufficient staffing, role clarity, and protected time for training; operationalize mandatory onboarding, continuing education, and simulation programs; identify

perinatal mental health–credentialed (i.e., PMH-C) clinicians within systems; and maintain readiness for obstetric, psychiatric, and substance-related emergencies.

- **Academic institutions and training bodies** should develop education pipelines and certification pathways aligned with perinatal mental health, substance use disorder, obstetric emergency readiness, and trauma-informed care.
- **Cross-sector partners, including pharmacy, law enforcement, emergency responders, CPS agencies, and corrections** should receive role-specific, trauma-informed training to support safe interaction, appropriate referral, and continuity of care for pregnant and postpartum women.
- **IT partners** should support workforce readiness through consultation platforms, decision supports, and technology-enabled tools that improve coordination and timely intervention, with clear privacy and consent safeguards.

Care Coordination and Continuity Across Systems

Coordinated pathways, integrated care models, and seamless transitions across systems

17. Create clear, time-sensitive clinical access and transition pathways that reduce delays in triage, referral, transport, and escalation for early pregnancy confirmation, urgent symptoms, and specialty evaluation.*[74-76]

- **Payers** should remove administrative and coverage barriers that delay time-sensitive testing, referrals, and transport.
- **Healthcare systems** should design, implement, and regularly update standardized clinical pathways that clarify when and how patients move from initial presentation to diagnostic evaluation, escalation, and specialty care.
- **Nurse advice lines, warm-lines, referral lines, emergency medical service and other transport partners, and outpatient specialty networks** should establish or strengthen coordinated triage, communication standards, and handoff processes to prevent avoidable delays in care.

18. Embed patient navigation, case management, and adherence supports to ensure completion of referrals, diagnostic testing, and prescribed treatments, and structured re-engagement of patients who miss care across the perinatal continuum.[77-79]

- **Payers, relevant public agencies, and community partners** should enable access to navigation supports through coverage, coordination, and aligned referral pathways.
- **Healthcare systems** should embed and sustain navigation and care coordination functions within care workflows that support appointment completion, medication adherence, timely follow-up, and re-engagement after missed care.
- **Case managers, social workers, community health workers, home visiting programs, and peer support providers** should conduct active outreach, reduce or eliminate barriers, and provide warm handoffs when care is delayed, missed, or disrupted.

19. Proactively connect pregnant and postpartum women to trusted support providers and community-based services and ensure continuity of those relationships across care transitions, life stages, and systems to prevent loss of support during high-risk periods.[80,81]

- **Payers and relevant public agencies** should support implementation through coverage, reimbursement, and alignment of referral and handoff pathways that allow relationships to continue across settings and over time.
- **Healthcare systems, CPS agencies, and relevant public agencies** should maintain continuity of supportive relationships across transitions such as hospitalization, discharge, incarceration, foster care involvement, custody changes, and loss events.
- **Healthcare facilities and community partners** should identify isolation risk and initiate warm handoffs to trusted providers—such as peer support specialists, doulas, home visiting programs, community health workers, and patient navigators—before and after discharge or when care is disrupted.
- **Community partners** offering housing, employment, case management, and peer mentorship programs should provide transitional supports and coordinated handoffs that keep women and families connected to stable, trusted supports during high-risk life transitions.

20. Establish and sustain integrated, multidisciplinary perinatal care across systems and settings to ensure continuity through at least one year postpartum and prevent patients from falling through gaps in care.[82,83]

- **Payers** should align coverage, reimbursement, and care coordination requirements to support continuity across inpatient, outpatient, residential, peer support, and home visiting services.
- **ADHS and AzHHA** should convene stakeholders and establish statewide standards for integrated perinatal mental health and substance use disorder care that extend through at least one year postpartum.
- **Healthcare systems** should operationalize integrated and multidisciplinary care models with shared care plans, defined handoff responsibilities, and clear escalation pathways during pregnancy and the postpartum period, including for behavioral health and chronic disease management.
- **Primary care and specialty providers** should co-manage conditions, close referral loops, and ensure timely transitions between providers and settings.
- **IT partners** should enable timely information sharing to support continuity across systems.
- **Community partners** should deliver culturally responsive wraparound supports and reinforce continuity beyond clinical settings.

21. Build interoperable data, referral, and technology infrastructure that enables continuity of care across facilities, systems, and geographic boundaries.[84-87]

- **Payers, relevant public agencies, social service programs, and technology developers** should align standards, governance, integrations, privacy protections, referral and

notification processes, and reimbursement policies, as applicable, to enable cross-system implementation and sustained use.
- **Healthcare systems and IT partners** should build and maintain interoperable data, referral, telehealth, remote monitoring, and other technology infrastructure that supports continuity of care, closed-loop referrals, proactive outreach, and timely information-sharing across settings and geographic boundaries.

Access, Coverage, and Social and Economic Supports

Comprehensive coverage, accessible care delivery, and stable housing and community supports

22. Ensure affordable, timely, and comprehensive access to perinatal care by expanding treatment capacity, improving geographic and physical accessibility, strengthening the perinatal workforce, and removing insurance coverage and other structural barriers to care.*[88-90]

- **Payers** should expand eligibility, coverage, reimbursement levels, and duration of perinatal services; reduce financial, logistical, and administrative barriers to essential care; and ensure coverage policies do not restrict access to medically necessary out-of-state services.
- **ADHS** should engage with partners to identify ways to strengthen licensing, oversight, and standards for treatment facilities and service delivery models.
- **Healthcare systems** should expand service availability, integrate care models, strengthen discharge planning supports, and ensure services are physically, linguistically, and operationally accessible.
- **Community partners** should be supported to coordinate with healthcare systems and relevant public agencies to strengthen outreach and connect pregnant and postpartum women to family-centered care, services, and resources.
- **Educational institutions and employers** should support perinatal workforce pipeline development and rural service capacity through training, recruitment, and retention strategies aligned with perinatal care needs.

23. Ensure access to stable, safe, community-based, and family-centered housing options that support health, recovery from drug use, and continuity of care during pregnancy and the postpartum period.[91-95]

- **State and local governments** should expand and fund community-based, family-centered housing options for pregnant and postpartum women through housing vouchers, rental assistance, and supportive housing initiatives.
- **Housing authorities, healthcare systems, and community partners** should develop housing resources, integrate supportive services, and establish formal referral pathways that connect eligible pregnant and postpartum women to appropriate housing options that promote health, recovery, and continuity of care.

24. Provide wraparound financial assistance, social services, and practical supports to address basic needs that directly affect care adherence and health outcomes during pregnancy and the postpartum period.[96-98]

- **Funders** should fund, reimburse, or otherwise resource wraparound financial, social, and practical supports and enable referral pathways that improve access, adherence, and continuity of care.
- **Healthcare systems** should systematically identify social needs, integrate screening into care workflows, and connect pregnant and postpartum women to appropriate supports.
- **Community partners** should deliver wraparound financial, social, and practical supports that reduce non-medical barriers to care.

25. Expand and sustain the social support workforce and infrastructure serving pregnant and postpartum women through dedicated funding, coverage, and reimbursement of peer-based and community-centered supports.[99-102]

- **Payers and relevant public agencies** should fund, reimburse, and scale peer support, doula services, community health workers, and outreach programs statewide, including in rural and underserved areas.
- **Healthcare systems and community partners** should recruit, train, and retain the social support workforce; deliver services; and integrate community supports into referral, navigation, and continuity-of-care workflows.

26. Expand and integrate trusted, community-based outreach and resources to connect pregnant and postpartum women to care, sustain engagement, and support continuity beyond clinical settings.[103-105]

- **Payers, healthcare systems, and relevant public agencies** should resource, integrate, and maintain referral pathways to community-based supports and enable navigation, benefits access, and continuity of engagement.
- **Public health agencies and community partners** should expand trusted, community-centered outreach that connects pregnant and postpartum women—especially those at higher risk or facing barriers—to care, accurate information, and ongoing support beyond clinical settings.
- **Doulas and community partners, including Tribal and faith-based organizations,** should deliver relationship-based support, education, and follow-up that reinforce care plans and sustain connection during high-risk periods.

27. Strengthen statewide, culturally-centered perinatal health education for pregnant and postpartum women, their families, and support networks so they understand when care is urgent, why follow-up matters, and how to navigate treatment—prioritizing maternal health alongside fetal health.[106-108]

- **Public health agencies** should co-design, standardize, and disseminate statewide perinatal health education that is culturally-centered, multilingual, and accessible across multiple media formats.

- **Healthcare systems and providers** should reinforce statewide perinatal health education during routine care, referrals, discharge planning, and follow-up using clear materials and teach-back to confirm understanding.
- **Community partners** should deliver and reinforce statewide perinatal health education within communities.

28. Build sustained, relationship-based support systems–such as peer groups, doulas, community health workers, home visitors, patient advocates, and culturally grounded or faith-based supports–that reduce isolation and strengthen emotional, cultural, and familial connection throughout the perinatal period.[109-112]

- **Funders** should fund, reimburse, or otherwise sustain community-based, relationship-based support systems, including peer-led and culturally grounded programs, through flexible funding mechanisms and reimbursement pathways when appropriate.
- **Healthcare systems and relevant public agencies** should identify pregnant and postpartum women and their families at risk of isolation or disrupted support, connect them to community-based supports, and reinforce culturally grounded networks that promote ongoing engagement and trust.
- **Community partners** should develop and sustain relationship-based supports that foster emotional, cultural, and familial connection throughout the perinatal period.

Trustworthy, Responsive, and Supportive Systems

Transparent systems, protected autonomy, and culturally responsive care

29. Ensure informed, transparent, trauma-aware consent and lawful decision-making support when initiating medical procedures, diagnostic testing, or actions that may involve CPS agencies for pregnant and postpartum women.[113,114]

- **Healthcare systems** should implement and enforce informed, trauma-aware consent practices and standardized processes to verify, document, and honor lawful medical decision-making authority when patients are unable to make decisions for themselves.
- **Clinicians** (OBs, PCPs, emergency and behavioral health providers) should ensure patients understand procedures, risks, alternatives, and possible system implications—such as mandated reporting requirements—before consent is obtained.
- **CPS agencies** should align investigative and communication practices to ensure transparency when healthcare decisions intersect with reporting requirements or system involvement.
- **Licensing bodies, legal counsel, and advocacy organizations** should support implementation through standards, training expectations, guidance, and accountability mechanisms.

30. Ensure perinatal care is culturally and linguistically accessible by institutionalizing reliable interpretation, translated patient education materials, and integration of traditional healing practices when desired.[115-118]

- **Medicaid/AHCCCS, in partnership with the Arizona Advisory Council on Indian Health Care (AACIHC), Tribal Nations, other Tribal partners, and relevant public agencies,** should align reimbursement, policies, and infrastructure to support culturally and linguistically accessible communication and integration of traditional healing practices when desired.
- **Healthcare systems, in partnership with language service vendors,** should institutionalize culturally and linguistically accessible care practices across all perinatal settings, including reliable interpretation, teach-back, and patient education materials that are understandable across languages and literacy levels.
- **Tribal partners, cultural leaders, and community partners** should co-develop patient education and care navigation materials that explain available care pathways, cultural healing options, and how to access traditional healing services when desired.

31. Strengthen culturally congruent care by partnering with communities, Tribal Nations, and trusted messengers to co-design care models that respect cultural practices, histories, and individuals' experiences.[119-122]

- **Healthcare systems and public health agencies** should partner with communities and Tribal Nations to co-design culturally congruent care models and sustained engagement strategies.
- **Tribal Nations, AACIHC, community-based and faith-based organizations, and doulas** should guide design and deliver trusted, culturally grounded services that strengthen relationships, engagement, and care uptake.

32. Reduce interpersonal and institutional bias in perinatal care through mandatory, ongoing training, clear documentation standards, and accountability mechanisms that ensure patient concerns are taken seriously and clinical decisions are grounded in established standards of care.[123-127]

- **Healthcare systems** should implement and enforce recurring training and practice standards related to bias awareness, trauma-informed care, and documentation.
- **Professional licensing boards** should reinforce expectations for bias-awareness training, professional documentation standards, and adherence to established standards of care through licensure requirements, continuing education expectations, and professional guidance.
- **CPS agencies, law enforcement, and corrections systems** should align training and accountability structures to reduce biased practices across system interactions with pregnant and postpartum women.

33. Ensure fair and clinically grounded decision-making by embedding transparent, standardized policies and procedures that promote adherence to evidence-based standards

of care and reduce opportunities for bias, discrimination, or unintentionally harmful practices affecting pregnant and postpartum women.[128,129]

- **Arizonans** should support reforms to statutes, reporting practices, and decision frameworks that create unintended harm or discourage care-seeking during pregnancy and the postpartum period.
- **Healthcare systems, CPS agencies, courts, and public health agencies** should implement standardized, non-punitive policies and decision frameworks for clinical care, screening, and reporting practices to ensure decisions are based on safety, clinical context, and evidence-based thresholds rather than subjective judgement or bias.

34. Build and sustain trust with communities that have experienced harm or marginalization by strengthening shared decision-making, patient advocacy, transparent communication, and community-embedded support throughout the perinatal continuum.[130-135]

- **Healthcare providers and healthcare systems** should operationalize patient-centered communication, shared decision-making, and advocacy practices that reduce fear and promote sustained engagement in care.
- **Public health agencies, CPS agencies, law enforcement, and social service providers** should use transparent and supportive communication when interacting with pregnant and postpartum women and their families.
- **Community partners** should deliver culturally congruent, relationship-based supports that reinforce trust beyond clinical settings.

Accountability, Governance, and System Oversight

Standardized governance, aligned policy frameworks, and sustained accountability across systems

35. Establish and enforce standardized, evidence-based policies and procedures across healthcare, behavioral health, child protective service agencies, and justice systems to set consistent baseline expectations and prevent missed or delayed care—while supporting patient-centered, individualized care.[136,137]

- **Healthcare systems and relevant public agencies** should develop, update, and enforce evidence-based policies and procedures that establish clear baseline expectations (e.g., timelines, escalation thresholds, follow-up requirements) for high-risk scenarios involving pregnant and postpartum women, while preserving clinician discretion and patient-centered decision-making.
- **CPS agencies, law enforcement, and professional associations** should align training, guidance, and compliance expectations with these policies to ensure consistency across systems, reduce variability driven by discretion or bias, and prevent missed or delayed care—without imposing punitive or one-size-fits-all responses.

36. Align statutes, reporting mandates, and agency policies with evidence-based, non-punitive perinatal care to reduce deterrence to care-seeking caused by punitive or unclear mandatory reporting practices and to promote family safety and health.[138-143]

- **Arizonans** should support reforms that align statutes and mandatory reporting requirements with evidence-based, non-punitive perinatal care.
- **State regulatory agencies, DCS, healthcare systems, and legal oversight bodies** should update implementing guidance, training, and operational procedures to ensure consistent, clinically appropriate, and lawful application across systems without creating unintended punitive consequences that deter care-seeking.

37. Strengthen accountability and performance monitoring systems across healthcare settings to sustain high-quality perinatal care and ensure adherence to nationally recognized, evidence-based clinical standards.[144-146]

- **APT, AzHHA, regulatory agencies, and healthcare leadership** should support monitoring of adherence to standards of care, identify performance gaps, and sustain continuous quality improvement across healthcare settings.
- **Healthcare systems, IT partners, relevant public agencies, and other regulatory and oversight partners** should support accountability through aligned measurement tools, medication safety mechanisms, documentation standards, and performance monitoring processes.

38. Strengthen transparency and information-sharing practices across healthcare, public health, and partner systems to support accountability, quality improvement, and informed decision-making.[147-149]

- **Healthcare systems, AzHHA, and relevant public agencies** should standardize data-sharing practices, documentation requirements, and communication of risks, findings, and system constraints to support accountability and informed clinical and operational decision-making.
- **Public health agencies and the MMRC** should use shared information to inform review processes, identify system-level issues, and support continuous quality improvement across the perinatal care continuum.

Section 4: Limitations

Several limitations should be considered when reviewing the data included in this report. The following section highlights key limitations in the reporting of maternal mortality in Arizona.

Misclassification of maternal mortality cases by race may occur, resulting in underestimation, especially for American Indian or Alaska Native women.[150,151] American Indian or Alaska Native (AI/AN) communities face persistent disparities in health status, including lower life expectancy and a higher burden of disease. These disparities are often linked to social and community health factors—such as limited access to quality education, poverty, and discrimination in the delivery of health services —and the enduring effects of historical trauma, such as the impacts of federal boarding schools and forced sterilization.[152-154] Additionally, AI/AN women represent a small proportion of the population – only 1.1% nationally (2020)[155] and 5.4% of live births in Arizona (2018-2022)[156]– leading to their frequent exclusion from analyses, national reports, and resource allocation, despite the higher rates of health challenges faced. These include lower life expectancy, higher poverty rates, and increased rates of certain health issues like type 2 diabetes-related deaths, suicides, and alcohol-related deaths when compared to White, non-Hispanic populations. The underreporting and misclassification of data and the increased disease burden within AI/AN communities further highlight the importance of racial misclassification, emphasizing the critical need for inclusion and recognition of these populations in health reporting and resource allocation efforts.[157]

Another major limitation is the inconsistency and incompleteness of available records for review. The MMRC determined that only 79.2% of case narratives included records that were "complete" or "mostly complete." Records are particularly difficult to obtain when the decedent's provider is unknown, or when the case involves case management, social work, and mental or behavioral health services. The MMRP also honors the sovereignty of Arizona's tribal nations, including the confidentiality of healthcare and other sensitive data. As a result, records from healthcare providers, law enforcement, EMS, and other services related to incidents on tribal lands are often unavailable. This limitation is routinely acknowledged by the MMRC during case reviews. MMRP staff make concerted efforts to identify and request all relevant records from available sources and continue to seek new opportunities, new partnerships, and collaboration to improve data access.

Additionally, there are limitations regarding the use of live births throughout this report. Firstly, one of the underlying data sources for this report (live birth data) comes from the ADHS Data Lakehouse and is a read-only copy of the birth transactional database. Data sourced from this table is updated nightly, and any new records, updates, or amendments made to a given record will be reflected here. Over time, year-over-year counts will change slightly due to the nature of this data source. Therefore, live birth counts and resulting ratios may differ slightly from previous reports, but overall trends remain the same. Secondly, throughout this report, live births are used to calculate mortality ratios. However, not all

pregnancies result in a live birth (i.e.; induced abortion, stillbirth, ectopic pregnancy, spontaneous abortion, molar pregnancy, etc.). Therefore, using live births as the denominator in mortality ratio calculations may slightly inflate mortality ratios,[158] as the mortality ratios in this report do not account for the alternative pregnancy outcomes listed previously.

There are also limitations related to the committee's identification and interpretation of prevention recommendations. One significant challenge is the unintentional representation of recommendations due to reliance on literal content documented during committee meetings, which may not fully capture the intended context. Additionally, assigning themes to each recommendation can introduce bias, especially when themes are altered over the analysis period, potentially affecting consistency in categorization. Although the MMRC includes members representing multiple sectors, disciplines, and personal or professional experiences, the committee may not have a complete picture of all maternal health initiatives, resources, or implementation efforts occurring across Arizona. Local activities can be difficult to track and may not always be reflected in statewide strategies. In addition, gaps in representation may affect the range of perspectives available during case review and recommendation development, which can influence how prevention opportunities are identified, interpreted, and prioritized.

Lastly, while the MMRP uses a standard outline to develop all case narratives, the content is identified and abstracted by clinical nurse abstractors using their best judgment based on available information. Social factors that may have contributed to a decedent's death are difficult to assess, especially when detailed case management notes or interviews with family members or friends (most often found in police records or medical examiner Preliminary Investigative Reports) are absent. Additionally, MMRC membership has changed over time, and attendance varies slightly from meeting to meeting. As a result, there is potential for bias or inconsistency during the abstraction and review process, depending on the context provided and the perspectives of professionals present during each review. In addition, although ADHS adopted the Review to Action Guidelines in 2018, these standards continue to evolve, resulting in gaps or inconsistencies in committee decisions. MMRP accounted for these factors when analyzing and reporting data that may be affected by these inconsistencies.

Section 5: Discussion

The overall pregnancy-related mortality ratio (PRMR) for 2018-2022 was 37.3 pregnancy-related deaths per 100,000 live births, an 52.9% increase from the PRMR of 24.4 in 2016-2020.[159] For the first time since 2016-2017, the Arizona PRMR decreased from 2021-2022. Similarly, at the national level, an increase was observed from 2018-2021, followed by a decrease from 2021-2022.[11] The national maternal mortality ratio was 17.4 deaths per 100,000 live births in 2018 and increased to 22.3 deaths per 100,000 live births,[11] which were generally lower than those observed in Arizona.

The number of maternal deaths was similar between 2016-2020 and 2018-2022 (363 vs. 392 deaths).[159] However, the proportion of pregnancy-related deaths (PRDs) increased between the two time periods (2016-2020: 27.5% PRD vs. 2018-2022: 38.0% PRD).[159]

The highest PRMR was observed among American Indian or Alaska Native (AI/AN) women (130.8 PRDs per 100,000 live births), followed by Black or African American (93.2), Hispanic or Latina (31.9), and White, non-Hispanic women (24.4). Compared with 2016-2020, PRMRs among Hispanic or Latina and White, non-Hispanic women were comparable to those in 2018-2022.[159] PRMRs among AI/AN women and Black or African American women were lower in 2016-2020 compared to 2018-2022 (AI/AN: 60.1 vs. 130.8; Black or African American: 52.8 vs. 93.2).[159] These findings are consistent with national reports on pregnancy-related deaths (2018-2022), indicating AI/AN women and Black or African American women faced the highest burden of maternal mortality.[160]For more information regarding Pregnancy-Related Deaths among Black or African American women in Arizona, see Maternal Mortality among Black/ African American Women in Arizona, 2016-2020. Together, these patterns highlight the importance of expanding culturally congruent, community-centered care and strengthening partnerships with communities, Tribal Nations, and trusted messengers to co-design care models (Rec. #6, #32).

The risk for maternal death increases with advanced maternal age and lower educational attainment.[12, 161-163] The highest PRMR observed in Arizona was among the 35–44-year age group (62.2 PRDs per 100,000 live births), and increased with age. The highest PRMRs were also observed among women with 9-12th grade education (no diploma) and those with a high school diploma or GED (53.1 and 53.7 PRDs per 100,000 live births, respectively). Those with a Bachelor's degree or higher had a PRMR of less than half that observed in the two highest groups (25.4 PRDs per 100,000 live births).

Women residing in rural Arizona continue to experience higher rates of maternal mortality compared to urban residents. The highest regional PRMR was observed in Northern Arizona (50.0 PRDs per 100,000 live births) and Western Arizona (41.8). Counties in Northern and Western Arizona (Navajo, Apache, and La Paz Counties) were identified by March of Dimes as having travel times to hospitals providing obstetric care of 31 to 60 minutes,[164] making it difficult to access maternity care in those areas. Longer travel time to maternity care is associated with poor health outcomes for both mothers and babies.[164-167] All counties in Northern and Western Arizona are considered Rural, except Yuma County. These findings

highlight persistent challenges in rural communities, including geographic access, treatment capacity, and workforce availability. Addressing these barriers will require strengthening access to perinatal services and expanding the social support workforce, particularly in rural areas (Rec. #22, #25).

Nearly half (47.9%) of all deliveries in Arizona from 2018-2022 were covered by Medicaid.[155] Yet Medicaid recipients accounted for 66.7% of deaths and a PRMR of 52.1 PRDs per 100,000 live births. In contrast, women with private insurance had the lowest PRMR (21.4 PRDs per 100,000 live births) and accounted for 24.5% of deaths. These findings highlight the importance of addressing financial, social, and practical barriers that affect access to care, adherence, and continuity of care across the perinatal period (Rec. #24).

Through detailed individual case reviews, the Arizona MMRC found that 90.6% of the 149 deaths reviewed in the 2018-2022 period were preventable. Nationally, the CDC reported that 87.0% of 2021 deaths, 83.5% of 2020 deaths, and 84.1% of 2017-2019 deaths were preventable. When examining preventability by race or ethnicity, the Arizona MMRC found that 100.0% of PRDs among Black or African American women, 92.9% among White, non-Hispanic women, 90.6% among Hispanic or Latina women, and 85.7% among AI/AN women were preventable.

Understanding when pregnancy-related deaths occur is pivotal to improving prevention and care practices. When examining the timing of preventable PRDs, most occurred in the postpartum period (74.1%). These findings highlight the importance of strengthening postpartum follow-up and care coordination by embedding patient navigation and adherence supports, and by sustaining integrated, multidisciplinary perinatal care across systems for at least one year postpartum (Rec. #18, #20).

From 2018 to 2022, natural deaths accounted for the majority (57.4%) of PRDs, followed by accidents (23.0%), suicides (11.5%), and homicides (5.4%) based on death certificates. The Arizona MMRC determined that comparable proportions of PRDs were suicides (11.4%) and homicides (5.4%). At the national level in 2021, 7.4% of PRDs were determined to be suicides, and 1.7% were determined to be homicides, both of which are lower proportions than those reported in Arizona.[167] When examining preventability by manner of death, the Arizona MMRC found that 100.0% of all accidents, suicides, and homicides were preventable, and 83.5% of natural deaths were preventable. These findings highlight the importance of strengthening prevention and identification of violence-related risks and ensuring timely, trauma-informed crisis response when pregnant or postpartum women experience violence, overdose, or other behavioral health crises (Rec. #1, #2).

Mental health conditions were the most common primary underlying cause of PRDs (29.5%), followed by infection (23.5%), other causes (16.1%), and hemorrhage (10.7%). At the national level, mental health conditions were also the leading underlying cause of PRDs in 2017-2019 and in 2020, though infection became the leading cause in 2021.[167] These findings highlight the importance of strengthening perinatal workforce readiness and clinical competency to ensure providers across healthcare and partner systems are equipped to recognize and

respond to perinatal mental health and substance use conditions during the perinatal period (Rec. #16).

The leading underlying causes of pregnancy-related death varied by race and ethnicity during 2018-2022: infection among AI/AN and Hispanic or Latina women, injury among Black or African American women, and mental health conditions among White, non-Hispanic women. This differed from 2016-2020 for most groups, when mental health conditions, cardiovascular disease, and hemorrhage were leading causes among AI/AN, Black, and Hispanic women, respectively.[159] These changes may partially reflect the impact of the COVID-19 pandemic, which placed a greater burden on AI/AN and Hispanic populations.[168] These findings highlight the importance of ensuring clinical and operational readiness across healthcare and institutional settings to respond to obstetric, psychiatric, infectious, and public health emergencies involving pregnant and postpartum women (Rec. #14).

The Arizona MMRC determined that mental health conditions contributed to 49.0% of PRDs, and SUD contributed to 40.9%. Untreated maternal mental health and substance use disorders are associated with poor pregnancy outcomes and poor infant health outcomes.[169,170] These findings highlight the importance of strengthening coordinated, trauma-informed behavioral health responses across healthcare, child protective service agencies, and community systems, reducing stigma and fear that deter care-seeking, and expanding supports that help women manage mental health and substance use conditions during the perinatal period (Rec. #3, #4, #5).

The Arizona MMRC also determined that discrimination contributed to 45.0% of PRDs. These findings highlight the importance of ensuring fair, transparent, and clinically grounded decision-making across systems by embedding standardized policies and procedures that reduce opportunities for bias and discrimination in care affecting pregnant and postpartum women (Rec. #33).

The recommendations highlighted in this discussion are not all-inclusive of those provided by the MMRC. Preventing pregnancy-related deaths in Arizona will require coordinated action across clinical, public health, community, and policy systems to implement the recommendations detailed in **Section 3**.

Section 6: Conclusion

The primary purpose of Arizona's Maternal Mortality Review Program (MMRP) is to collect detailed information on the causes and circumstances surrounding maternal deaths in order to identify prevention opportunities and develop recommendations for action. This work is supported by the ERASE MM grant (5 NU58DP007788-02-00), which aims to improve the availability of timely, accurate, and standardized information on maternal deaths. The MMRP is actively enhancing the efficiency of its review process with the goal of conducting analyses closer to real time. This approach helps ensure that the MMRC's prevention recommendations remain responsive to emerging trends in maternal health in Arizona. The findings in this report highlight the complex clinical, community, and systemic factors that influence maternal outcomes in Arizona. Behavioral health conditions—including mental health conditions and substance use disorders—were the most frequently identified contributing factors to pregnancy-related deaths, alongside breakdowns in patient-provider communication, care coordination, and clinical decision-making. Structural conditions such as discrimination, financial barriers, and housing instability also contributed to many cases, underscoring the broader social and systemic contexts in which maternal deaths occur. Together, these findings reinforce that preventing pregnancy-related deaths requires coordinated action across healthcare, public health, community, and policy systems.

Based on these findings, the MMRC identified five priority strategies to reduce maternal mortality in Arizona, selected for their potential impact and feasibility within the current healthcare and policy landscape. These priorities focus on strengthening clinical readiness and provider training to ensure timely recognition and response to high-risk perinatal conditions; improving standardized screening and risk assessment across care settings to support early identification of complications; reducing structural barriers that limit access to timely and comprehensive perinatal care; implementing consistent, evidence-based clinical protocols for obstetric emergencies to improve reliability of care; and establishing clear, time-sensitive care pathways that support rapid triage, referral, and escalation when urgent symptoms or complications arise.

Across reviewed cases, the MMRC determined that the majority of pregnancy-related deaths were preventable. Each case represents not only a loss to families and communities but also an opportunity to strengthen systems of care and prevent future tragedies. Preventing maternal deaths requires sustained collaboration across healthcare providers, public health agencies, community organizations, policymakers, and families themselves. By implementing the recommendations outlined in this report, Arizona can continue to strengthen its systems of care and move toward a future where every pregnant and postpartum woman is supported by timely, respectful, and effective care.

Section 7: Appendices

Appendix A. Arizona Maternal Mortality Review Committee Membership

Thank you to the following Arizona MMRC Members who participated in the review of and creation of recommendations for 2018-2022 cases.

Teresa Anzar, RNC-OB, MSN
RN Consultant
United Healthcare
Arizona Perinatal Trust

Autumn Argent, MSN, RNC-OB, CCE
System Educator - Perinatal
Northern Arizona Healthcare

Laura Bacon, CNP, APRN-CNS, RNC-OB
Advanced Practice Registered Nurse
Clinical Nurse Specialist
Honor Health

Pamela Barnes-Palty, PsyD
Licensed Psychologist
Barnes-Palty Psychology Group

Meloney Baty, MA
Healthy Start Project Director
Maricopa County Department of Public Health

Amber-Rose Begay
Maternal-Child Health Project Coordinator
Diné College

Laura Luna Bellucci, MPA
Bureau Chief, Bureau of Women's and Children's Health
Arizona Department of Health Services

Jennie Bever, PhD, IBCLC
President and CEO
4th Trimester Arizona

Ashley Boruff
Maternal Child Health EPSDT Manager
Arizona Health Care Cost Containment System

Vicki Buchda
Senior Vice President, Care Improvement *(former)*
Arizona Hospital and Healthcare Association

Deb Christian
Executive Director *(former)*
Arizona Perinatal Trust

Mike Clement, MD
Retired Pediatrician
Arizona Perinatal Trust

Bianca Comer, MDP, BS
Founder and Owner
Our Mothers and Us

Dean Coonrod, MD
Chair Department of Obstetrics and Gynecology
Maricopa Integrated Health System/District Medical Group
Professor Department of Obstetrics and Gynecology
University of Arizona College of Medicine-Phoenix

Kimberly Couch, RN, CNM, FNP, DPN (Capt.)
Director of Women and Infant Services (former)
Phoenix Indian Medical Center
Indian Health Services
United States Public Health Service Corp

Jessica Dalton-Rambaran, MSN, RN
Nurse-Family Partnership Nurse Manager
Pima County Health Department

Jeannea Dathard
Doula
Divine Dancing Doula

Jessica Davenport-Williams
Co-founder and President
Black Girls Break Bread

Christopher Dickerson, PhD
Assistant Professor of Public Health
Diné College

Kate Dobler, Med, CPM, BS, IMH-E
Women's Services Network Coordinator
Arizona Health Care Cost Containment System

Pooja Doehrman, MD
Women's Health Department Chair
Dignity Health

Cara English, DBH, LAC
Chief Executive Officer (*former*)
Cummings Graduate Institute for Behavioral Health Studies

Elise Erickson, PhD, CNM, FACNM
Assistant Professor
University of Arizona

Nora Espino
Intimate Partner Homicide Project Coordinator
Arizona Coalition to End Sexual and Domestic Violence

Megan Fah, MD
Anesthesiologist
Mayo Clinic

Holly Figueroa
Tribal Relations Project Manager
White Mountain Apache Behavioral Health Services

Traci Fitzhugh, MD, FACOG
Medical Director
Arizona Priority Care

Lauryn Fjell
Domestic Violence Response Coordinator
Arizona Coalition to End Sexual and Domestic Violence

Kim Flanders, DNP, DNM, FACNM
Certified Nurse-Midwife
Our Way Wellness

Ivette Fullerton, MSW, PMH-C
Patient/Family Advisor

Joyce Garcia-Gonzalez, CNM, MSN
Certified Nurse-Midwife
West Valley Women's Care

Katherine Glaser, MD, MPH
General Obstetrics and Gynecology
Tuba City Regional Health Care Corporation

Erica Glaze, MPH, MCHES, CCCE
Founder and Lead Consultant
Live Wellthy, LLC

Kendra Gray, DO
MMRC Co-Chair, *2021-2024*
Maternal Fetal Medicine
Dignity Medical Group

Lisa Green White, MSN, RNC-OB, C-EFM, C-ONQS, SANE-A &-P
Nurse Educator Labor & Delivery/Mother Baby Unit
Yuma Regional Medical Center

Heidi Haeder Heild, LBSW
Associate Director Maternal Child Health Services
Banner University Health Plan

Craig (Will) Heise, MD
Toxicologist
University of Arizona, College of Medicine
Phoenix, Dept of Medical Toxicology
Banner University Medical Center - Phoenix

Guadalupe Herrera-Garcia, DO
Maternal Fetal Medicine
Desert Maternal Fetal Medicine- Owner
Desert Harmony Wellness - CEO

Cindy Herrick MA, PMH-C, CPSS, MHFA
Strategic Research and Special Projects Lead
The Policy Center for Maternal Mental Health

Wendell Honanie Jr.
Maternal Health Innovation Program Manager
Inter Tribal Council of Arizona

Kevin Huls, MD, MFM
Medical Director, Banner University Medical Center
Program Director, Maternal-Fetal Medicine
University of Arizona College of Medicine-Phoenix
Sonoran Maternal Fetal Medicine

Emily Jensen
Home Visitation Supervisor
South Phoenix Healthy Start

Melissa Johnson, DBH, MC, LPC
Behavioral Health Consultant
El Rio Health Center

Robert (BJ) Johnson, MD
Founding MMRC Chairman, 2011-2021
Maternal Fetal Medicine
Arizona Perinatal Trust

Diana Jolles, PhD, CNM, FACNM
DNP Clinical Faculty
Frontier Nursing University
American Association of Birth Centers

Leandra Jones, MPH
Patient/Family Advisor

Valerie Kading, DNP, MBA, MSN, PMHNP-BC
VP Clinical and Medical Development
Acadia Healthcare

Sarah Kellerhals, MD, MFM
MMRC Co-Chair, 2023-2027
Maternal Fetal Medicine
Dignity Health Medical Group
Creighton University – Phoenix

Karen Kelsch
Social Worker
The Women's Center at Northwest

Jessica Knight
Reverend/Chaplain
Executive Director
FIRE Revolution Freedom Center

Amy Lebbon, CNM
Maternal Child Health Consultant
Indian Health Services

Nazhonii Leos
Patient/Family Advisor

Monique Lin, MD, MSPH
Maternal Fetal Medicine
Mountain Park Health Center, Inc.

Stacey Litson, MPH
Navajo Maternal & Child Health Project Coordinator
Diné College

Eloisa Lopez
Executive Director
Pro-Choice Arizona
The Abortion Fund of Arizona

Sheri Lopez, CD-DONA, CLC, NCS, CPDD, CCBE, CPBET, RN
Founder
You Can't Groom Me
Birth and Baby Services (BABS)

Kathy Lynch, MD, MPH
Family Physician with Obstetrics
Whiteriver Indian Health Service Hospital

Michael Madsen, MD
Medical Examiner
Coconino County Medical Examiner's Office

Paula Mandel, RN
Deputy Director
Pima County Health Department

Fade Mahmoud, MD
Adult Oncologist
Banner Gateway Medical Center

Maria Manriquez, MD, FACOG, FASAM
Phoenix Branch Director
Comprehensive Center for Pain & Addiction
Director, UME Pain and Addiction Curriculum
Professor, Department of Obstetrics and Gynecology
University of Arizona, College of Medicine Phoenix

Beth McManis, PhD, CNM, MS, FACNM
Assistant Professor
Northern Arizona University School of Nursing

Linda Meiner, MSN, RNC-NIC, NE-BC
Clinical Transport Manager - Perinatal Transport
PHI AirMedical / Air Evac Services

Lizette Melis, MA, MEd
Perinatal Mental Health Coordinator
The Guidance Center

Katie Mommaerts, PhD, MSW, LCSW
Executive Director
Postpartum Support International Arizona

Kimberly Moore-Salas, IBCLC
MMRC Co-Chair, 2024-2028
Consultant
Tribal Indemnity, LLC

Dorothy Mora, CNM
Certified Nurse-Midwife
Tsehootsooi Medical Center

Lakisa Muhammad, CPM
Chief Executive Officer
Black Birth Equity NOW

Fatima Muhammad, MPH
Founder
MODABA, Village Mother's

Tandi Myles, LCSW
Licensed Clinical Social Worker
Mountain Park Health Center, Maryvale Clinic

Staci Myron
Family Support Specialist
Hopi Women, Infant and Children's Program

Nicole Neal, MPH, C.H.E.S
Health Advancement Specialist
Blue Cross Blue Shield of Arizona

Olymphia O'Neale-White, DSW, LCSW, C-FSW, PMH-C, BCD
Founder & Executive Trainer
Through My Lens Consulting Services

Diane Ortega, CNM
Owner, Administrative Director
Willow Birth Center

Tina Pattara-Lau, MD
Maternal Child Health Consultant
Indian Health Services

Nic Peters, MD, MD(H), IFMCP, FAAP
Pediatrician/Pediatric Oncologist
Pimri Pediatrics

Catrina Popelier, MPH, RN, IBCLC, IMH-E(II)
Quality Management Nurse
Department of Child Safety

Khalid Qadafi
Program Evaluator
South Phoenix Healthy Start

Vicki Rainy
Recovery Educator
RI International

Diana Rangel, BSW
Bilingual Victim Services Specialist
Arizona Coalition to End Sexual and Domestic Violence

Andrew Rubenstein, MD, FACOG
MMRC Co-Chair, *2021-2023*
General Obstetrics and Gynecology

Ryan Russell, Lt.
Homicide Unit Detective
Mesa Police Department

Rachael Salley
Deputy Assistant Director
Clinical Program Management
Arizona Health Care Cost Containment System

Susan Smith
Prevention Adminstrator
Arizona Department of Child Safety

Nick Stepp
Detective
Glendale Police Department

Janae Stevenson
Program Evaluator (former)
South Phoenix Healthy Start

Casandra Stouder
Indigenous Prevention and Wellness Specialist

Brittany Sullivan, MD
Surgical Oncologist

Tara Sundem, MS, APRN, NNP-BC
Co-Founder, Executive Director
Hushabye Nursery

Eric Tack, MD, JD, MPH
Deputy Assistant Director
Managed Care Clinical Compliance
Arizona Health Care Cost Containment System

Jaime Testa, MD
Medical Director
United Healthcare Community Plan

Shadie Tofigh
Director, Maternal Child Health Collective Impact
March of Dimes, Arizona Chapter

Megan Trosko
Director of Care Improvement
Arizona Hospital and Healthcare Association

Sarah Torres
Prevention Administrator
Arizona Department of Child Safety

Roberta Ward, CNM, FNP, DNP
Certified Nurse-Midwife
River People Health Center
Salt River Pima-Maricopa Indian Community

Shelly Ward, MCJ
Victim Services Administrator
Mesa Police Department

Maria Welch, BA
Research Site Coordinator
Johns Hopkins Bloomberg School of Public Health
Center for Indigenous Health

Breann Westmore
Director of Government Affairs
Humana

Jennifer Whitehair, MD
General Obstetrics and Gynecology
Tuba City Regional Health Care Corporation

Elizabeth Wood
Co-Founder, Educator
Matrescense: 4th Trimester

Laurie Wood
Chief Executive Officer
Arizona Perinatal Trust, Inc

Olivia Zoph, MD
Emergency Medicine Physician
Tucson Medical Center
Sells Indian Hospital

Appendix B. Glossary

Definitions for Common Terminology in Maternal Mortality

The following are definitions for common terminology found in this report.

- **Discrimination:** Encompasses the following
    - Treating someone less or more favorably based on the group, class, or category they belong to, resulting from biases, prejudices, and stereotyping. It can manifest as differences in care, clinical communication and shared decision-making.
    - Discriminatory interactions between individuals based on differential assumptions about the abilities, motives, and intentions of others and resulting in differential actions toward others based on their race. It can be conscious as well as unconscious, and it includes acts of commission and acts of omission. It manifests as lack of respect, suspicion, devaluation, scapegoating, and dehumanization.
    - The systems of power based on historical injustices and contemporary social factors that systematically disadvantage people of color and advantage white people through barriers in housing, education, employment, earnings, benefits, credit, media, health care, criminal justice, etc.
- **Natural Death:** A death occurring in the course of nature and from natural causes, such as age or disease. “Natural” does not mean inevitable, but rather a manner of death that was more medical or clinical in nature. Natural deaths are not a result of an accident, homicide, or suicide.
- **Maternal Mortality (MM):** The death of a woman while pregnant or within 1 year of the end of a pregnancy – regardless of the outcome, duration, or site of the pregnancy – from any cause related to or aggravated by the pregnancy or its management. Though the CDC definition excludes accidental and incidental causes from maternal mortality reporting, the Arizona MMRP reviews and reports on all maternal mortalities occurring in Arizona regardless of the manner of death.
- **Maternal Mortality Review Information Application (MMRIA):** A CDC-developed database that collects/abstracts clinical and non-clinical information pertaining to maternal deaths. Committee Decisions MMRIA Form standardizes review by guiding committee determinations about pregnancy-relatedness, manner of death, cause of death, and preventability for each case.
- **Pregnancy-Associated:** The death of a woman during pregnancy or within one year of the end of pregnancy, regardless of the cause. All deaths that have a temporal relationship to pregnancy are included.
- **Pregnancy-Associated Mortality Ratio (PAMR):** An estimate of the number of pregnancy-associated deaths for every 100,000 live births.
- Pregnancy-Related: The death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of

pregnancy. In addition to having a temporal relationship to pregnancy, these deaths are causally related to pregnancy or its management.

- **Pregnancy-Related Mortality Ratio (PRMR):** An estimate of the number of pregnancy-related deaths for every 100,000 live births. This ratio is often used as an indicator to measure the nation's health.
- **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, community, provider, facility, and/or systems factors. MMRIA allows MMRCs to document preventability decisions in two ways: 1) determining preventability as a "yes" or "no" and/or 2) determining the chance to alter the outcome using a scale that indicates "no chance," "some chance," or "good chance." Any death with a "yes" response or a response that there was "some chance" or a "good chance" to alter the outcome was considered "preventable"; deaths with a "no" response or "no chance" were considered "not preventable."
- **Resident:** Arizona residency was determined by the county of residence as listed on the death certificate. This does not indicate citizenship or legal residence in Arizona.
- **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 that produced the fatal injury. In addition to the listed causes of death from the death certificate, the MMRC assigns an underlying cause of death code for Pregnancy-Related cases.

Appendix C. AZ Statute Language

On May 2, 2025, Governor Katie Hobbs signed into law SB 1316. This law establishes A.R.S. §36-3501.01 and the Maternal Mortality Review Program to coordinate and facilitate the review of pregnancy-associated deaths to understand the incidences, causes, and preventability by the Maternal Mortality Review Committee. This bill establishes appointees to the committee and requires a biannual report due May 15th of even years.

> **36-3501.01.** Maternal mortality review program; committee; members; reports; compensation; definition
>
> A. The maternal mortality review program is established to evaluate the incidence, causes and preventability of pregnancy-associated deaths. The program shall coordinate and facilitate case reviews by the maternal mortality review committee. In collaboration with the maternal mortality review program, the maternal mortality review committee shall produce prevention recommendations that aim to address the contributing factors that lead to preventable pregnancy-associated deaths.
>
> B. The maternal mortality review program is composed of the maternal mortality review committee and the committee's staff. The director of the department of health services shall appoint the members of the committee. The director or the director's designee shall serve as cochairperson of the committee. The committee shall elect a second cochairperson from the committee's membership.
>
> C. The director of the department of health services shall appoint at least the following members of the maternal mortality review committee, one of whom is from a county with a population of less than five hundred thousand persons:
>
> 1. Two obstetricians who are licensed pursuant to title 32, chapter 13 or 17, at least one of whom is a maternal fetal medicine specialist.
>
> 2. A certified nurse midwife who is licensed pursuant to title 32, chapter 15.
>
> 3. A representative of a nonprofit organization that provides education, services or research related to maternal and child health.
>
> 4. A representative of an organization that represents hospitals in this state.
>
> 5. A behavioral health professional.
>
> 6. A domestic or interpersonal violence specialist.
>
> 7. A forensic pathologist or toxicologist.
>
> 8. An individual with personal or community-level experience in maternal health issues.
>
> 9. A representative from the Arizona health care cost containment system.
>
> 10. A representative from the department of child safety.
>
> 11. A representative from the Arizona perinatal trust.
>
> 12. A representative of Indian health services.

D. The maternal mortality review program shall:

1. Develop a data collection system for maternal fatalities.

2. Provide training to cooperating agencies and individuals on identification, review and dissemination processes.

3. On or before May 15 of each even-numbered year, produce a statistical report on the incidence and causes of pregnancy-related deaths in this state and submit a copy of this report, including the committee's recommendations for preventing maternal fatalities, to the governor, the president of the senate, the speaker of the house of representatives and the chairpersons of the health and human services committees of the house of representatives and the senate, or their successor committees.

4. Study the adequacy of statutes, ordinances, rules, training and services to determine the changes that are needed to decrease the incidence of preventable maternal fatalities.

E. Committee members are not eligible to receive compensation, but members appointed pursuant to subsection C of this section are eligible for reimbursement of expenses pursuant to title 38, chapter 4, article 2.

F. For the purposes of this section, "pregnancy-associated death" means a death that occurred during pregnancy or within one year after the end of pregnancy.

Appendix D. Supplemental Data Table: Pregnancy-Related Deaths, Sociodemographic Characteristics^

	Pregnancy-Related Deaths			
	# of Deaths	% of Deaths	Live Births	Ratio (All)
Overall	149	N/A	399581	37.3
Year	n=149			
2018	15	10.1	82119	18.3
2019	28	18.8	80670	34.7
2020	26	17.4	77898	33.4
2021	45	30.2	78921	57.0
2022	35	23.5	79973	43.8
Sociodemographic Characteristics				
Maternal Race or Ethnicity	n=148			
American Indian or Alaska Native	28	18.9	21401	130.8
Asian or Pacific Islander	*	*	15779	*
Black or African American	22	14.9	23610	93.2
Hispanic or Latina	53	35.8	166351	31.9
White, non-Hispanic	42	28.4	172440	24.4
Maternal Age	n=149			
10-14 Years of Age	0	**	169	**
15-24 Years of Age	24	16.1	101653	23.6
25-34 Years of Age	83	55.7	228682	36.3
35-44 Years of Age	42	28.2	67576	62.2
45-54 Years of Age	0	**	2331	**
55-60 Years of Age	0	**	502	**
Maternal Education	n=149			
8th grade or less	*	*	10152	*
9-12th grade; No diploma	25	16.8	47080	53.1
High School grad or GED	57	38.3	106120	53.7
Some college, no degree	26	17.4	87983	29.6
Associate's degree	9	6.0	34477	26.1
Bachelors degree or more	27	18.1	106306	25.4
Maternal Residence				
Urban vs. Rural	n=148			
Urban	119	80.4	339939	35.0
Rural	29	19.6	50059	57.9
Regions	n=148			
Northern	13	8.8	25980	50.0
Western	10	6.8	23952	41.8
Central	104	70.3	276368	37.6
Southeastern	21	14.2	62867	33.4

Table continues on following page.

Table cont.

	Pregnancy-Related Deaths			
	# of Deaths	**% of Deaths**	**Live Births**	**Ratio (All)**
Payer	n=147			
Medicaid	98	66.7	188028	52.1
Private Insurance	36	24.5	167848	21.4
Self-Pay	*	*	21878	*
Other	8	5.4	20822	38.4

*Data is suppressed for numerator non-zero counts less than 6 and denominator reference populations of less than 100 persons in order to protect confidentiality. Additionally, if one cell in the previous scenario does not pass this test, the complementary proportion, related percentage, or ratio that together sum to a whole (or 100%) shall also be suppressed.
** Percentages and ratios with a case count of 0.
^Case counts greater than or equal to 6 but below 10 and their corresponding calculations should be interpreted with caution.
Urban vs. Rural:

Urban: Residing in Maricopa, Pima, Pinal, or Yuma Counties
Rural: Residing in Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Mohave, Navajo, Santa Cruz, or Yavapai Counties

Regions:

Northern: Apache, Coconino, Navajo, and Yavapai Counties
Western: La Paz, Mohave, and Yuma Counties
Central: Gila, Maricopa, and Pinal Counties
Southeastern: Cochise, Graham, Greenlee, Pima, and Santa Cruz Counties

Payer:

Self-Pay: No source of payment was identified at the time of admission
Other: Indian Health Service (IHS), TriCare/CHAMPUS, and other types

Appendix E. Supplemental Data Table: Pregnancy-Related Mortality Ratios by Inclusion Criteria^

See **Appendix J** for Inclusion Criteria.

	Pregnancy-Related Deaths		
	Ratio (All)	**Ratio (CDC)**	**Ratio (AZ)**
Overall	37.3	37.8	35.5
Year			
2018	18.3	18.8	17.0
2019	34.7	35.8	32.2
2020	33.4	32.9	32.1
2021	57.0	56.9	55.8
2022	43.8	44.9	41.3
Sociodemographic Characteristics			
Maternal Race or Ethnicity			
American Indian or Alaska Native	130.8	129.5	116.8
Asian or Pacific Islander	*	*	*
Black or African American	93.2	94.1	88.9
Hispanic or Latina	31.9	32.9	31.9
White, non-Hispanic	24.4	24.4	22.6
Maternal Age			
10-14 Years of Age	0.0	0.0	0.0
15-24 Years of Age	23.6	24.0	23.6
25-34 Years of Age	36.3	36.7	34.1
35-44 Years of Age	62.2	63.3	59.2
45-54 Years of Age	0.0	0.0	0.0
55-60 Years of Age	0.0	0.0	0.0
Maternal Education			
8th grade or less	*	*	*
9-12th grade; No diploma	53.1	53.9	46.7
High School grad or GED	53.7	54.5	52.8
Some college, no degree	29.6	29.9	27.3
Associate's degree	26.1	26.7	26.1
Bachelors degree or more	25.4	24.2	24.5
Payer			
Medicaid	52.1	53.0	48.9
Private Insurance	21.4	21.0	20.3
Self-Pay	*	*	*
Other	38.4	35.4	38.4

Table continues on following page.

Table cont.

	Pregnancy-Related Deaths		
	Ratio (All)	**Ratio (CDC)**	**Ratio (AZ)**
Maternal Residence			
Urban vs. Rural			
Urban	35.0	35.1	34.4
Rural	57.9	56.1	47.9
Regions			
Northern	50.0	50.0	38.5
Western	41.8	41.8	33.4
Central	37.6	37.6	37.3
Southeastern	33.4	31.8	31.8
Committee determination of preventability			
Preventable Deaths			
Yes	33.8	34.2	32.0
No	3.5	3.6	3.5
Chance to Alter Outcome (among Preventable Deaths)			
Good Chance	9.3	9.0	9.0
Some Chance	23.0	23.6	21.5
No Chance	*	*	*
Unable to Determine	*	*	*
Timing of Death			
Pregnant at time of death	6.0	6.2	6.0
Day of delivery	4.8	4.9	4.5
Pregnant within 42 days of death	12.0	12.1	11.5
Pregnant 43-365 days of death	14.5	14.6	13.5
Preventability for each Timing of Death Group			
Pregnant at time of death (Preventable)	5.3	5.4	5.3
Day of delivery (Preventable)	3.5	3.6	3.3
Pregnant within 42 days of death (Preventable)	10.5	10.5	10.0
Pregnant 43-365 days of death (Preventable)	14.5	14.6	13.5
Committee determinations on circumstances surrounding death			
Did obesity contribute to the death?			
Yes	8.5	8.7	7.8
Probably	3.0	3.1	3.0
No	22.5	22.6	21.8
Unknown	3.3	3.3	3.0
Did discrimination contribute to the death?			
Yes	6.5	6.7	6.3
Probably	10.3	10.5	9.3
No	9.8	10.0	9.5
Unknown	9.0	8.7	8.8

Table continues on following page.

Table cont.

	Pregnancy-Related Deaths		
	Ratio (All)	**Ratio (CDC)**	**Ratio (AZ)**
Did mental health conditions contribute to the death?			
Yes	13.8	13.9	12.8
Probably	4.5	4.6	4.5
No	13.0	13.1	12.5
Unknown	6.0	6.2	5.8
Did substance use disorder contribute to the death?			
Yes	14.0	14.4	13.3
Probably	*	*	*
No	20.5	20.6	19.8
Unknown	1.5	1.5	1.5
Manner of Death			
Manner of Death as listed on the Death Certificate			
Accident	8.5	8.7	8.0
Homicide	2.0	2.1	2.0
Natural	21.3	21.6	20.3
Suicide	4.3	4.1	4.0
Pending Investigation	*	*	*
Could not be determined	*	*	*
Was this death a suicide? (as determined by the committee)			
Yes	4.0	3.9	3.8
Probably	*	*	*
No	27.8	28.3	26.5
Unknown	5.3	5.4	5.0
Was this death a homicide? (as determined by the committee)			
Yes	2.0	2.1	2.0
Probably	0.0	0.0	0.0
No	34.3	34.7	32.5
Unknown	*	*	*

Table continues on following page.

Table cont.

	Pregnancy-Related Deaths		
	Ratio (All)	**Ratio (CDC)**	**Ratio (AZ)**
Committee determinations of causes of death			
Mental Health Conditions	11.0	11.0	10.5
Infection	8.8	9.0	8.5
Hemorrhage (Excludes Aneurysms or CVA)	4.0	4.1	4.0
Injury	2.8	2.8	2.8
Cardiovascular Conditions	2.0	2.1	2.0
Cardiomyopathy	1.5	*	*
Hypertensive Disorders of Pregnancy	*	*	*
Embolism - Thrombotic (Non-Cerebral)	*	*	*
Neurologic/Neurovascular Conditions (Excluding CVA)	*	*	*
Amniotic Fluid Embolism	*	*	*
Unknown COD	*	*	*
Cerebrovascular Accident (CVA) not Secondary to HDP	*	*	*
Gastrointestinal Disorders	*	*	*
Anesthesia Complications	*	*	*
Cancer	*	*	*
Conditions Unique to Pregnancy	*	*	*
Hematologic	*	*	*
Metabolic/Endocrine	*	*	*
Renal Diseases	*	*	*

*Data is suppressed for numerator non-zero counts less than 6 and denominator reference populations of less than 100 persons in order to protect confidentiality. Additionally, if one cell in the previous scenario does not pass this test, the complementary proportion, related percentage, or ratio that together sum to a whole (or 100%) shall also be suppressed.
** Percentages and ratios with a case count of 0.
^Case counts greater than or equal to 6 but below 10 and their corresponding calculations should be interpreted with caution.
Urban vs. Rural:

Urban: Residing in Maricopa, Pima, Pinal, or Yuma Counties
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Payer:

Self-Pay: No source of payment was identified at the time of admission
Other: Indian Health Service (IHS), TriCare/CHAMPUS, and other types

Appendix F. Supplemental Data Table: Maternal Mortality Review Committee Decisions for Pregnancy-Related Deaths^

	Pregnancy-Related Deaths			
	# of Deaths	% of Deaths	Live Births	Ratio (All)
Overall	149	N/A	399581	37.3
Committee determination of preventability				
Preventable Deaths				
Yes	135	90.6	399581	33.8
No	14	9.4	399581	3.5
Chance to Alter Outcome (among Preventable Deaths)	n=134			
Good Chance	37	27.6	399581	9.3
Some Chance	92	68.7	399581	23.0
No Chance	*	*	399581	*
Unable to Determine	*	*	399581	*
Timing of Death	n=149			
Pregnant at time of death	24	16.1	399581	6.0
Day of delivery	19	12.8	399581	4.8
Pregnant within 42 days of death	48	32.2	399581	12.0
Pregnant 43-365 days of death	58	38.9	399581	14.5
Preventability for each Timing of Death Group	n=135			
Pregnant at time of death (Preventable)	21	15.6	399581	5.3
Day of delivery (Preventable)	14	10.4	399581	3.5
Pregnant within 42 days of death (Preventable)	42	31.1	399581	10.5
Pregnant 43-365 days of death (Preventable)	58	43.0	399581	14.5
Committee determinations on circumstances surrounding death				
Did obesity contribute to the death?	n=149			
Yes	34	22.8	399581	8.5
Probably	12	8.1	399581	3.0
No	90	60.4	399581	22.5
Unknown	13	8.7	399581	3.3
Did discrimination contribute to the death?	n=142			
Yes	26	18.3	399581	6.5
Probably	41	28.9	399581	10.3
No	39	27.5	399581	9.8
Unknown	36	25.4	399581	9.0
Did mental health conditions contribute to the death?	n=149			
Yes	55	36.9	399581	13.8
Probably	18	12.1	399581	4.5
No	52	34.9	399581	13.0
Unknown	24	16.1	399581	6.0

Table continues on following page.

Table cont.

	Pregnancy-Related Deaths			
	# of Deaths	**% of Deaths**	**Live Births**	**Ratio (All)**
Did substance use disorder contribute to the death?	n=149			
Yes	56	37.6	399581	14.0
Probably	*	*	399581	*
No	82	55.0	399581	20.5
Unknown	6	4.0	399581	1.5
Manner of Death				
Manner of Death as listed on the Death Certificate	n=148			
Accident	34	23.0	399581	8.5
Homicide	8	5.4	399581	2.0
Natural	85	57.4	399581	21.3
Suicide	17	11.5	399581	4.3
Pending Investigation	*	*	399581	*
Could not be determined	*	*	399581	*
Was this death a suicide? (as determined by the committee)	n=149			
Yes	16	10.7	399581	4.0
Probably	*	*	399581	*
No	111	74.5	399581	27.8
Unknown	21	14.1	399581	5.3
Was this death a homicide? (as determined by the committee)	n=149			
Yes	8	5.4	399581	2.0
Probably	0	**	399581	**
No	137	91.9	399581	34.3
Unknown	*	*	399581	*

Table continues on following page.

Table cont.

	Pregnancy-Related Deaths			
	# of Deaths	**% of Deaths**	**Live Births**	**Ratio (All)**
Committee determinations of causes of death	n=149			
Mental Health Conditions	44	29.5	399581	11.0
Infection	35	23.5	399581	8.8
Hemorrhage (Excludes Aneurysms or CVA)	16	10.7	399581	4.0
Injury	11	7.4	399581	2.8
Cardiovascular Conditions	8	5.4	399581	2.0
Cardiomyopathy	6	4.0	399581	1.5
Hypertensive Disorders of Pregnancy	*	*	399581	*
Embolism - Thrombotic (Non-Cerebral)	*	*	399581	*
Neurologic/Neurovascular Conditions (Excluding CVA)	*	*	399581	*
Amniotic Fluid Embolism	*	*	399581	*
Unknown COD	*	*	399581	*
Cerebrovascular Accident (CVA) not Secondary to HDP	*	*	399581	*
Gastrointestinal Disorders	*	*	399581	*
Anesthesia Complications	*	*	399581	*
Cancer	*	*	399581	*
Conditions Unique to Pregnancy	*	*	399581	*
Hematologic	*	*	399581	*
Metabolic/Endocrine	*	*	399581	*
Renal Diseases	*	*	399581	*

*Data is suppressed for numerator non-zero counts less than 6 and denominator reference populations of less than 100 persons in order to protect confidentiality. Additionally, if one cell in the previous scenario does not pass this test, the complementary proportion, related percentage, or ratio that together sum to a whole (or 100%) shall also be suppressed.

** Percentages and ratios with a case count of 0.

^Case counts greater than or equal to 6 but below 10 and their corresponding calculations should be interpreted with caution.

Appendix G. Contributing Factor Domains and Grouping Methodology

The CDC's MMRIA Committee Decisions Form includes 25 contributing factor classes that may be selected to classify issues identified by the MMRC as prevention opportunities during case review. For analytic clarity and to reduce redundancy across overlapping categories, these 25 classes were grouped into 12 broader contributing factor domains. Groupings were based on shared mechanisms of action, similar intervention strategies, and frequent co-occurrence within case reviews.

Figure 18 in the main report displays the six domains most frequently associated with recommendations to prevent pregnancy-related deaths. To enhance clarity and focus, only these six domains are displayed in the main report. All 12 domains — including original contributing factor class counts and justification for grouping decisions — are presented below to ensure transparency and completeness.

Domains	Contributing Factor Class	Count
BEHAVIORAL HEALTH CONDITIONS		
	Mental Health Conditions	68
	Substance Use Disorder	54
		TOTAL 122
Mental Health Conditions and Substance Use Disorder were combined because substance use disorder is clinically defined as a mental health condition and is included when reporting mental health conditions as a leading underlying cause of death. These conditions frequently co-occur, share similar gaps in screening, treatment access, stigma, and continuity of care, and have substantially overlapping prevention strategies. Combining them under the domain of **Behavioral Health Conditions** reflects both clinical classification and a shared systems lens for prevention and integrated care delivery.		
PATIENT-PROVIDER COLLABORATION		
	Knowledge	59
	Delay	15
	Cultural/Religious	14
	Adherence	10
		TOTAL 98
Adherence to Medical Recommendations, Lack of Knowledge regarding the importance of symptoms or follow-up, Cultural/Religious or Language Factors, and Delay were combined because they reflect interconnected dynamics influencing how patients and providers engage in care decisions and follow-through. These factors often co-occur and involve communication, shared understanding, trust, and timely action. Combining them under the domain of **Patient-Provider Collaboration** emphasizes the relational nature of care engagement and aligns with prevention strategies focused on culturally responsive communication, education, and shared decision-making.		
CARE COORDINATION		
	Continuity of Care/Care Coordination	49
	Communication	17
	Outreach	12
		TOTAL 78
Poor Communication, Lack of Case Coordination or Management, Lack of Continuity of Care (system and provider perspectives), and Inadequate Community Outreach/Resources were combined because they reflect interconnected breakdowns in care coordination and information sharing across providers, facilities, and community systems. These factors frequently co-occur in cases involving fragmented care, limited record access, and insufficient cross-sector collaboration. Combining them under the domain of **Care Coordination** captures shared mechanisms and aligns with overlapping prevention strategies focused on improving communication, data sharing, and coordinated care delivery.		

Table continues on following page.

Table cont.

Domains	Contributing Factor Class	Count
CLINICAL DECISION-MAKING		
	Clinical Skill/Quality of Care	66
	Assessment	10
	Referral	4
		TOTAL 80
Clinical Skill/Quality of Care, Failure to Screen or Inadequate Risk Assessment, and Lack of Referral or Consultation were combined because they represent interconnected components of clinical decision-making within direct patient care. These factors often occur along the same continuum—recognizing risk, applying appropriate clinical judgment, and escalating care when indicated. They share overlapping prevention strategies, including provider training, standardized screening protocols, supervision, and clear referral pathways. Combining them under the domain of **Clinical Decision-Making** reflects their shared mechanism within care delivery and aligns with quality improvement approaches.		
DISCRIMINATION		
	Structural Racism	49
	Discrimination	18
	Interpersonal Racism	4
		TOTAL 71
Discrimination, Structural Racism, and Interpersonal Racism were combined because they represent related forms of differential treatment and disadvantage operating at individual, interpersonal, and systemic levels. These factors frequently intersect and may influence clinical communication, decision-making, access to resources, and care experiences. Combining them under the domain of **Discrimination** reflects this continuum across levels while aligning with prevention strategies that address both individual interactions and broader institutional practices.		
SOCIOECONOMICS		
	Access/Financial	46
	Unstable Housing	12
		TOTAL 58
Lack of Access/Financial Resources and Unstable Housing were combined because they reflect material and structural conditions that limit an individual's ability to obtain and engage in care. These factors often co-occur and involve systemic barriers such as insurance gaps, financial hardship, transportation limitations, provider shortages, and housing instability. Combining them under the domain of **Socioeconomics** captures shared underlying resource constraints and aligns with prevention strategies focused on improving access to coverage, stable housing, and supportive services.		
MEDICAL CONDITIONS		
	Chronic Disease	46
		TOTAL 46
Chronic Disease was retained as a standalone domain under **Medical Conditions** because it reflects significant pre-existing health conditions that independently increase risk for poor maternal outcomes. Unlike other domains that capture system or structural factors, chronic disease represents underlying clinical risk requiring targeted management and care optimization. Maintaining this as a distinct domain preserves its clinical and epidemiologic importance.		
SOCIAL SUPPORT		
	Social Support/Isolation	28
		TOTAL 28
Social Support was retained as a standalone domain because it reflects the absence of protective relational support from family, partners, or friends influencing help-seeking, safety, and care engagement. Maintaining this as a separate domain preserves its role as an independent contributor and aligns with prevention strategies focused on strengthening support networks and community connections.		

Table continues on following page.

Table cont.

Domains	Contributing Factor Class	Count
HEALTHCARE INFRASTRUCTURE		
	Policies/Procedures	16
	Equipment/Technology	7
		TOTAL 23
Lack of Standardized Policies/Procedures and Inadequate or Unavailable Equipment/Technology were combined because they reflect facility-level infrastructure gaps that affect the ability to deliver safe and timely care. These factors relate to the foundational systems, protocols, and resources necessary to support clinical practice. Combining them under the domain of **Healthcare Infrastructure** captures shared operational deficiencies and aligns with prevention strategies focused on strengthening institutional capacity and readiness.		
TRAUMA		
	Violence	15
	Trauma	13
		TOTAL 28
Trauma and Violence/Intimate Partner Violence were combined because they represent overlapping forms of exposure to physical, emotional, or sexual harm that may influence health, safety, and care engagement. These experiences frequently co-occur and share similar prevention strategies, including screening, trauma-informed approaches, safety planning, and coordinated response systems. Combining them under the domain of **Trauma** reflects their shared mechanism as harmful exposures impacting maternal health outcomes.		
LEGAL		
	Legal	7
		TOTAL 7
Legal was retained as a standalone domain because it reflects statutory, regulatory, and policy frameworks that influence maternal health outcomes. These factors relate to laws, reporting requirements, guardianship processes, and legislative or regulatory actions that shape access to care and system response. Maintaining this as a distinct domain preserves the role of policy-level structures in prevention and aligns with recommendations focused on statutory and regulatory change.		
LAW ENFORCEMENT RESPONSE		
	Law Enforcement	6
		TOTAL 6
Inadequate **Law Enforcement Response** was retained as a standalone domain because it reflects the timeliness, appropriateness, and thoroughness of operational response by law enforcement agencies. Unlike legal frameworks, this domain captures implementation and response performance within individual cases. Maintaining it separately preserves analytic clarity between policy design and operational execution and aligns with prevention strategies focused on improving response protocols and coordination.		
		GRAND TOTAL 645

Appendix H. Recommendation Details

Additional implementation details associated with Recommendations R1–R38 were documented during case review discussions and the MMRC feedback period to preserve key nuances and operational considerations that informed each recommendation. To maintain clarity and focus in the main body of the report, these details are provided below. Numbering (R1–R38) is for reference only and does not indicate priority.

Artificial intelligence (AI) tools were used as a support tool during recommendation synthesis, including to help identify recurring themes, reduce duplication, and refine language. AI was also used to assist with reviewing the quality and relevance of supporting evidence identified by MMRP staff. All AI-assisted outputs were reviewed, verified, and revised by MMRP staff before inclusion in the report.

R1. Screening and identification: Routine and repeated screening for domestic violence, sexual violence, trafficking, and Adverse Childhood Experiences (ACEs) across healthcare settings; screening conducted privately and without partners present when indicated; assessment of firearm access and immediate safety risk. Safety planning and harm reduction: Rapid safety planning tailored to patient circumstances; harm-reduction approaches when pregnant and postpartum women cannot safely leave abusive environments; documentation practices that prioritize survivor safety and confidentiality. Protection and crisis response: Connection to crisis resources (e.g., National Domestic Violence Hotline and local equivalents); coordination with shelters and advocacy organizations; enforcement and monitoring of firearm restrictions related to probation, protective orders, or documented risk. Survivor supports: Access to safe, family-centered housing options; survivor-centered services that support parents and children; community-centered advocacy and follow-up supports.
R2. Multidisciplinary crisis response: Co-response models that pair law enforcement with crisis professionals, behavioral health providers, or social workers when mental health, substance use, or violence is involved. Timeliness and accountability: Defined response-time expectations for domestic violence, overdose, and suspicious death calls; timely follow-up and continuity of investigation; documentation standards that support accountability. Victim-centered safety: Response practices that prioritize victim safety, stabilization, and de-escalation, and language access at the point of response; avoidance of practices that retraumatize survivors. Maternal death investigation: Requirement that homicide or external causes be fully considered and ruled out before case closure in maternal deaths; prevention of premature case closure; coordination between emergency services, law enforcement, medical examiner offices, and public health review processes to support maternal mortality surveillance and prevention learning.
R3. Post-event follow-up: Structured follow-up after pregnancy loss, stillbirth, neonatal death, or traumatic birth events; continuity supports for parents and caregivers following injury, violence, or loss. Family-centered response: CPS agency engagement and response pathways that begin at first contact and continue through placement, reunification, or custody transitions; supports for infants and children following parental death or incapacitation; coordination to maintain family unity when safety allows. Non-punitive system alignment: Non-punitive substance use response and reporting practices; avoidance of automatic escalation or removal when supportive services can ensure safety; reduction of retraumatization through coordinated system response. Care coordination and peer support: Survivor support, case management, and coordinated referral across healthcare, CPS agencies, and community systems. Early and ongoing intervention: Early, frequent, and coordinated intervention for pregnant and postpartum women and their families affected by violence or traumatic loss; monitoring and adjustment of supports as needs evolve.
R4. Public education and messaging: Evidence-based public education on substance use, harm reduction, and overdose prevention (e.g., naloxone use, fentanyl test strips, medication safety and storage) delivered alongside clear guidance on when and how to seek emergency help; messaging that reduces fear of calling 911 during overdose events; public education addressing abortion-related stigma and associated mental health impacts. Transparency and consent: Clear, patient-facing explanations of mandated reporting requirements and system involvement prior to consent for screening or testing, particularly for substance use and mental health concerns; standardized consent practices that reduce fear and misunderstanding. Institutional practices and language: Guidance and training on non-stigmatizing language and interactions for

healthcare providers, CPS agency staff, and law enforcement; protocols that distinguish past substance use history from current risk; alignment of enforcement and reporting practices with evidence-based thresholds. Crisis and law enforcement response: Protocols for trauma-informed law enforcement interviews and co-response approaches when mental health or substance use concerns are present.
R5. Supportive care and stigma reduction: Education on weight bias and its impact on care-seeking behaviors (e.g., delayed care, leaving against medical advice); non-stigmatizing dialogue around obesity prevention, treatment, and management; realistic chronic disease management planning that accounts for mobility, mental health, and social context; shared lifestyle change plans grounded in patient goals and capacity. Behavioral health supports: Accessible and affordable mental health services for pregnant and postpartum women managing chronic disease; coping strategies and psychoeducation addressing stress, trauma, and the impact of substance use on chronic disease control; integration of behavioral health support into chronic disease management plans. Barrier identification and response: Routine assessment of barriers to adherence (e.g., transportation, distrust, fear of systems, food insecurity, domestic violence, affordability); responsive problem-solving that addresses barriers to care; coordination with CPS agencies when applicable to support parents managing chronic conditions. Community and environmental supports: Expansion of healthy habits education; investments in food access and nutrition security; free or low-cost nutrition and physical activity programs tailored to pregnant and postpartum women with chronic conditions.
R6. Access and reimbursement: Reimbursement for full-spectrum doula services; coverage for patient-centered counseling and peer-based healing supports; integration of community-based and spiritual healing services alongside medical and behavioral health care; removal of reimbursement barriers that exclude non-Western or community-defined providers. Culturally grounded supports: Healing supports that address trauma related to domestic violence, sexual assault, trafficking, pregnancy loss, stillbirth, medical trauma, and system involvement; approaches that honor spiritual beliefs, collective healing practices, and community norms; peer support models rooted in shared lived experience. Cultural care integration: Routine assessment of spiritual and cultural healing preferences; documentation and respect for those preferences in care planning; coordination with cultural or spiritual support providers when desired by the patient. Sustaining recovery and wellbeing: Healing supports that extend beyond crisis response and acute care; relationship-based services that reinforce safety, meaning, belonging, and continuity during pregnancy and the postpartum period.
R7. Universal screening and identification: Standardized screening for Perinatal Mood and Anxiety Disorders (PMADs), suicidality, Substance Use Disorder (SUD), intimate partner violence, ACEs, and firearm access across all healthcare touchpoints, including prenatal, postpartum, emergency, urgent care, inpatient, outpatient, specialty, and non-traditional entry points. Use of validated tools (e.g., EPDS, PASS) with protocols that address anxiety even when depression scores are low; screening tools specific for AI/AN populations; routine screening without partners present when indicated; consistent screening regardless of care setting or presenting complaint. Clinical assessment and risk stratification: Comprehensive, condition-specific assessment following abnormal screenings or concerning presentations, including vital sign review prior to discharge; complete vaginal bleeding evaluations (i,e. vital signs, speculum exam, ultrasound, CBC); cardiac risk screening and echocardiography when indicated (e.g. methamphetamine use); monitoring for bowel distension following cesarean delivery; evaluation for hypertensive disorders, sepsis, thromboembolic disease, and substance-related complications using evidence-based protocols; incorporation of relevant history (e.g., eating disorders, trauma exposure, chronic disease, prior perinatal complications) into assessment and care planning. Documentation and information continuity: Required documentation of screening results, assessment findings, diagnoses, risk stratification, and escalation actions in the EHR to support continuity across providers and settings; accurate and specific diagnosis coding for mental health and substance use disorders (e.g. type, severity, recovery status); documentation of safety plans, referrals, follow-up timelines, and clinical decision-making; use of HIE and Controlled Substances Prescription Monitoring Program (CSPMP) when clinically appropriate. Escalation, referral, and follow-up pathways: Standardized escalation protocols triggered by positive screenings or high-risk assessments, including closed-loop referrals to behavioral health, social work, specialty care, or support services; suicide prevention pathways incorporating safety planning, increased visit frequency, daily check-ins, and support engagement when indicated; defined follow-up timelines for high-risk conditions; structured re-engagement processes for patients who miss appointments or are lost to follow-up. Consent and patient understanding: Documented patient consent prior to diagnostic or laboratory testing, particularly drug and alcohol testing; clear explanation of mandated reporting requirements before screening or

testing; non-stigmatizing communication practices; prioritization of patient autonomy, understanding, and safety during screening, assessment, and escalation. Training and system readiness: Ongoing education for clinicians and staff on screening tools, assessment standards, escalation thresholds, documentation expectations, and recognition of postpartum psychosis, severe mood disorders, and co-occurring substance use; standardized facility protocols and drills for obstetric emergencies, sepsis recognition, hypertensive crises, and post-abortion care; quality monitoring and post-event review processes to identify missed opportunities and inform improvement.
R8. Specialty consultation standards: Defined expectations for mandatory or expedited consultation in high-risk scenarios (e.g., anesthesia consult for high BMI, cardiology for thromboembolic risk, neurology for stroke concerns); use of national or statewide consultation resources when local specialists are unavailable. Interdisciplinary care models: Coordinated care for complex conditions requiring multiple specialties (e.g., blood clots requiring ≥24-hour admission, gestational diabetes, substance use disorder, mental health conditions, autoimmune disease); interdisciplinary contraception and medication planning for medically complex patients. Consultation infrastructure: Utilization of consultation support lines (e.g., Arizona Perinatal Psychiatry Access Line); development of rapid-response OB consultation pathways; clear referral mechanisms across inpatient, outpatient, and emergency settings. Continuity of specialty care: Ongoing specialty follow-up during pregnancy and the postpartum period, including coordination of Medications for Opioid Use Disorder (MOUD), mental health treatment, and chronic disease management.
R9. High-risk clinical pathways and protocols: Development and implementation of structured high-risk pregnancy protocols for individuals with multiple co-occurring conditions, advanced organ disease, functional limitations, or conditions requiring multi-specialty management, including clear escalation criteria, defined specialty involvement, and longitudinal care planning across pregnancy and postpartum. Staffing, equipment, and physical accommodation: Provision of one-on-one nursing support when clinically indicated; availability and appropriate use of positioning tools, bariatric or specialized equipment, and staff training to safely care for patients of all body sizes and physical needs. Navigation and specialty access: Assignment of dedicated case managers or patient navigators with direct access to specialty providers to coordinate care, manage symptoms, support medication management, and ensure timely appointments across settings. Continuity of care: Clear care plans that follow patients across inpatient, outpatient, and specialty settings; proactive coordination to prevent gaps in care. Chronic pain management: Individualized chronic pain care planning that balances safety, function, and quality of life, with coordinated follow-up and reassessment during pregnancy and the postpartum period.
R10. Medication management and prescribing practices: Education on safe opioid prescribing for individuals with cardiovascular conditions; consideration of substance use history prior to prescribing opioids or other potentially addictive medications; use of non-opioid and non-stimulant alternatives when clinically appropriate; pharmacist involvement in medication safety, counseling, and adherence support. Condition–specific management: Counseling on the risks of untreated hypertension and the impacts of commonly used medications; education on medication adherence, home monitoring, and the importance of ongoing cardiology follow-up when indicated; diabetes management education before, during, and after pregnancy, including trimester-specific education for gestational diabetes; tailored education and management planning for individuals with co-occurring chronic and behavioral health conditions. Shared decision-making and patient education: Patient-centered counseling that supports understanding of treatment options, risks, and benefits; development of shared care plans that reflect patient values, pregnancy intentions, and postpartum needs; use of clear, accessible educational materials to reinforce adherence and engagement in care. Referral and specialty co-management: Timely referral from OB or primary care to Maternal Fetal Medicine and other specialties for high-risk chronic conditions; coordination between primary and specialty providers to support continuity and consistency of management during transitions.
R11. Cardiac and hypertension monitoring: Early prenatal cardiology workup for individuals with cardiac risk or history, including baseline preeclampsia evaluation and referral; universal screening for cardiac risk factors among women of reproductive age with referral for positive findings; standardized hypertension readiness protocols and lab sets; required echocardiograms for patients admitted with postpartum hypertension; counseling on risks of untreated hypertension, medication impacts, and the importance of home monitoring and adherence; annual cardiology follow-up when indicated; evaluation for implantable cardioverter-defibrillator (ICD) placement in individuals with significantly reduced ejection fraction. Remote and home monitoring: Coverage and provision of home blood pressure machines for pregnant and postpartum women; remote blood pressure monitoring and telehealth follow-up, particularly for women facing rurality or transportation barriers; structured workflows to review, act on, and escalate abnormal home

monitoring data. Neurologic and seizure disorder monitoring: Close postpartum follow-up for women with seizure disorders, with collaborative OB–Neurology management recognizing sleep deprivation as a risk factor; referral to MFM for women with high-risk neurologic or chronic conditions considering pregnancy or currently pregnant. Metabolic and endocrine monitoring: Education on diabetes management before, during, and after pregnancy including trimester-specific education for gestational diabetes; frequent pregnancy testing and early prenatal engagement for women with Polycystic Ovary Syndrome to enable early monitoring and risk mitigation. Care coordination supports for monitoring: Assignment of case managers or patient navigators for pregnant and postpartum women with high-risk medical histories to support symptom monitoring, medication management, specialty access, and appointment follow-up.
R12. High-risk condition recognition and response: Training on recognition and management of hypertensive disorders of pregnancy with hypertension-specific quality improvement tracer metrics; standardized postpartum stroke assessment and action protocols; neurological evaluation for stroke even when presenting complaints are non-neurologic; sepsis recognition with prompt antibiotics, bloodwork, and anticoagulant caution in high bleeding risk; rapid transfusion and massive transfusion response protocols for Disseminated Intravascular Coagulation (DIC); evaluation and monitoring for thromboembolic disease with evidence-based treatment (e.g., heparin when indicated). Emergency escalation and continuity: Provider documentation of critical symptoms and clinical response for continuity across teams; perimortem arrest protocols including simulation training, equipment location clarity, 24/7 obstetric availability, and transfer pathways; explicit escalation thresholds; emergency response protocol improvements in jails and correctional facilities for pregnant and postpartum women. Perinatal-specific considerations: Education on emergency warning signs across early pregnancy through the postpartum period; postpartum breast cancer standards, including breast exams and patient education; smoking cessation counseling during pregnancy and the postpartum period; prescriber counseling on mental health medication adherence, including breastfeeding considerations. Clinical decision-making: Consideration of emotional and physical implications of non-urgent procedures during severe illness; trauma-informed decision-making during high-acuity events.
R13. Clinical protocol standardization: Evidence-based protocols and bundles for hypertensive disorders of pregnancy; POSTBIRTH warning signs protocols; sepsis recognition and response using shock index and timely antibiotics; massive transfusion protocols for hemorrhage and DIC; standardized induction and pitocin use protocols; post-abortion care protocols to confirm complete evacuation; infection prevention and nosocomial infection reporting standards; limited-resource and pandemic care protocols; automatic COVID testing for symptomatic pregnant patients. Condition–specific standards: Protocols for high BMI and anesthesia consultation; continuous fetal monitoring for pregnancies ≥24 weeks outside the OB unit; standardized neurologic and cardiac evaluation pathways when indicated; clearly defined escalation thresholds for obstetric and medical emergencies.
R14. Emergency preparedness planning: Pandemic and public health emergency response plans inclusive of perinatal populations; defined escalation pathways for infectious disease outbreaks affecting pregnant and postpartum women. Psychiatric and medical acuity monitoring: High-visibility monitoring protocols for postpartum psychiatric patients; rapid access pathways for emergency cardiac and neurologic workups; sepsis protocols with obstetric involvement across care settings. Operational readiness and staffing: Staffing acuity documentation to support safe patient-to-provider ratios; defined on-call coverage and specialty availability during emergencies; coordination between facilities during surge events; routine interdisciplinary simulation exercises and drills to test escalation pathways, communication protocols, staffing capacity, and cross-setting coordination during high-acuity events. Corrections and institutional alignment: Contraband search protocols in jails that minimize retraumatization; alignment of correctional health emergency procedures with obstetric and psychiatric standards.
R15. Critical care and emergency equipment: ECMO eligibility teams and clear criteria for use with pregnant and postpartum patients; obstetric emergency carts equipped with EKG monitors, defibrillators, and emergency medications; equipment parity across units and facilities during emergencies. System readiness and allocation: Staffing and equipment alignment to prevent delays in care; vaccine supply management and prioritization for pregnant and postpartum women during shortages. Transport and stabilization: Avoidance of unnecessary transport of unstable or fragile patients when care can be safely provided on-site; clear criteria for transfer when higher-level care is required.
R16. Perinatal mental health and substance use expertise: Training requirements for identification and management of postpartum psychosis, severe mood disorders, and co-occurring substance use disorder; annual or biannual perinatal psychopharmacology education for prescribers; standardized onboarding and refresher training on use of APAL; clear identification of PMH-C–credentialed providers within healthcare systems to

support referral efficiency; education on safe prescribing, medication adherence, and close follow-up during pregnancy and the postpartum period. Emergency readiness and clinical simulation: Mandatory, recurring education and simulation training focused on perinatal risk recognition and emergency response, including hypertensive crises, hemorrhage, cardiac arrest, thromboembolic events, sepsis, toxic shock syndrome, and anesthesia-related complications; multidisciplinary obstetric emergency drills involving OB, MFM, anesthesia, emergency medicine, and ICU teams; observer policies and safety protocols during high-risk procedures. Patient-centered care: Training on trauma-informed care principles, recognition of generational trauma, and the impacts of prior trauma on disclosure, decision-making, and care engagement; education on bias awareness and non-stigmatizing communication in perinatal mental health and substance use care. Workforce development and pipeline capacity: Expansion of peer support, doula, and maternal mental health coaching roles; reimbursement guidance for peer-based and community-aligned workforce models; workforce pipeline development through academic institutions and certification support; strategies to increase availability of certified perinatal mental health professionals. Technology and workforce supports: Use of clinical alerts, consultation platforms, and technology-enabled tools to aid timely intervention with clear privacy, consent, and governance safeguards; workforce wellness strategies addressing burnout, secondary trauma, and compassion fatigue among perinatal care providers.
R17. Early access and triage: Affordable and accessible pregnancy testing and early ultrasound to confirm gestational age; nurse advice lines or warm-lines to guide patients on when urgent or emergency care is needed; patient education on symptom escalation thresholds, including worsening symptoms following viral exposure. Referral and escalation pathways: Standardized escalation triggers embedded in pathways (e.g., early imaging or stroke workup when indicated); clear referral timelines and expectations for specialty evaluation; removal of payer-related delays for urgent diagnostics or referrals. Transport and logistics: Defined communication requirements for transport requests, including medical equipment and medication needs; coordination between clinical teams and EMS to prevent delays during transfers. Barrier mitigation: Pathway design that accounts for transportation, cost, language access, and other practical barriers that can delay diagnostics or treatment.
R18. Care coordination supports: Embedded patient navigators, case managers, social workers, community-based support providers, and home visiting staff to guide pregnant and postpartum women through medical, behavioral health, and social service systems; active coordination across obstetrics, primary care, specialty care, behavioral health, and substance use disorder treatment. Referral completion and adherence support: Assistance with appointment scheduling, referral tracking, and medication education; support for understanding prescriptions, testing requirements, and follow-up instructions; coordination of early pregnancy and specialty follow-up; reinforcement of medication adherence through education, reminders, and check-ins. Re-engagement after missed care: Structured protocols to contact and re-engage patients who miss appointments or fall out of care using phone outreach, text messaging, telehealth, home visits, or community-based follow-up; proactive outreach following discharge from inpatient, residential, or emergency care; continuity supports for pregnant and postpartum women leaving care against medical advice. Postpartum follow-up: Enhanced follow-up for women at a higher risk, including blood pressure monitoring, home health visits, and close interval check-ins; targeted follow-up for women with mental health conditions, substance use disorder, or chronic disease; extension of navigation supports beyond one year postpartum for high-risk families when clinically indicated, including continuity following maternal or infant death to support surviving caregivers and household stabilization. Discharge planning and transition support: Comprehensive discharge planning from hospitals, inpatient psychiatric units, and residential treatment facilities; assistance with appointment scheduling, prescription access, and transportation at discharge; transitional services while awaiting inpatient or residential placement; continuity planning for pregnant and postpartum women involved with multiple systems (e.g., Veterans Affairs, CPS agencies, justice system). Communication and access tools: Warm-lines, text-based support, and telephonic navigation services for questions about pregnancy and the postpartum period; clear pathways for patients to re-enter care after disruption; education and aftercare supports for families affected by substance use disorder, including overdose prevention and harm reduction education when relevant.
R19. Identification and initial connection: Identification of social isolation risk during pregnancy and the postpartum period; proactive connection to trusted supports prior to discharge, care disruption, or leaving against medical advice; referrals following abortion, pregnancy loss, or other destabilizing events. Continuity across transitions and systems: Maintenance of supportive relationships across hospital discharge, postpartum transition, custody changes, foster care involvement, justice system involvement, and re-entry;

continuity planning for pregnant and postpartum women involved with CPS agencies or multiple systems; prevention of abrupt loss of support during transitions between care settings or life stages. Relational supports: Use of peer mentors, navigators, and support providers to sustain engagement over time; discharge planning that explicitly includes social and peer support continuity; outreach to pregnant and postpartum women with prior system involvement or known disengagement risk. Family-centered practices: Family-accommodating inpatient mental health and substance use treatment models; approaches that minimize unnecessary family separation; coordinated supports for parents and caregivers during periods of instability or system involvement.
R20. Integrated care models and duration: Statewide integrated perinatal mental health and substance use care models extending through at least one year postpartum; alignment of inpatient, outpatient, residential, peer support, and home visiting services; coverage of family-inclusive treatment models that allow infants and children to remain with parents and support bonding and infant feeding; inclusion of post-detox and post-incarceration re-entry pathways to prevent loss to follow-up; integration of lactation support, contraception access, community nursing, and peer-based supports within multidisciplinary care models. Care coordination and shared management: Multidisciplinary coordination across obstetrics, primary care, cardiology, endocrinology, psychiatry, and behavioral health; shared care plans and defined handoff responsibilities; transition of care from OB to primary care for chronic disease management; closed-loop referrals following new diagnoses or medication initiation; targeted coordination for high emergency department utilizers; continuity models extending through 12–18 months postpartum for high-risk women; coordination of whole-household behavioral health needs when clinically appropriate. Navigation and continuity: Inclusion of patient navigators and perinatal case managers, particularly for women receiving care across multiple systems (e.g., VA, CPS agencies, criminal justice); explicit hospital discharge planning pathways, including transitional services while awaiting inpatient or residential placement; structured re-engagement processes following missed appointments or care disruption; linkage to community-based wraparound services. Information sharing: Standardized communication protocols across care settings; timely access to medical records, including out-of-state records when relevant; clear explanation of care options and shared decision-making with patients and their families; communication protocols in domestic violence, custody, and incarceration-related contexts; alignment of justice system, EMS, social services, and healthcare communication pathways for pregnant and postpartum women. System tracking and coordination: Mechanisms to track statewide availability of inpatient and residential substance use treatment beds; coordination of transportation when higher levels of care are indicated; use of HIE infrastructure to support continuity across facilities and systems; coordination with social service programs to promote continuity of nutrition and household stability during the postpartum period, consistent with state and federal eligibility frameworks.
R21. Interoperability and data integration: EHR interoperability across clinics, emergency departments, EMS, correctional facilities, and across state lines; nationally accessible or federated HIE concepts; real-time data availability to support transitions of care. Referral and coordination infrastructure: Closed-loop referral platforms that integrate medical, behavioral health, and social services; integration of community health factors with referral tracking and follow-up; HIPAA-compliant data-sharing mechanisms between healthcare, social services, and AHCCCS. Technology-enabled supports: Telehealth expansion and reimbursement; mobile applications, remote monitoring tools, and technology supports for SUD recovery and chronic condition management; governance frameworks to ensure appropriate consent, privacy, and data use.
R22. Treatment capacity and models: Long-term residential SUD treatment when clinically indicated; structured step-down and outpatient relapse-prevention programs; safeguards, monitoring standards, and accreditation requirements for sober living environments serving pregnant and postpartum women; family-centered treatment models that allow infants and children to remain with parents and support bonding and infant feeding; specialized treatment pathways for pregnant and postpartum women with co-occurring conditions. Service accessibility and delivery models: Expansion of telehealth platforms and user training; mobile health units; on-site prenatal and postpartum care within residential or congregate treatment settings; availability of mental health services within primary and perinatal care settings; interpreter services and linguistically appropriate care; community-informed social work and community health worker support; family-friendly behavioral health services; equipment and clinical accommodations appropriate for all patient body sizes. Financial supports: Expanded eligibility for coverage regardless of immigration status; expanded mental health and SUD benefits; protection of access to the full range of reproductive health services; reimbursement for all perinatal services provided; affordable diagnostics and routine laboratory testing; coverage of transportation, childcare supports during visits, and medication assistance; enrollment assistance and education to ensure benefits are usable in practice.

Continuity of care: Comprehensive discharge supports following inpatient or residential care, including housing, clothing, transportation, food security, and care coordination; transitional services while awaiting inpatient or residential placement; structured follow-up and referral pathways to prevent gaps in care. Workforce capacity and infrastructure: Recruitment and retention strategies to address provider shortages, including rural service incentives; specialty capacity expansion in shortage areas (e.g., psychiatry, endocrinology); workforce pipeline development and training aligned with perinatal care needs; increased capacity for certified perinatal mental health professionals. Tribal and community-based delivery: Expanded capacity for Tribal community–based treatment programs funded and delivered within Tribal Nations; partnerships with community-based and faith-based organizations to deliver family-centered services that support engagement and continuity of care.
R23. Emergency and transitional housing: Emergency shelters that accommodate families; transitional housing programs with integrated care coordination; shelters and transitional housing linked to prenatal, postpartum, mental health, and substance use services. Recovery- and family-centered housing: Sober living homes designed for perinatal populations; housing options that allow parents to remain with infants and children while receiving treatment or recovery support; housing pathways for parents with SUD. Longer-term housing solutions: Housing vouchers and rental assistance; renovation and repurposing of abandoned or underutilized buildings for family-centered housing; grant-funded partnerships that combine housing with supportive services. Integration with care systems: Formal referral pathways between healthcare systems and housing providers; co-located or coordinated supportive services to maintain engagement in medical, behavioral health, and recovery care.
R24. Financial and material supports: Short-term financial assistance to prevent interruption of medical care (e.g., utilities, medications, essential medical supplies; emergency funds to prevent service disruption; coverage or vouchers for essential items needed to attend or complete care. Care-enabling services: Childcare during medical visits; transportation services, including wheelchair-accessible transportation; appointment reminders and follow-up systems; case management and outreach following missed visits. Social needs identification and referral: Routine screening for community health factors (e.g., PRAPARE); structured referral pathways for food, housing stability, childcare, employment, and legal supports; coordination with community-based providers to ensure services are received. Family and legal supports: Improved access to affordable and timely paternity testing; navigation support for benefits and family-related administrative needs that affect care engagement.
R25. Coverage and reimbursement mechanisms: Medicaid coverage for peer support services; reimbursement for full-spectrum doulas; payment models that sustain community health workers and outreach staff. Workforce development and sustainability: Funding for recruitment, training, supervision, and retention of peer and community-based support workers; certification and credentialing pathways for peers with lived experience. Infrastructure and integration: Ongoing funding for community support networks; integration of community-based supports into healthcare referral systems, navigation workflows, and continuity planning.
R26. Community-based service delivery: Integrated community health centers in high-risk areas; insurance-covered community-based support services; home visiting programs; stillbirth, pregnancy loss, and chronic disease support resources; family-centered parenting classes and peer groups; non-judgmental nutrition and wellness supports. Intentional outreach and navigation: Outreach to marginalized, rural, refugee, immigrant, and uninsured populations; trusted messenger models; education and navigation related to reproductive health services and rights; benefits and insurance navigation; connection to perinatal mental health and substance use supports. Continuity: Structured referral pathways from healthcare settings to community supports; outreach following discharge, missed appointments, abortion or pregnancy loss, or prior system involvement; sustained engagement during public health emergencies; community task forces and cross-sector partnerships to identify gaps and adapt services over time.
R27. Maternal health education: Importance of prenatal and postpartum care for both the pregnant woman and fetus including adherence to scheduled visits, referrals, and medications; POSTBIRTH warning signs; ectopic pregnancy symptoms; when, where, and how to access emergent care. Mental health and substance use awareness: PMADs and suicidal ideation including signs, what to say, and who to call; healthy coping strategies as alternatives to alcohol or drug use. Safety and prevention education: Firearm safety and secure storage; overdose recognition and emergency response including calling 911 and naloxone administration; vaccine education (e.g. COVID-19, influenza, Tdap), including safety data and misconception rebuttal.

Public health and rights information: Pandemic-specific guidance; public access to abortion and reproductive health information; paternity testing awareness to reduce stigma and misinformation.
R28. Relationship-based peer support: Peer-led parenting groups; mutual aid and support circles; family-centered education about substance use disorder and mental health conditions; peer spaces that normalize shared experience and reduce isolation. Cultural connection: Integration of traditional practices, ceremonies, and culturally rooted healing approaches when desired; partnerships with faith-based and cultural organizations to sustain identity, meaning, and connection. Collective loss and disruption supports: Community-based support following community-wide loss or disruption (e.g., pandemics, maternal deaths, collective trauma); grief-responsive programming that acknowledges shared impact and fosters reconnection.
R29. Informed consent practices: Written and verbal informed consent supported by teach-back to confirm understanding; consent obtained prior to medical procedures, diagnostic testing, and treatment decisions; clear explanation of risks, benefits, and alternatives. Lawful decision-making authority: Standardized verification and documentation of medical power of attorney, guardianship, advance directives, or proxy decision-makers under Arizona law; clear location and visibility of authority documentation in the medical record; inclusion of designated decision-makers in medical decision-making when patients are unable to make decisions for themselves. Proactive decision-making planning: Early discussions about medical power of attorney, proxy decision-making, and patient preferences, particularly for patients with increased health or social risk factors, so lawful decision-making authority and patient wishes are document before urgent decisions arise. Transparency and reporting implications: Patient-facing explanation of potential reporting or CPS implications before screening, testing, or disclosure when reporting may be triggered; careful clinical evaluation of substance use history and context before making a report, including consideration of whether a positive toxicology result may reflect prescribed or medically administered substances. Trauma-aware application: Respect for patient autonomy and preferences during pregnancy loss, substance use disclosure, mental health care, and high-risk decision-making; care practices that minimize coercion, fear, or misunderstanding and support informed decision-making
R30. Language access and comprehension: Reliable interpretation in preferred languages; translated materials appropriate for literacy level; teach-back requirements to verify understanding across healthcare and CPS agency interactions; alignment with immigration-related service systems to ensure language-accessible information and interpretation when pregnant and postpartum women interact with healthcare or government services. Clinical communication and consent: Counseling materials (e.g., MFM and genetic counseling) that are understandable across language and literacy levels; documentation of patient understanding and consent; avoidance of reliance on family members for interpretation. Traditional healing integration: Co-developed directories of trusted traditional healers; documentation of traditional healing use with consent; allowance of traditional healers in inpatient and critical care settings; dedicated space for ceremonies when requested. Workforce and reimbursement alignment: Employing or contracting traditional healing practitioners, including in non-tribal facilities; AHCCCS reimbursement for traditional healing services with Tribally-defined accreditation requirements; alignment of state and federal systems with culturally informed care frameworks. System frameworks and training: Tribal-led cultural care frameworks with budget and policy support; training for perinatal mental health providers to accommodate culturally-centered and homeopathic preferences, including breastfeeding considerations.
R31. Co-design and governance: Community- and Tribal-led co-design of care models, outreach strategies, and service delivery pathways; respectful data-sharing agreements that protect sovereignty and community priorities; support for Tribal-led maternal mortality review and learning processes; inclusion of community representatives in advisory and decision-making structures. Cultural humility: Cultural humility training for healthcare and public health staff; education on historical and intergenerational trauma, colonization, and system harm; workforce development that emphasizes listening, accountability, and relationship-building rather than cultural competency checklists. Culturally grounded care delivery: Integration of traditional healers and culturally grounded practices within inpatient and outpatient settings; appropriate vaccination messaging and preventive care outreach; refugee and asylum-seeker–specific parenting and perinatal education developed with community partners. Community trust and engagement: Community co-designed public health campaigns; use of trusted messengers to disseminate information and reinforce care pathways; sustained engagement strategies that extend beyond episodic clinical encounters.
R32. Training and skill development: Initial and recurring bias-awareness training for all staff; role-playing and scenario-based exercises that reflect real perinatal care situations; education on substance use disorder, mental

health conditions, homelessness, body size, disability, and other factors that can influence care interactions; training on trauma-informed care, recognition of behavioral health concerns, and appropriate referral and care coordination for pregnant and postpartum women. Clinical standards: Documentation standards that prohibit stigmatizing, subjective, or judgment-laden language in the medical record; protocols requiring appropriate clinical evaluation and workups when patients report symptoms or concerns; explicit documentation when standard protocols are modified, delayed, or withheld, including clinical rationale. Reinforcement: Use of national patient safety and awareness campaigns (e.g., CDC Hear Her) to reinforce patient voice and symptom recognition; integration of bias-reduction expectations into performance monitoring, supervision, and quality improvement processes; mechanisms to identify patterns of differential treatment, reporting practices, or missed escalation related to bias and trigger corrective action.
R33. Fair decision-making and resource allocation: Standardized clinical criteria for allocation of limited or high-risk resources (e.g., ECMO and critical care triage teams) to ensure decisions are based on medical need and likelihood of benefit rather than subjective judgment; documentation of clinical rationale when standard emergency protocols or escalation pathways are modified or withheld. Consent-based screening and testing practices: Documented informed consent prior to drug or alcohol testing; consistent screening approaches that avoid discretionary or selective testing; clear patient communication about the purpose of screening, potential reporting requirements, and available treatment or support options. Family support alignment: Education for mandated reporters on statutory reporting thresholds, clinical context, and available support pathways to promote consistent, appropriate report decisions; coordination between healthcare providers and CPS agencies to connect families to treatment and supportive services when substance use or mental health concerns are identified; protocols that support family preservation and prioritize keeping newborns with parents when clinically safe and supportive services are available. Bias reduction: Training and protocols addressing implicit bias, stigma related to SUD, homelessness, body size, mental health, and race/ethnicity; avoidance of labeling patients as "non-compliant" without assessing structural or social barriers to care; policies ensuring appropriate equipment, services, and treatment options are available for all patients regardless of body size, socioeconomic status, or prior system involvement.
R34. Patient-centered care practices: Shared decision-making for contraception, treatment options, and care planning; assessment of barriers to adherence and support for follow-through. Navigation supports: Patient advocates and navigators for pregnant and postpartum women with learning disabilities, language barriers, or complex system involvement; culturally congruent case managers to support understanding, follow-through, and continuity of care. System responses: Safety-centered approaches to domestic violence; non-punitive responses to substance use relapse; transparent communication during CPS agency involvement, custody concerns, or justice-system contact. Community-embedded trust-building: Use of community health workers, peer supporters, and trusted messengers to build rapport, recognize safety concerns, and connect pregnant and postpartum women to resources in ways that feel safe and respectful.
R35. Cross-system procedural alignment: Standardized follow-up processes for patients who leave without being seen or against medical advice; consistent timelines and expectations for CPS case follow-through; aligned suicide observation and response protocols across healthcare and justice settings. Reporting and investigation standards: Standardized approaches to mandated reporting related to SUD treatment (e.g., MOUD-related reporting); consistent law enforcement investigation standards for maternal deaths with concerning circumstances; clear and timely root cause analysis reporting pathways to MMRC. Continuity across systems: Policies that support coordination between healthcare, CPS agencies, behavioral health, and justice systems during transitions, investigations, or custody changes to prevent gaps in care and follow-up, while supporting continuity for families as interconnected units.
R36. Evidence-based reporting alignment: Clear statutory and policy distinctions between current safety risk and historical substance use; elimination of medically unnecessary or duplicative reporting triggers; alignment of reporting thresholds with clinical and patient safety standards. Policy alignment: Policies that reduce deterrence to prenatal, postpartum, and mental health care-seeking by clarifying when reporting is required versus discretionary; safeguards to prevent automatic punitive responses when safety can be addressed through services and supports. Operational guidance: Updated agency guidance and cross-system training to ensure consistent interpretation and application of reporting statutes; clarity for clinicians, CPS agency staff, and mandated reporters on reporting obligations, thresholds, and alternatives. Clinical fidelity: Statutory and regulatory language that reflects current clinical standards of care, trauma-informed practice, and public health evidence related to perinatal mental health, substance use, and family preservation when safe.

R37. Performance monitoring: Routine inspection and review processes; increased inspection frequency where clinical risk is elevated; documentation and review of staffing ratios and resource constraints; root cause analysis data sharing with MMRC; monitoring adherence to emergency protocols. Prescription oversight: Pharmacist accountability for accurate MOUD dosing; use of CSPMP and HIE checks prior to prescribing when indicated; documentation and justification when standard protocols are modified or withheld; lactation consultation prior to prescribing medications that affect breastfeeding when feasible. System support: Provider performance dashboards; aligned payer requirements and incentives; access to provider wellness and burnout-prevention resources to support safe, sustained care delivery.
R38. Operational transparency: Documentation and communication of staffing ratios, service limitations, and resource constraints; disclosure of waitlists or scarcity for time-sensitive services (e.g., vaccines, specialty care). Information sharing: Timely communication of abnormal findings and test results to patients, primary care providers, and health plans; clear documentation of escalation decisions and care limitations. Accountability and learning: Sharing of root cause analysis findings with MMRC and public health entities; standardized reporting pathways to identify recurring system failures and inform corrective action.

Appendix I. Maternal Mortality Identification Process: Additional Details

Case Identification through Arizona Death Certificates

Arizona vital records death certificates are the primary source used to identify potential maternal death cases. However, live birth certificates, fetal death certificates, and hospital discharge data are also queried in the case identification process to find supporting information.

A potential maternal death was initially selected if the decedent met the following criteria:

- Identified as female on the death certificate
- Between 10 and 60 years of age at the time of death

Among decedents meeting the sex and age criteria, additional screening was conducted to identify (or "flag") cases with any of the following types of ICD (International Classification of Diseases) codes:

- Z codes
- O codes
- A34 codes

Decedents were also identified as potential maternal death cases if the death certificate indicated pregnancy within the year prior to death (as marked by the pregnancy checkbox).

Maternal deaths occurring between 2018 and 2020 were identified with guidance provided by the ADHS Bureau of Public Health Statistics. For each data source, record-level unique identifiers (13 characters long) were created using a combination of the decedent's first name, last name, date of birth, and sex. These unique identifiers were used to conduct the following three linkages:

- Death Certificates with Hospital Discharge Data records
- Death Certificates with Live Birth Certificates
- Death Certificates with Fetal Death Certificates

Each linked record-level match was assigned a probability score indicating the likelihood of an accurate match. All matches were then manually reviewed by selected members of the MMRP team to ensure accuracy.

Death Record Linkage with Arizona Hospital Discharge Database

Linkage between death records and the hospital discharge database was performed to identify relevant information that could support the classification of a death as a maternal death. This linkage also helped locate hospital information to request medical records for review by the MMRP team. Similar to death certificate records, the HDD was queried to identify patients who did not identify as male and who were between 10 and 60 years of age at the time of hospitalization. Patients were flagged if they had any of the previously listed

ICD codes. Maternal death certificates were linked to hospitalization events that occurred during the calendar year of the death as well as the calendar year preceding the death.

Death Record Linkage with Vital Records Live Birth Certificates

In addition to other data sources, death certificates for potential maternal death cases were linked with Arizona Vital Records Live Birth Certificates. This linkage aimed to identify supporting evidence that the death occurred either during or within one year postpartum and to obtain key demographic information for epidemiological assessments. Maternal death certificates were linked to live birth certificates for live births that occurred either in the same calendar year as the maternal death or in the calendar year preceding the death.

Death Record Linkage with Vital Records Fetal Death Certificates

Similar to live birth certificates, death records were linked with Arizona Fetal Death Certificates. This linkage aimed to gather supporting information that the death occurred either during or within a year of pregnancy. Maternal death certificates were linked to fetal death certificates for fetal deaths that occurred either in the same calendar year as the maternal death or in the year prior.

Appendix J. Maternal Mortality Epidemiological Methods: Additional Details

Missing Data

Missing data in this report were addressed using methodologies consistent with those outlined in the CDC's Division of Reproductive Health (DRH) reports.[9] Cases with missing data for a particular stratum (i.e., category) were excluded from calculations pertaining to that stratum. For instance, if 100 cases were identified and one case had missing race or ethnicity data, that case was excluded from any race or ethnicity calculations (i.e., ratios, proportions, and others). The sample size (n) for each strata calculation was indicated whenever possible.

All-Inclusive Criteria for Report

Data metrics presented in the narrative used live birth counts for the all-inclusive criteria.

Numerator: All cases were included in this report in every calculated statistic if they met the case criteria listed in **Appendix I**.

Denominator: For mortality ratio calculations, all live births with an Arizona-issued birth certificate were included, regardless of county of residence or place of delivery, if the maternal age of the live birth was between 15-49 years of age at the time of birth.

$$\frac{Maternal\ Deaths\ for\ Birthing\ Persons\ Ages\ 15–49\ years\ of\ age}{Live\ Births\ for\ Arizona\ for\ Birthing\ Persons\ Ages\ 15–49\ years\ of\ age} \text{ x } 100{,}000 = \text{Mortality Ratio}$$

Arizona Inclusion Criteria, per Statute (Appendix I)

Numerator: Maternal death cases in which the decedent was aged 15-49 years at the time of death, and the death occurred in Arizona.

Denominator: All live births with an Arizona-issued birth certificate, regardless of county of delivery, provided maternal age was between 15 and 49 years at the time of birth.

$$\frac{Maternal\ Deaths\ for\ Birthing\ Persons\ Ages\ 15–49\ years\ of\ age}{Live\ Births\ for\ Arizona\ for\ Birthing\ Persons\ Ages\ 15–49\ years\ of\ age} \text{ x } 100{,}000 = \text{Mortality Ratio}$$

CDC-Recommended Inclusion Criteria (Appendix I)

Numerator: Maternal death cases in which the decedent was 15-49 years of age at the time of death, and most recently resided in Arizona.

Denominator: For maternal mortality ratio calculations, all live births with an Arizona-issued birth certificate were included, provided the maternal residence listed on the certificate was in Arizona and the maternal age was between 15-49 years at the time of birth.

$$\frac{Maternal\ Deaths\ for\ Birthing\ Persons\ Ages\ 15–49\ years\ of\ age}{Live\ Births\ for\ Arizona\ for\ Birthing\ Persons\ Ages\ 15–49\ years\ of\ age} \text{ x } 100{,}000 = \text{Mortality Ratio}$$

Final Case Count

The final case count presented in this report includes all cases that met the following criteria:

Decedent sex: Persons identified as female in the Arizona death certificate, with confirmation from additional case records received by the abstraction team

Age at time of death: Persons aged between 15 and 49 years at the time of death, as indicated on the Arizona death certificate and further supported by cases reviewed by the abstraction team

Pregnancy-Relatedness: Persons identified as pregnancy-related by the MMRC. For figures 3 & 4, pregnancy-associated case counts included any of the following three categories of cases identified by the MMRC:

- Pregnancy-Related,
- Pregnancy-Associated, but Not Related, and
- Pregnancy-Associated, but unable to determine pregnancy-relatedness

Arizona Residency and/or Place of Death: The decedent met at least one of the following:

- Most recently resided in Arizona prior to death, as documented on the death certificate and/or the corresponding live birth certificate.
- Died in Arizona, as listed on the Arizona death certificate

Additionally, maternal death cases were included in the final case count if they met all of the following conditions:

- Satisfied all four criteria listed above (i.e., sex, age, pregnancy-relatedness, and Arizona residency and/or place of death)
- Had an identified Arizona death certificate number

The case was not identified through the Arizona MMR internal case identification process, and instead, any of the following scenarios apply:

- The case was identified through the Arizona Infant Mortality Review Program
- The case was identified through a non-Arizona MMR Program through their internal process, but the case either recently resided in Arizona or passed away in Arizona.
- The case was identified through the CDC media release database system.

Mortality Ratios

Mortality Ratios are the preferred method for comparing trends across strata due to differences in data sources and slight variations in time intervals between maternal death cases (numerator) and live births (denominator). The three inclusion criteria standards were implemented for all report strata (i.e., categories) as needed. All data metrics included in the report narrative were based on the “All-inclusive” criteria. **Appendix E** displays data taking into account the Arizona and CDC-recommended inclusion criteria. In all cases, the selected inclusion criteria were implemented consistently to both the numerator and denominator when calculating mortality ratios.

Maternal Race or ethnicity

Case Counts

All maternal mortality cases in this report had race or ethnicity information documented in various fields. However, race or ethnicity information was primarily sourced from the Vital Records maternal death certificate race or ethnicity field for two main reasons:

- A high level of completeness for race or ethnicity data within the death certificate
- Consistency with Vital Records as the primary source of information for case counts (i.e., numerator for mortality ratios) with the denominator values for this stratum.

Mortality Ratio Formula

Numerator: Maternal death cases were included in the race or ethnicity stratum, if race or ethnicity information was documented as described in the "Case Counts" section above.

Denominator: All live births with an Arizona-issued birth certificate were included in the denominator if maternal race or ethnicity was documented on the certificate.

Mortality Ratio for each Race or Ethnicity Stratum =

$$\frac{Race\ or\ Ethnicity\ Category\ for\ Maternal\ Deaths,\ \ Ages\ 15–49\ years\ of\ age}{Maternal\ Race\ or\ Ethnicity\ Category\ of\ Live\ Births,\ \ Ages\ 15–49\ years\ of\ age} \text{ x } 100{,}000$$

Stratum (i.e. Categories)

- American Indian or Alaska Native (AI/AN)
- Asian or Pacific Islander (API)
- Black or African American
- Hispanic
- White, Non-Hispanic
- Unknown/Missing

Maternal Age

Case Counts

All maternal mortality cases in this report had the maternal age at the time of death recorded. The primary source for maternal age information was the decedent's age field on the Vital Records death certificate, which was consistently documented for all cases.

Mortality Ratio Formula

Numerator: All cases were included in the Maternal Age stratum of this report if they had age information documented as mentioned in the "Case Counts" description for these strata.

Denominator: All live births with an Arizona-issued birth certificate were included if the certificate had the maternal date of birth and date of birth of the child; these fields were used to calculate maternal age.

Mortality Ratio for each Age Group Stratum =

$$\frac{Maternal\ Age\ Category\ for\ Maternal\ Deaths,\ \ Ages\ 15–49\ years\ of\ age}{Maternal\ Age\ Category\ of\ Live\ Births,\ \ Ages\ 15–49\ years\ of\ age} \text{ x } 100{,}000$$

Stratum (i.e. Categories)

- 10-14 Years of Age
- 15-24 Years of Age
- 25-34 Years of Age
- 35-44 Years of Age
- 45-54 Years of Age
- 55-60 Years of Age
- Unknown/Missing

Maternal Education

Case Counts

All maternal mortality cases in this report had maternal education information documented in various fields. Leveraging multiple data sources allowed for enhanced data completeness. The availability of maternal education data through multiple data fields in multiple data sources facilitated the use of conditional assignment statements within SAS version 9.4 to account for missing data and optimize the completeness of maternal education information within this report.

Mortality Ratio Formula

Numerator: Maternal death cases were included in the maternal education stratum, if education information was documented, as mentioned in the "Case Counts" section.

Denominator: All live births with an Arizona-issued live birth certificate were included in this analysis if maternal education was documented in the certificate.

Mortality Ratio for each Maternal Education Group Stratum =

$$\frac{Maternal\ Education\ Category\ for\ Maternal\ Deaths,\ \ Ages\ 15–49\ years\ of\ age}{Maternal\ Education\ Category\ of\ Live\ Births,\ \ Ages\ 15–49\ years\ of\ age} \text{ x } 100{,}000$$

Stratum (i.e. Categories)

- 8th Grade or Less
- 9th-12th Grade; No Diploma
- High School Graduate or GED Completed
- Some College Credit, but No Degree
- Associate's Degree
- Bachelor's Degree or More
- Unknown/Missing

Maternal Residence

Overview for Case Data

All maternal mortality cases in this report had maternal residence documented across various fields and data sources. This facilitated the implementation of additional data management techniques, which served to optimize the completeness of maternal residence data. This was especially important because maternal residency serves as the foundation for two key metrics in this report (Urban-Rural and Regional) and was a required element for applying the CDC-recommended inclusion criteria.

Overview of Mortality Ratio Formula

Maternal residence information for live births is needed to calculate mortality ratios. Maternal residency for live births was primarily sourced from live birth certificate data.

Maternal Residence Based on County

Arizona County	Region	Urban-Rural Designation
Apache	Northern	Rural
Cochise	Southeastern	Rural
Coconino	Northern	Rural
Gila	Central	Rural
Graham	Southeastern	Rural
Greenlee	Southeastern	Rural
La Paz	Western	Rural
Maricopa	Central	Urban
Mohave	Western	Rural
Navajo	Northern	Rural
Pima	Southeastern	Urban
Pinal	Urban	Urban
Santa Cruz	Southeastern	Rural
Yavapai	Northern	Rural
Yuma	Western	Urban

*Urban-Rural designation was based on definitions included in the Arizona Vital Statistics Annual Report.

Urban-Rural Maternal Residence

Case Counts

All maternal mortality cases with a recent residence in Arizona were classified as either Urban or Rural. Urban-Rural classifications were based on definitions outlined in the Arizona Vital Statistics Report.[19] Details on the data source are provided in the Maternal Residence - Overview of Case Data section.

Mortality Ratio Formula

Numerator: All maternal mortality cases were included in the urban-rural maternal residence stratum if the county of maternal residence was documented (see Maternal Residence "Overview of Case Data")

Denominator: All live births with an Arizona-issued live birth certificate were included in the denominator, where the county of maternal residence was documented on the certificate.

Mortality Ratio for each Residence Stratum =

$$\frac{Urban{-}Rural\ Maternal\ Residence\ Category\ for\ Maternal\ Deaths,\ \ Ages\ 15{-}49\ years\ of\ age}{Urban{-}Rural\ Maternal\ Residence\ Category\ of\ Live\ Births,\ \ Ages\ 15{-}49\ years\ of\ age} \text{ x } 100{,}000$$

Stratum (i.e. Categories)

- Urban
- Rural

Regional Maternal Residence

Case Counts

All maternal mortality cases with recent residence in Arizona were assigned to one of the four Arizona Regions (see Maternal Residence - Maternal Residence Based on County). Details on data sources are described in the Maternal Residence -Overview of Case Data section.

Mortality Ratio Formula

Numerator: All cases were included in the regional maternal residence stratum of this report if they had a county of maternal residence documented (see Maternal Residence "Overview of Case Data" section).

Denominator: Live births with an Arizona-issued live birth certificate that met the inclusion criteria and had the maternal county of residence documented were included.

Mortality Ratio for each Regional Stratum =

$$\frac{Regional\ Maternal\ Residence\ Category\ for\ Maternal\ Deaths,\ \ Ages\ 15{-}49\ years\ of\ age}{Regional\ Maternal\ Residence\ Category\ of\ Live\ Births,\ \ Ages\ 15{-}49\ years\ of\ age} \text{ x } 100{,}000$$

Stratum (i.e. Categories)

- Central
- Northern
- Southeastern
- Western

Maternal Payer Type

Case Counts

All maternal mortality cases in this report had payer type information documented in various fields, which helped mitigate data gaps in this stratum. Medical insurance information for decedents was sourced from the Maternal Mortality Review Information App (MMRIA) registry. The primary source of payer information was the insurance payer listed for the obstetric delivery, as recorded on the corresponding live birth or fetal death certificates. If payer information was unavailable in the registry, then the payer was identified from inpatient hospital records acquired by the program. In cases where both sources were missing payer information, the payer type recorded in MMRIA was used. This approach ensured minimal missing data for these strata.

Mortality Ratio Formula

Numerator: Maternal death cases were included in the insurance type stratum of this report if payor information was documented as mentioned in the "Case Counts" description for this metric.

Denominator: All live births with an Arizona-issued live birth certificate were included in the denominator if the payer of the delivery was documented on the certificate.

Mortality Ratio for each Payer Type Stratum =

$$\frac{Payer\ Type\ Category\ for\ Maternal\ Deaths,\ \ Ages\ 15–49\ years\ of\ age}{Payer\ Type\ Category\ of\ Live\ Births,\ \ Ages\ 15–49\ years\ of\ age} \text{ x } 100{,}000$$

Stratum (i.e. Categories)

- Private Insurance
- Medicaid
- Self-Pay: indicated when no source of payment was identified at the time of admission. Self-Pay can be due to various complex societal factors (e.g., foreign-born, insurance lapse, pay out-of-pocket, etc.), which are beyond the scope of this report.
- Other: included Indian Health Services and TriCare/CHAMPUS.

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