



Pregnancy-Associated Deaths in Maine, 2021-2024



Data and Insights from Maine's Maternal, Fetal, and Infant Mortality Review (MFIMR)

Each year in Maine, **5-12 women die during pregnancy or within one year** of the end of their pregnancy. These deaths are tragedies that profoundly impact families and communities across the state. Understanding the circumstances of each death can help Maine prevent future deaths and improve maternal health.

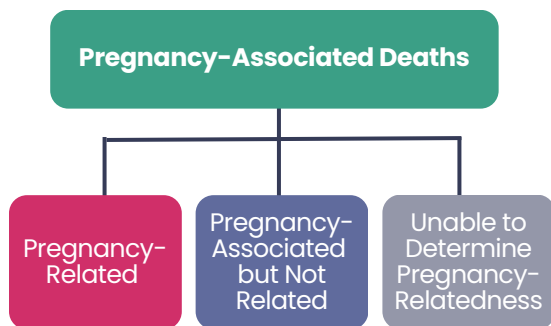
What is MFIMR?

Maine [statute 22 MRS §261](#) requires all pregnancy-associated deaths are reviewed by Maine's Maternal, Fetal, and Infant Mortality Review (MFIMR) panel, a multidisciplinary body of health professionals and individuals with related lived experience. MFIMR is charged with determining whether a death was related to pregnancy, identifying circumstances that contributed to the death, and developing recommendations to prevent future occurrences. The MFIMR panel aims to review pregnancy-associated deaths within 18 months of the event.

Maine's MFIMR:



What is a Pregnancy-Associated Death?



A **pregnancy-associated death** is any death to a birthing person **while pregnant or within one year** of the end of pregnancy, regardless of the cause of death. [2]

A **pregnancy-related death** is a death during pregnancy or within one year of the end of pregnancy **from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.** [2]

A **pregnancy-associated, but not related death** is a pregnancy-associated death determined by Maine's MFIMR panel to not be related to pregnancy. [2]

32 pregnancy-associated deaths were identified in 2021-2024; 31 were reviewed by MFIMR.

The MFIMR panel began reviewing pregnancy-associated deaths in 2022, starting with death year 2021. A total of 31 deaths were reviewed by the MFIMR panel at quarterly meetings held in 2022-2025. Special circumstances have delayed the review of one death. **This data brief includes reviewed deaths only (n=31).**

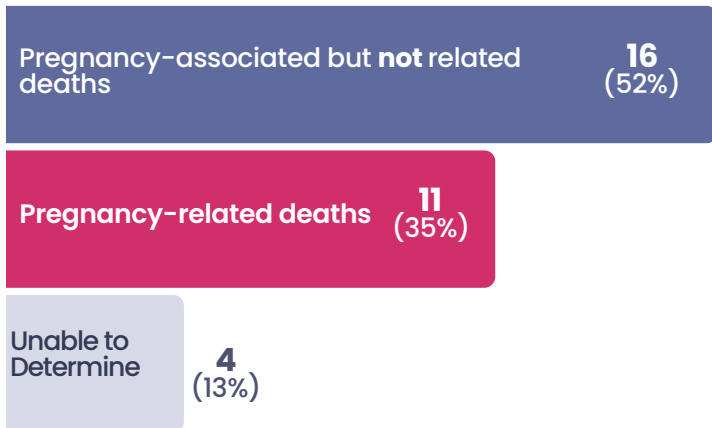
Key Panel Determinations

During the case review process, MFIMR panel members must determine whether a death was **related to pregnancy**, whether it was **preventable**, what circumstances **contributed** to the death, and the **manner** of the death.

71% of the 31 deaths reviewed (n=22) occurred in the **postpartum period**; eight deaths (26%) occurred **during pregnancy**; one death occurred **during delivery**.



35% of the 31 deaths reviewed (n=11) were determined to be **related to pregnancy**.



90%

of **all deaths** reviewed were determined to be **preventable** (28 of 31).

82% of **pregnancy-related** deaths were **preventable** (9 of 11).

Deaths are considered preventable if the panel determines there is at least some chance for a change in policy or practice to have altered the outcome.

Circumstances Contributing to Deaths

The MFIMR panel determines whether discrimination, mental health conditions, substance use disorder (SUD), and/or obesity contributed to each death reviewed. Deaths may have more than one contributing circumstance. Among the 31 deaths reviewed, **mental health conditions** were the most frequent contributing circumstance, contributing to/probably contributing to **65%** (n=20) of deaths. **Discrimination** and **SUD** were also identified as contributing to **more than half** of the 31 deaths reviewed. Obesity (not pictured) was determined to have contributed to 1 of 31 deaths.



■ Was or probably was a contributor

■ Was NOT a contributor, probably was NOT a contributor, or could not determine

Manner and Cause of Death

The primary source of data on the manner and underlying causes of pregnancy-associated deaths are Maine death certificates. During case reviews, MFIMR may vote to disagree with the manner or cause of death as recorded on a death certificate based on additional information provided from other sources. The MFIMR panel disagreed with the recorded manner of one death reviewed, and did not disagree with the underlying cause of death for any deaths reviewed.

Manner of Deaths

Manner of death refers to the circumstances under which a death occurs. MFIMR determines if the manner of each pregnancy-associated death reviewed was a **homicide or suicide** based on information obtained for case reviews, which may include medical records and other sources not available at the time of death certification.

- **Homicide:** Of the 31 deaths reviewed, **no deaths** were determined to be a **homicide**.
- **Suicide:** Of the 31 deaths reviewed, **three** were determined to be **suicides**, in alignment with the manner recorded on the decedents' death certificates. **One** was determined to be a **probable suicide**, rather than due to an accident as was indicated on the death certificate.

Twenty-seven deaths were determined to be neither a homicide nor a suicide. According to death certificate data, the manner of these deaths was accidental (n=20) or natural (n=7).

Underlying Causes of Death

39% (n=12) of the 31 deaths reviewed were due to an **unintentional overdose**. Unintentional overdose was the **most common cause** of pregnancy-associated deaths, followed by motor vehicle accidents (n=6) and suicides (n=3).

	Pregnancy-Associated but NOT related	Pregnancy-Related	Unable to Determine	Total
Unintentional overdose (accidental poisoning)	8	3	1	12
Motor vehicle accident	3		3	6
Suicide (intentional self-harm)	1	2		3
Cerebrovascular Accident	1	1		2
Thrombotic pulmonary or other embolisms		2		2
Sepsis/Septic Shock		1		1
Cardiovascular conditions		1		1
Infection	1			1
Injury or accident (non-motor vehicle)	1			1
Amniotic fluid embolism		1		1
Other mental health or substance use related	1			1

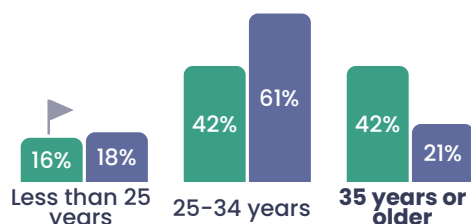
Characteristics of Deaths vs. Live Births

Pregnancy-associated deaths are rare in Maine, but not all pregnant and postpartum people are at equal risk of experiencing a fatal event. Understanding how individuals who experience a pregnancy-associated death are similar to, or different than, Maine's birthing population overall can help identify disparities. Demographic and geographic disparities often indicate underlying inequities in the social drivers of health. Additional data are included in **Appendix A**.



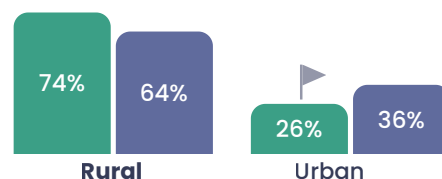
Age

Mainers who experienced a pregnancy-associated death were more likely to be **older** compared to birthing people overall. **42%** of **pregnancy-associated deaths** were **35 years of age or older**, vs. **21%** of **birthing people** in 2021-2024.



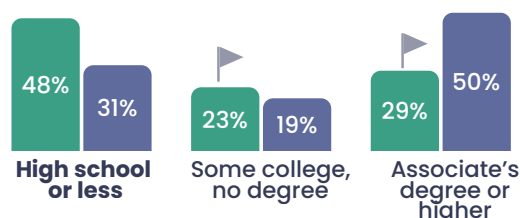
Rurality

Mainers who experienced a pregnancy-associated death were more likely to live in a **rural** area than birthing people overall. **74%** of **pregnancy-associated deaths** were **rural** residents, vs. **64%** of **birthing people** in 2021-2024.



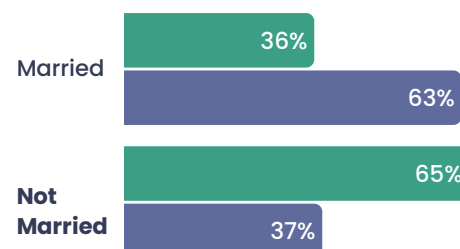
Education

Mainers who experienced a pregnancy-associated death were more likely to have **lower educational attainment** compared to birthing people overall. **48%** of those with a **pregnancy-associated death** had completed **high school or less education**, vs. **31%** of **birthing people** in 2021-2024.



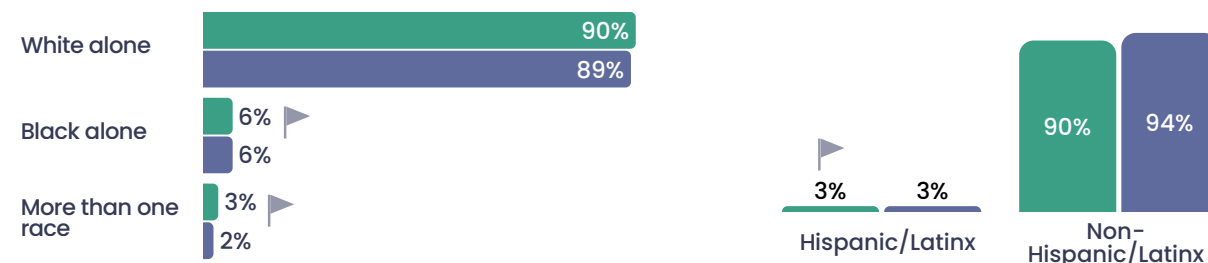
Marital status

Mainers who experienced a pregnancy-associated death were more likely to be **unmarried** compared to Maine resident birthing people overall. **65%** of **pregnancy-associated deaths** were **not married**, vs. **37%** of **birthing people** in 2021-2024.



Race and Ethnicity

Race and ethnicity among Mainers who experienced a **pregnancy-associated death** closely mirrored race and ethnicity among **Maine resident birthing people** overall in 2021-2024. *Only categories representing one or more pregnancy-associated deaths are included.*



Data source: Maine Death Certificates and/or Birth Certificates, MECDC DRVS
 Data note: Percentages may not add to 100% due to missing data. See Appendix A.
 Interpret with caution; death percentage is calculated with fewer than 10 in the numerator.

Social and Environmental Context

Data on barriers to health care access and stressful life experiences are abstracted from health care and social service records and/or obtained through interviews with the decedents' family members or friends. Although these barriers and experiences may not have directly contributed to the death of a pregnant or birthing person, they expand our understanding of the social and environmental context of pregnancy-associated deaths in Maine.

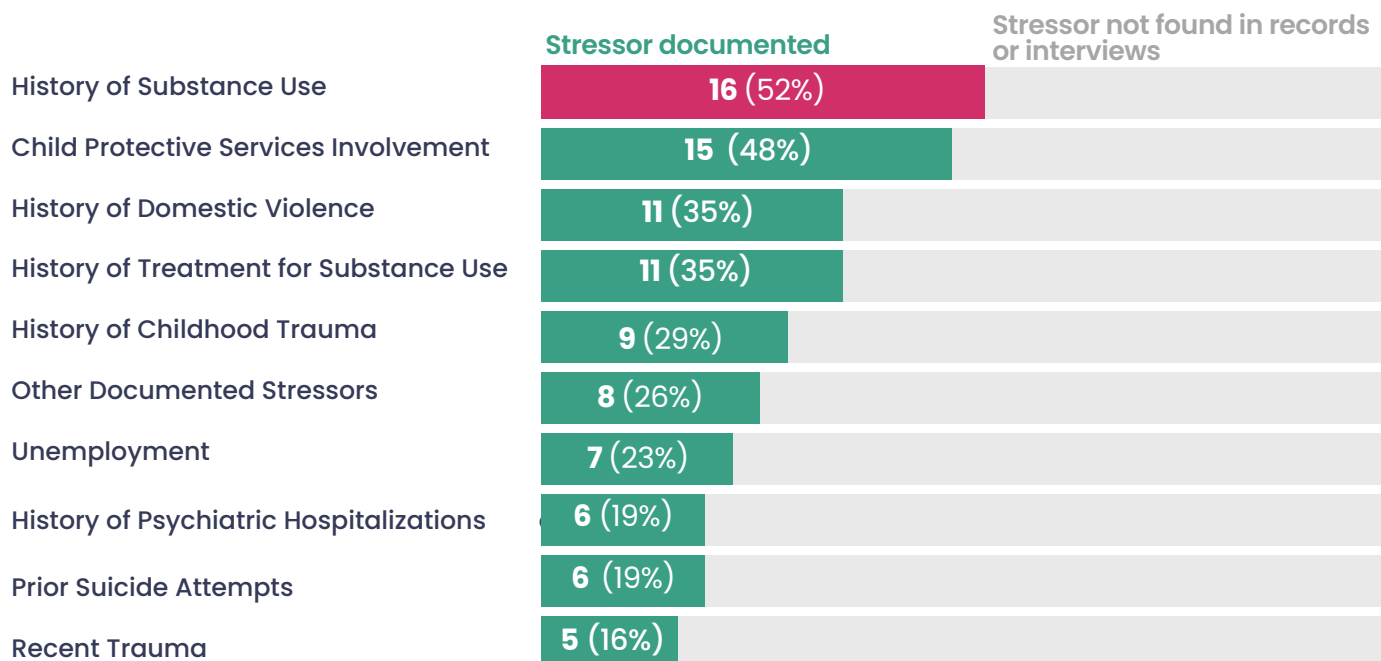
Barriers to Health Care Access

At least one **barrier to health care access** was identified in **65%** (n=20) of the 31 deaths reviewed based on documentation in medical records and/or interviews with family or friends. **Transportation** was most common (n=9), followed by distance (n=4), and financial issues (n=3).



Documented Stressful Life Experiences

In **68%** (n=21) of the 31 deaths reviewed, **at least one significant stressful life experience** was identified based on documentation in health care and social service records and/or reports from friends or family during interviews. The most common stressful life experience was a **history of substance use (52%)**. In **32%** (n=10) deaths reviewed, **more than five significant stressful experiences** were documented.



Data source: Maine MMRIA

Data note: Medical records and interviews are an essential component of case reviews, however, they may not provide a complete account of all barriers and stressors experienced by those with a pregnancy-associated death. Decedents may have experienced other barriers and stressors than those listed here, and/or the stressors they experienced may not have been accurately captured in health care records or by interviewees.

Technical Notes

ABOUT MATERNAL MORTALITY REVIEW IN MAINE

Maine's MFIMR is convened and administered by the Maine Center for Disease Control and Prevention (MECDC), with support for the maternal mortality review process from the Maine Medical Association Center for Quality Improvement (MMA-CQI), and made possible by a grant from US Centers for Disease Control and Prevention's Enhancing Reviews and Surveillance to Eliminate Maternal Mortality program (ERASE-MM). Data in this report are drawn from Maine's Maternal Mortality Review and Information Application (MMRIA), and include information obtained from Maine vital records (birth certificates, death certificates, and fetal death certificates), medical and social service records, family interviews, and panel deliberations.

DEFINITIONS: TYPE OF DEATH

Maternal death: A maternal death is defined by the World Health Organization and the US CDC National Vital Statistics System as a death to a birthing person during or within 42 days of the end of pregnancy due to causes directly related to or aggravated by pregnancy, *excluding* accidental or incidental causes (e.g., deaths due to homicide, suicide, drug overdose, motor vehicle accidents, etc.) [1]

Pregnancy-associated death: A pregnancy-associated death is *any* death to a birthing person while pregnant or within one year of the end of pregnancy, regardless of the cause of death. The MFIMR panel began to routinely review all Maine resident occurrent pregnancy-associated deaths in 2023, beginning with 2021 deaths. [2]

Pregnancy-related death: A pregnancy-related death is defined by US CDC ERASE-MM as a death during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. Maine's MFIMR panel uses this definition to determine whether a pregnancy-associated death was also pregnancy-related. [2]

Pregnancy-associated, but not related death: A pregnancy-associated death determined by Maine's MFIMR panel to not be related to pregnancy [2]

Preventable death: Maine's MFIMR panel applies the ERASE-MM definition of preventability when reviewing pregnancy-associated deaths: A death is considered preventable if the committee determines that there was at least some chance of the death being averted by one or more reasonable changes to patient, family, provider, facility, system and/or community factors. [2]

DEFINITIONS: CONTRIBUTING CIRCUMSTANCES

Maine's MFIMR panel is tasked with determining if discrimination, obesity, mental health, and/or substance use contributed to a death. The definitions of each circumstance are outlined below.

Discrimination: MFIMR determines whether discrimination contributed to the death using Hardeman's definition of discrimination: treating someone less or more favorably based on the group, class or category they belong to resulting from biases, prejudices, and stereotyping. Discrimination can manifest as differences in care, clinical communication and shared decision-making. [3]

Mental health conditions: MFIMR determines whether a mental health condition contributed to the death, and not just whether the person had a mental health condition. Mental health conditions are defined as present when the individual had a documented diagnosis of a psychiatric disorder. If a formal diagnosis is not available, subject matter experts (e.g., psychiatrist, psychologist, licensed counselor) may determine whether the criteria for a diagnosis of substance use disorder or another mental health condition are met based on the available information. [2]

Obesity: MFIMR determines whether obesity contributed to the death, not just whether the person was obese. The committee may determine that obesity contributed to the death when the condition directly compromised an individual's health or health care. BMI is calculated from weight and height ($\text{weight [kg]} / \text{height [m}^2\text{]}$); a BMI of 30 or higher is considered obese. [4]

Substance use disorder (SUD): MFIMR determines whether SUD contributed to the death, and not just whether the individual had SUD. SUD is characterized by recurrent use of substances causing clinically and functionally significant impairment, such as health problems or disability. The panel may determine that substance use disorder contributed to the death when the disorder directly compromised their health status. [2]

FOR MORE INFORMATION

Maine's MFIMR panel: <https://www.maine.gov/dhhs/mecdc/population-health/mch/perinatal/maternal-infant/>

US CDC ERASE-MM: <https://www.cdc.gov/maternal-mortality/index.html>

[1] US CDC, National Center for Health Statistics, *How NCHS Measures Maternal Deaths?* Retrieved from <https://www.cdc.gov/nchs/maternal-mortality/faq.htm>

[2] US CDC, Enhancing Reviews and Surveillance to Eliminate Maternal Mortality, Maternal Mortality Review Committee Decisions Form, version 24. Retrieved from <https://www.cdc.gov/maternal-mortality/media/pdfs/2024/05/mmria-form-v24-fillable-508.pdf>

[3] Hardeman RR, et al. Developing Tools to Report Racism in Maternal Health for the CDC Maternal Mortality Review Information Application (MMRIA): Findings from the MMRIA Racism & Discrimination Working Group. *Matern Child Health J.* 2022.

[4] US CDC, *Division of Nutrition, Physical Activity, and Obesity*, Obesity and Weight Status, Retrieved from https://www.cdc.gov/nccdphp/dnpao/data-trends-maps/help/npao_dtm/definitions.html

Appendix A

Characteristics of Pregnancy-Associated Deaths vs. Resident Births

Data on demographic and residential geography of pregnancy-associated deaths and resident births are obtained from Maine vital records (birth and death certificates). Data on resident births refer to characteristics of the birthing person. Characteristics included were selected based on the completeness of data. Ongoing data quality improvement efforts may allow for the inclusion of additional demographic data in future reports.

Select Demographic and Geographic Characteristics	Pregnancy-Associated Deaths, 2021-2024 reviewed deaths only		Maine Resident Births, 2021-2024	
	Count	Percent (%)	Count	Percent (%)
Total	31	--	47,297	--
Age				
Under 25 years	5	16% ▸	8,347	18%
25-34 years	13	42%	2,8871	61%
35 and over years	13	42%	10,059	21%
Missing or unknown	0	--	20	<1%
Education				
High school or less	15	48%	14,625	31%
Some college	7	23% ▸	8761	19%
Associate's degree or more	9	29%	23,693	50%
Missing or unknown	0	--	218	<1%
Race				
White alone	28	90%	41,685	88%
Black alone	2	6% ▸	2,845	6%
AIAN alone	0	--	307	1%
Asian alone	0	--	768	2%
NHOPI alone	0	--	26	<1%
Oth race alone	0	--	508	1%
Two or more race	1	3% ▸	903	2%
Missing or unknown	0	--	255	1%
Ethnicity				
Hispanic	1	3% ▸	1282	3%
Non-Hispanic	28	90%	44,490	94%
Missing or unknown	2	6% ▸	1525	3%
Marital status				
Married	11	35%	29,733	63%
Not Married	20	65%	17,213	36%
Missing or unknown	0	--	351	1%
Rurality				
Rural	23	74%	29,610	63%
Urban	8	26% ▸	16,700	35%
Missing or unknown	0	--	987	2%

Data source: Maine Death Certificates and/or Birth Certificates, MECDC DRVS
 ▸ Interpret with caution; percentage is calculated with fewer than 10 in the numerator.