West Virginia
Fatality and Mortality Review Team

Annual Report
December 1, 2025

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West Virginia Fatality and Mortality Review Team Annual Report 2025

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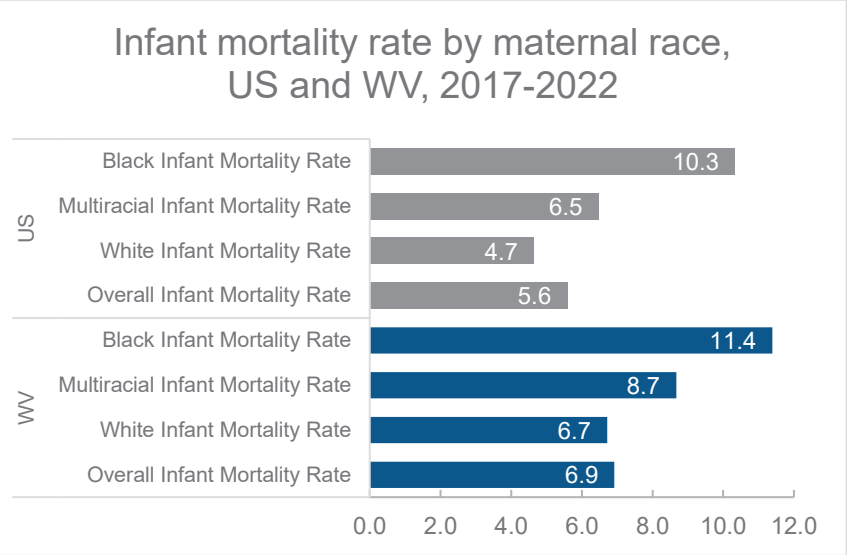
Executive Summary

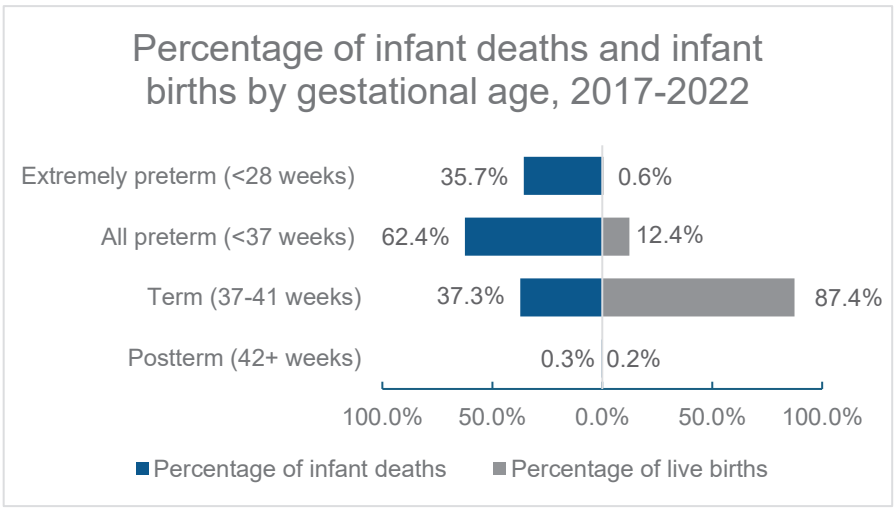
Infant Mortality Rate and Disparities Among Minority Populations

Infant mortality is the death of an infant before his or her first birthday and serves as a marker for the health of a society. The infant mortality rate in West Virginia (WV) over the period of 2017-2022 has continuously remained higher than that of the nation (refer to Figure 1 in full report). Additionally, mortality rates among Black and multiracial infants remain higher than white infants, also reflecting national trends.



Preterm Birth, Low Birthweight, and Congenital Conditions

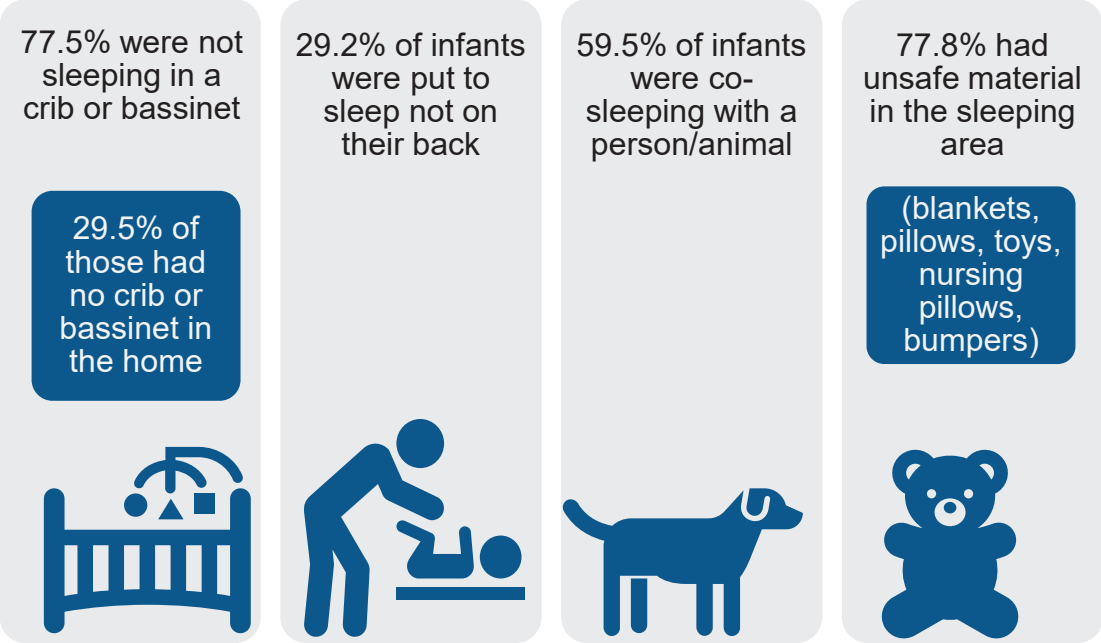
Of the 703 infant deaths reviewed in this report, 30.2% died on the day of delivery and only 38.5% of infants left the hospital following birth. Congenital anomaly was the leading cause of death, accounting for 20.2% of deaths from 2017 to 2022. Many infants who died within the first year of life were born with health risks: 62.5% were born with low birthweight (less than 1500 grams/5.5 lbs) and 62.4% were born preterm (less than 37 weeks gestational age). Both were much higher percentages than found in the general infant population for WV during that same time.



Low birthweight and preterm birth causes aren't always known. However, many maternal health factors are linked to these, including stress, age (being younger than 17 or older than 35), being underweight or overweight, chronic health conditions like diabetes or high blood pressure, as well as use of tobacco, alcohol, or other substances.

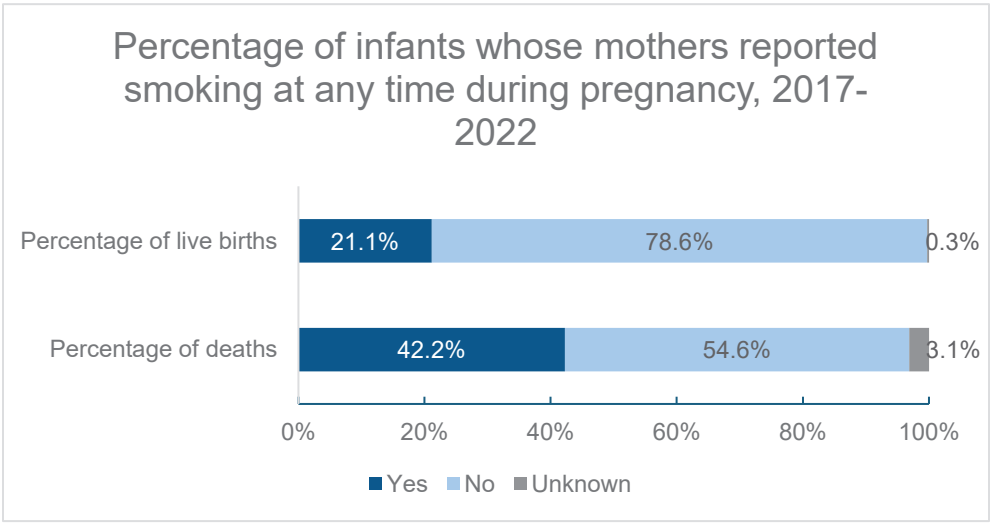
Sleep-related Deaths

Of the infant cases that left the hospital following delivery, 66.1% (n=179) of those were classified as sleep-related deaths, meaning that the infant death was related to sleep or the sleep environment, regardless of the primary cause of death. Almost all (88.3%) sleep-related deaths occurred in the post neonatal period between 28 days to 365 days after birth, and many involved unsafe sleeping environment conditions.



Maternal Smoking

Although cigarette smoking rates have decreased over the last decade, WV had the highest maternal smoking rates from 2017 to 2022, with 21.1% of mothers reporting smoking at any time during pregnancy versus the national rate of 5.5%. This maternal smoking rate was even higher among infant deaths at 42.2%. Additionally, 61.6% of sleep-related deaths had documentation of secondhand smoke exposure in the home and 60.7% were exposed to maternal smoking at some point during pregnancy. Smoking during pregnancy or exposure to secondhand smoke after birth are both linked to increased risk for sleep-related death.



Infant Multiyear Overview

Overview: 2017-2022 infant deaths (Six-year analysis)

Infant mortality rates in West Virginia (WV) remain above the national rate according to Centers for Disease Control and Prevention (CDC) data. This holds true when infant mortality rates are viewed by race, with White infants having the lowest mortality rate, and Black infants having the highest mortality rate.

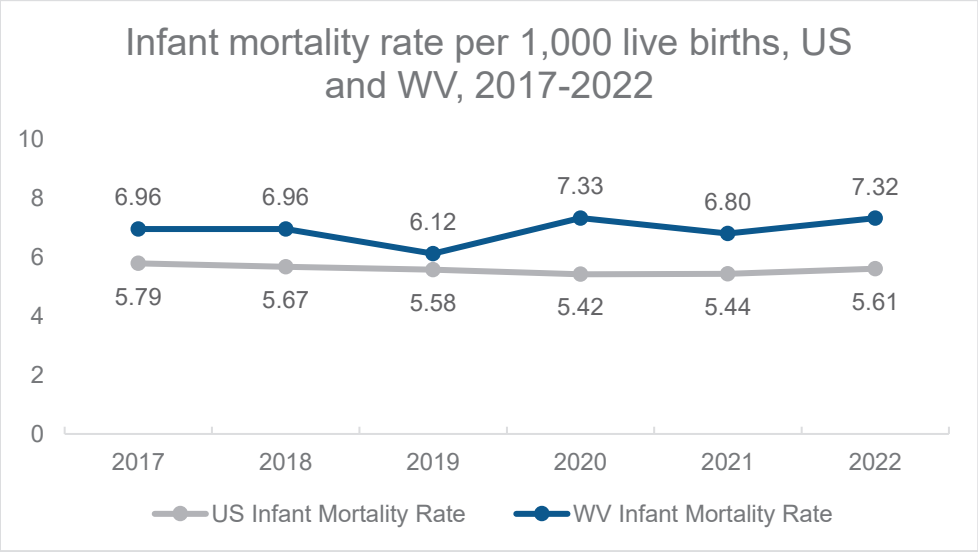


Figure 1. CDC NCHS NVSS Linked Birth/Infant Death Records, CDC WONDER

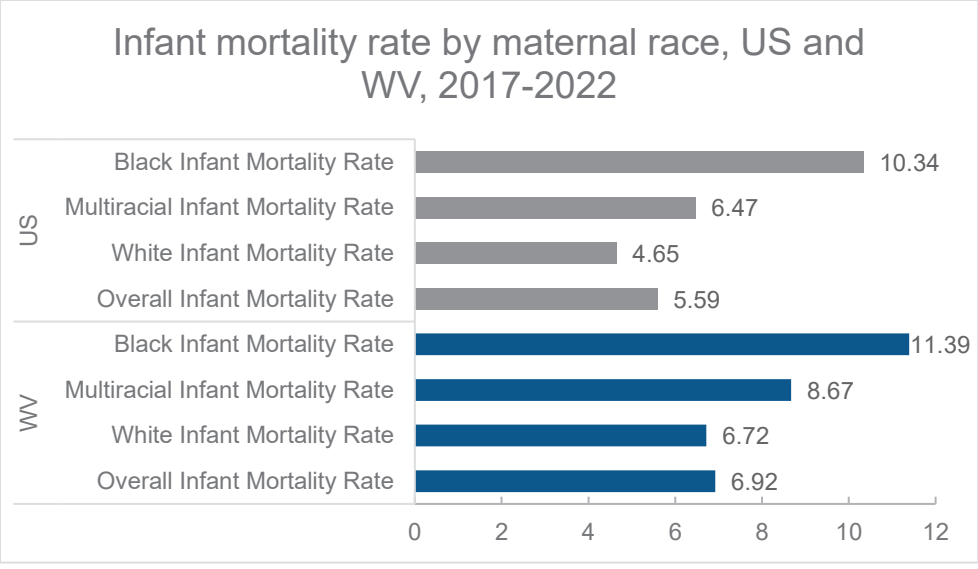


Figure 2. CDC NCHS NVSS Linked Birth/Infant Death Records, CDC WONDER**.** Infant deaths by ethnicity, as well as American Indian or Alaska Native, Asian, and Native

Hawaiian or Other Pacific Islander infant deaths are not included at this time because they do not meet the CDC's data suppression threshold guidelines for reporting rates.

Infant and Maternal Mortality Review Panel

The WV Infant and Maternal Mortality Review Panel (IMMRP) is a piece of the WV Fatality and Mortality Review Team (FMRT) that includes a team of multidisciplinary experts that review infant and pregnancy-related deaths to understand why these deaths occurred, contributing factors, and whether the deaths could have been prevented. Within the WV Department of Health, Bureau for Public Health, Office of Maternal Child and Family Health (WVDH BPH OMCFH) there is an IMMRP Program that includes case abstractors, analysts, and a program director to facilitate this work and link it to federal maternal and infant health programming.

Infant mortality review includes all live-born infants that were a resident of WV at the time of their death and who died before their first birthday. Deaths that occurred outside WV are still eligible for review, however records from these other states may not be available to case abstractors due to differences in state laws around data sharing. This may impact the reviewers' ability to determine if the death was preventable as well as other details. The case profile is a comprehensive picture built by program abstractors and may be from many different facilities and agencies for both mother and infant, and includes medical files, investigations, autopsy results if applicable, and other case-relevant details. A de-identified case narrative is presented to the Panel to review and determine if the death was preventable and, if applicable, what recommendations can be made to prevent future deaths. Recommendations can be intended to improve the education provided to families, child agency protocols, system-level improvements in infant emergent care, availability of records, etc.
The Fetal and Infant Mortality Review (FIMR, pronounced "femur") is the platform created by the National Center for Fatality Review and Prevention (NCFRP) and housed in the National Fatality Review Case Reporting System (NFR-CRS). This platform is where case information for infant mortality review is stored. The NFR-CRS is made available to states, districts, and territories for use in infant mortality reviews.

Case Analysis

This report includes infant deaths for 2017 through 2022, a six-year analysis intended to provide insight into demographic and situational trends that might not otherwise be visible in a single year. Data was exported from the NCFRP's FIMR system and analyzed by the OMCFH IMMRP Program Epidemiologist using Microsoft Excel. Per NCFRP, "NFR-CRS cannot be directly compared with vital statistics data nor should it be used to compute mortality rates."[1] All infant death data and graphs in this report are limited to WV residents unless indicated otherwise. Live birth data, used for comparison with infant death cases,

[1] NCFRP, NCFRP Data Dissemination Policy & Guidelines for Requesting De-identified Dataset: https://ncfrp.org/wp-content/uploads/NCFRP_Data_Dissemination_Policy_Guidelines_v9_Mar2025.pdf

were accessed from the Centers for Disease Prevention and Control National Center for Health Statistics, National Vital Statistics System (CDC NCHS NVSS) Natality files, housed on the CDC WONDER Online Database, and will be noted when used. Likewise, linked birth/infant death record data is used for calculating infant mortality rates and are from CDC NCHS NVSS CDC WONDER Online Database. Guidelines for sleep-related infant death case definition are according to NCFRP recommendations.

Small Number Reporting

West Virginia is a state with a relatively small population size, and care must be taken in reporting small numbers in order to both protect the privacy of the individual as well as maintain reliability of the data. When numbers are too small, calculated rates, ratios, and percentages are not included because they may be statistically unreliable. This section will utilize the same minimum numerator and denominator data standards as the maternal review section for consistency:

- Rates/ratios: do not report if numerator is less than eight.
- Percentages: do not report if denominator is less than 10.

Infant Mortality Rate

Infant mortality is defined as any death of an infant before his or her first birthday, and the rate is per 1,000 live births in the geographic region of interest.

$$\text{IMR:} \quad \frac{Number\ of\ WV\ resident\ infant\ deaths}{Number\ of\ WV\ resident\ live\ births} \times 1{,}000$$

Infant Deaths Overview

From 2017 to 2022 there were 703 infant death cases entered into FIMR for WV, representing live-born infants who died before their first birthday from any manner and cause of death.

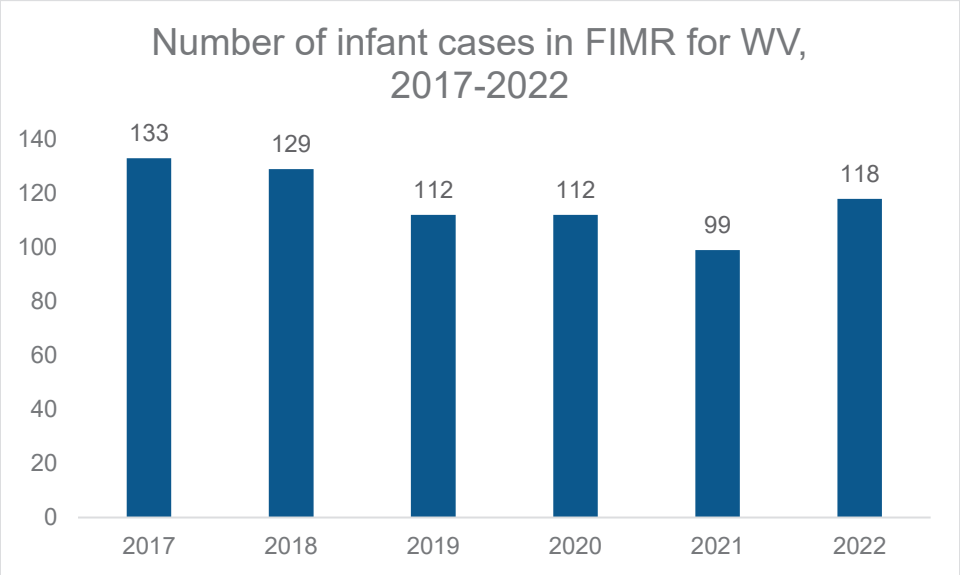


Figure 3. Total number of cases for infants who were WV residents and died before their first birthday per year.

General Birth Characteristics

Of the 703 infant death cases in FIMR, only 38.5% of infant cases left the hospital following birth. Many of these infants were born with health risks including early birth (less than 37 weeks gestational age) and low birthweight (less than 2500 grams or 5.5 lbs). The percentage of infant cases within FIMR that were born preterm was 62.4% (n=700), much higher than among all live-born infants to WV residents during that same period of time at 12.4%. Within the category of early birth there is "extremely preterm," with a gestational age of less than 28 weeks, and 35.7% of FIMR cases (n=250) were within this category. Among the infant cases within FIMR with recorded birthweight (n=696), 62.5% had low birthweight, compared to just 9.6% of all live-born infants to WV residents during the same time. More than 36% (252) of infant cases within FIMR were born with extremely low birthweight, compared to only 0.6% of live-born infants during that time, and 17.2% (120 of 696 infants with known birthweight) of cases had a birthweight of less than 500 grams. Infants who are preterm or low birthweight may have more health problems at birth or later in life than those with a normal gestational age or birthweight. While there are many unknowns about what causes preterm birth and associated low birthweight, there are maternal risk factors that may increase risk[2], including:

- Chronic health conditions like diabetes and high blood pressure
- Being underweight or overweight/having obesity
- High stress
- Experiencing domestic violence

[2] March of Dimes, Preterm labor and preterm birth: https://www.marchofdimes.org/find-support/topics/birth/preterm-labor-and-preterm-birth-are-you-risk

- Exposure to air pollution or lead
- Infections, including sexually transmitted infections like syphilis[3]
- Young maternal age or advanced maternal age
- Use of tobacco, alcohol, or other substances

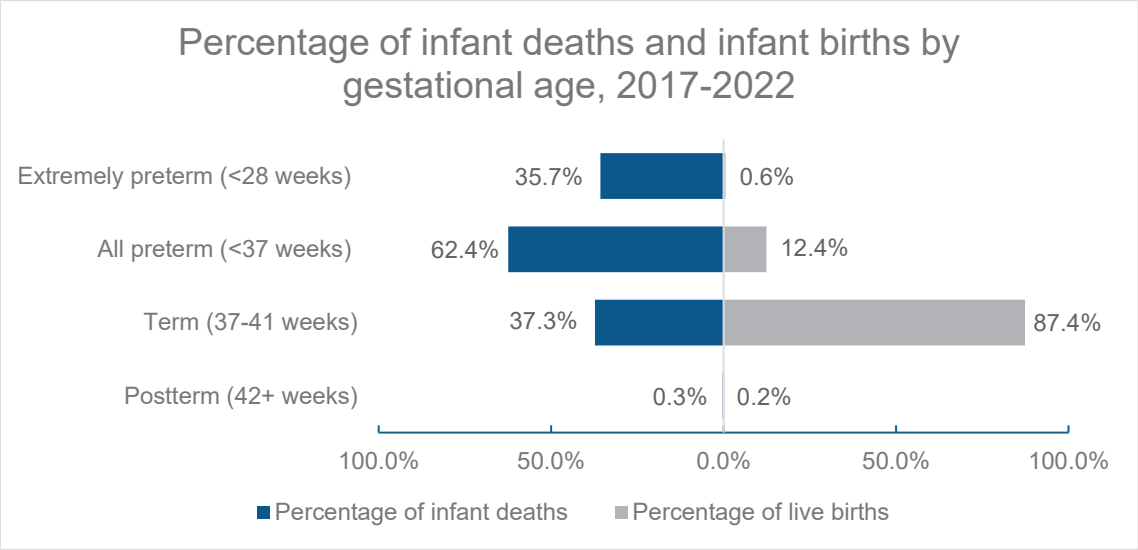


Figure 4. Gestational age comparisons among FIMR cases (n=700). Note: Percentages for all preterm, term, and postterm categories may not add up 100.0% due to rounding.

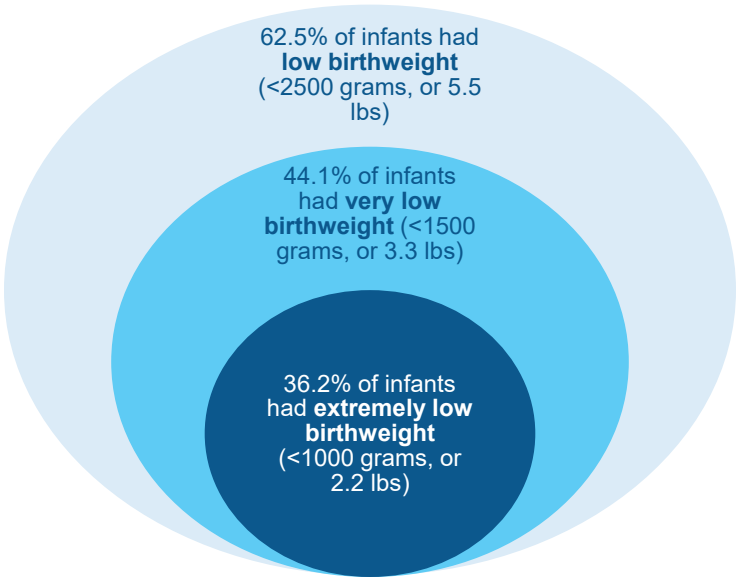


Figure 5. Overall low birthweight sorted into overlapping subcategories for infant cases within FIMR (n=696) for 2017-2022 (weight categories under low birthweight are not

[3] JAMA, Screening for Syphilis Infection During Pregnancy: https://jamanetwork.com/journals/jama/fullarticle/2833883

mutually exclusive, so infants included in “extremely low” are included in “low” and “very low”). Percentages for subcategories are calculated from all FIMR cases and will not add up to 100%.

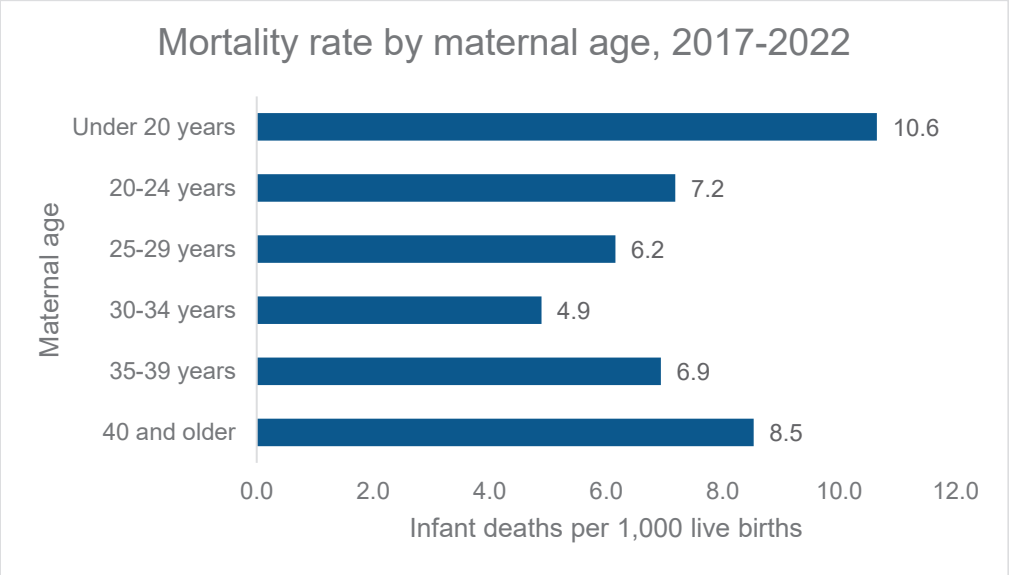


Figure 6. Infant cases within FIMR by maternal age at birth (n=702). Maternal age (including women 40 and older as well as women under 20) is a risk factor for preterm birth.

Maternal Smoking

Although cigarette smoking rates have decreased over the last decade, WV still had one of the highest maternal smoking rates from 2017 to 2022, with 21.1% of mothers reporting smoking at any time during pregnancy versus the national rate of 5.5%.[4] This maternal smoking rate was even higher among cases within FIMR at 42.2%.

The percentage of mothers who reported smoking at any time during pregnancy was **twice** as high among infant deaths than among live births.

[4] CDC NCHS NVSS, Natality on CDC WONDER Online Database

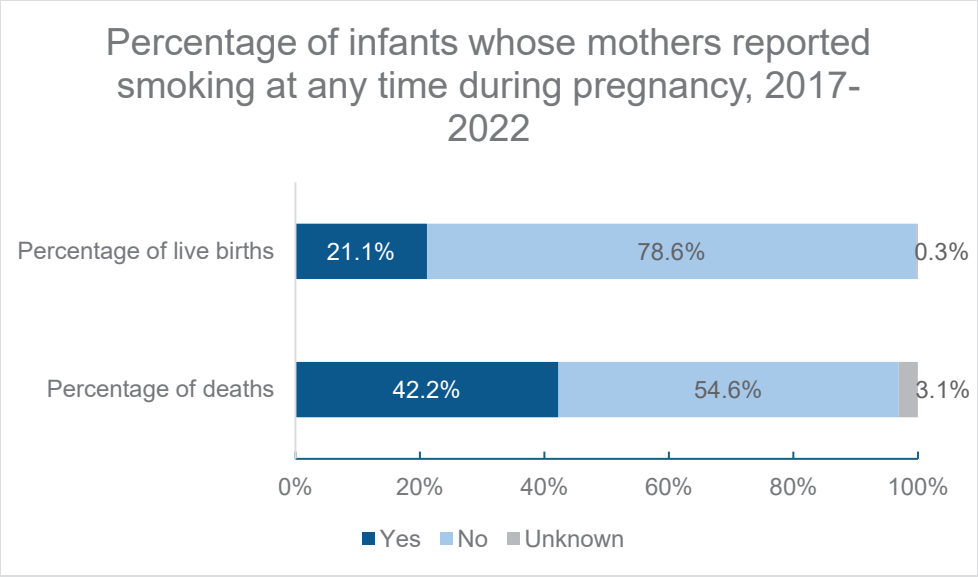


Figure 7. When looking at infant deaths from 2017 through 2022, there is an increase in the percentage of mothers who reported smoking at any time during pregnancy around 2019, where almost half of the cases in FIMR for that year had tobacco use noted.

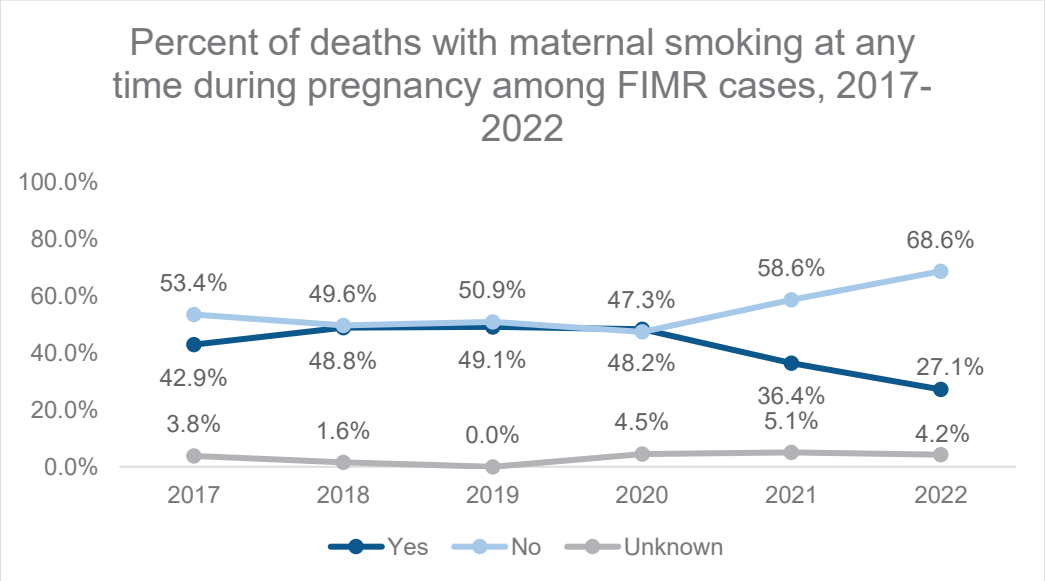


Figure 8. While there has been a sharp decrease in maternal smoking during pregnancy since 2019, mothers switching to e-cigarettes/vaping may account for this decrease. Documentation of reported maternal e-cigarette/vaping use on birth certificates, similar to cigarette use, began partway through the reporting period and will be included in future analysis.

Prenatal Care

According to FIMR records, 91.9% of infants who died were born to mothers who reported attending at least one prenatal appointment, with only 6.0% reporting no prenatal care. The number of visits for infants ranged from one to 26, with an average number of nine visits. The mortality rate for infants in FIMR who received no prenatal care was 20.2 per 1,000 live births, more than **three times** the overall mortality rate for infants in WV during this time.

Infants of mothers who **do not receive** prenatal care have a much higher mortality rate than infants who do.

Demographics

Infant Deaths by Sex

Infant deaths within FIMR from 2017 through 2022 were 57.6% male (405) and 42.4% female (298). This pattern holds true on a national level as well, showing the male infant mortality rate is higher than the female infant mortality rate.

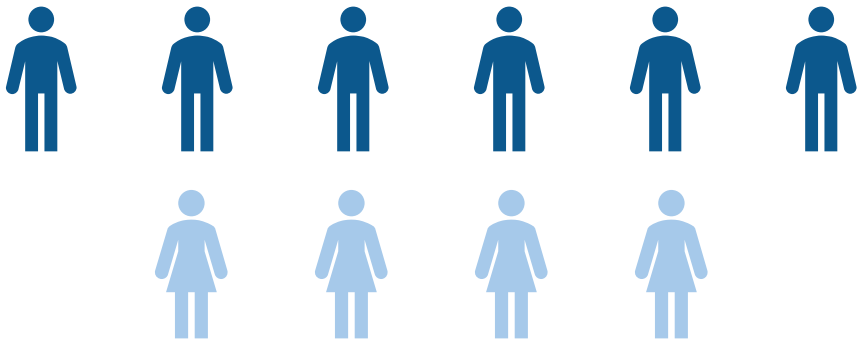


Figure 9. Infant mortality is slightly higher in male infants versus female infants. This is true beyond just WV and is likely tied to different biological and genetic factors.

Deaths by Race and Ethnicity

Infant race and ethnicity within FIMR includes both maternal and paternal race and ethnicity if that information is available to the abstractor. This may create differences

between CDC National Vital Statistics Reports, where infant mortality rates are presented by race and Hispanic origin of the mother.[5]

Race (n=702)	Number of Infant Deaths, 2017-2022
Black	54
White	588
Multiracial	56
American Indian or Alaska Native	1
Asian	2
Native Hawaiian or Other Pacific Islander	1
Hispanic Origin (n=693)	**Number of Infant Deaths, 2017-2022**
Hispanic or Latino	27
Not Hispanic or Latino	666

Table 1. The IMMRP team is following CDC guidance outlined for maternal deaths, where statewide counts are reported, but rates, ratios, and percentages have thresholds that must be met for reliable data standards.

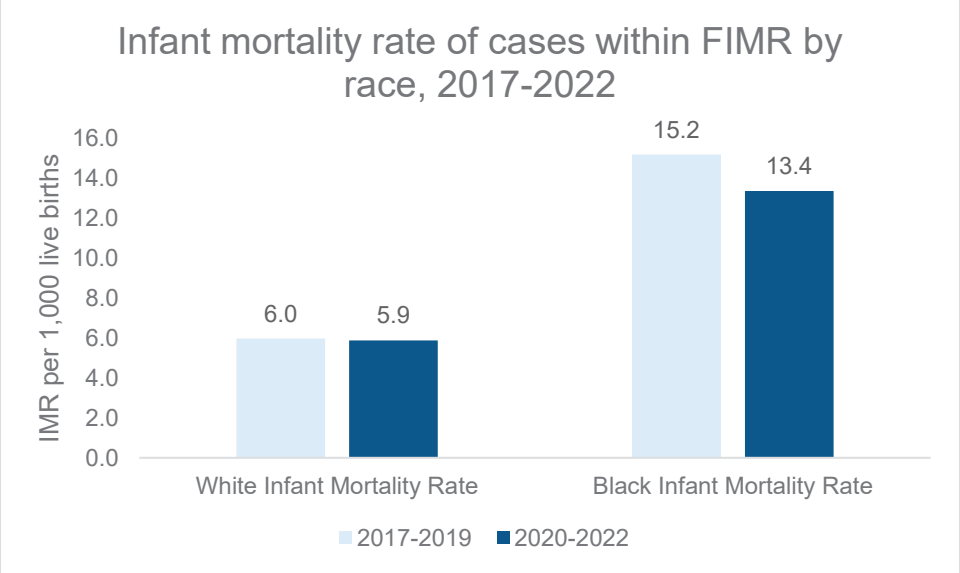


Figure 10. The Black infant mortality rate for infant cases within FIMR remains higher than their white infant peers. To calculate a reliable rate for Black infant mortality, a three-

[5] CDC National Vital Statistics Reports, Infant Mortality in the United States, 2023: Data from the Period Linked Birth/Infant Death File: https://www.cdc.gov/nchs/data/nvsr/nvsr74/nvsr74-07.pdf

year period from 2017-2019 and from 2020-2022 was combined and showed a recent decrease in rate.

Deaths by Age in Days

Neonatal: deaths occur during the first 27 days of life

- Early neonate: 0-6 days
- Late neonate: 7-27 days

Postneonatal: deaths occur between 28 and 365 days of life

Figure 11. Almost two out of three (62.7%) of all infant deaths for this period occurred in the first four weeks of life (neonatal period), and the remaining 37.8% in that postneonatal period between 28 and 365 days. Many of these deaths are infants who never left the hospital following birth—61.5% of all cases within FIMR are infants who did not.

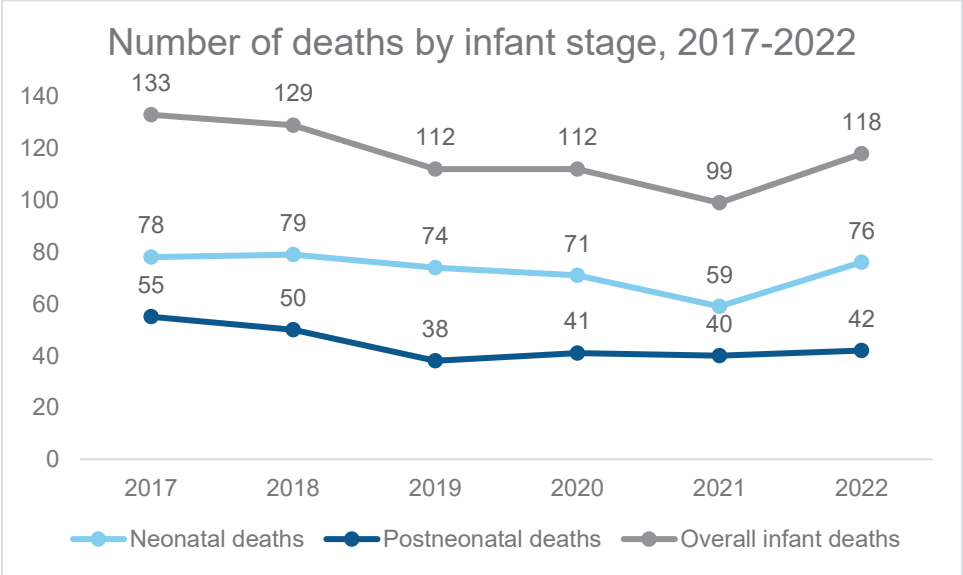


Figure 12. Neonatal deaths are consistently higher than postneonatal deaths.

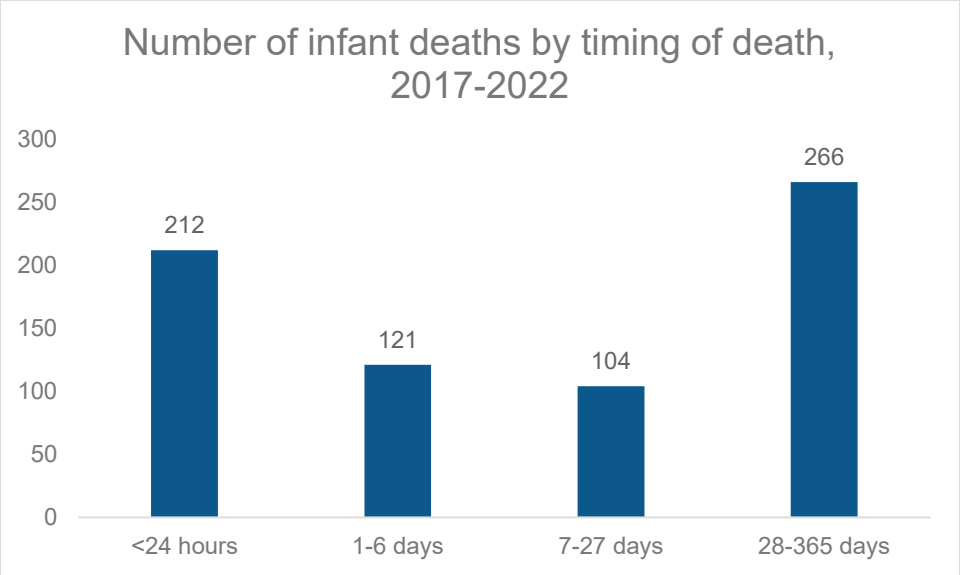


Figure 13. However, when neonatal deaths are differentiated between less than 24 hours, one to six days, and seven to 27 days, it becomes apparent that most of these deaths occur within those first 24 hours, most likely before an infant has left the hospital.

Manner of Death

Manner of Death was known for 93.0% (654 of 703 cases) of the infant deaths from 2017-2022, with the remaining 49 other cases missing records due to out-of-state deaths. Sometimes out-of-state records are not available to the abstractor for inclusion in panel review, which can make it harder for the panel to make determinations for the case.

Figure 14. Definition source: Centers for Disease Control and Prevention, Medical Examiners' and Coroners' Handbook on Death Registration and Fetal Death Reporting, 2003 Revision (latest) [accessed on 08/12/25: https://www.cdc.gov/nchs/data/misc/hb_me.pdf]

*Suicide is an additional Manner of Death category, however it is not included here because it is not a possible selection for infant death reporting.

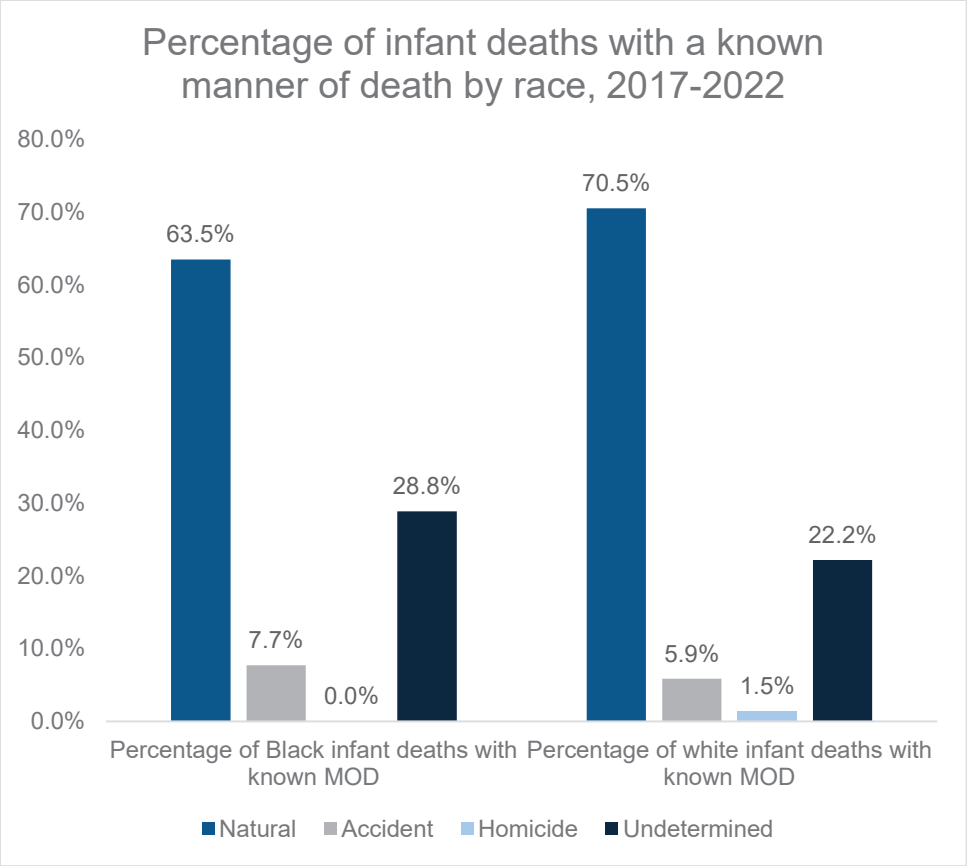


Figure 15. Graph showing distribution of manner of death for all known Black infant deaths (n= 52) and white infant deaths (n=546). Forty-nine cases of the 703 total cases did not have a manner of death assigned, most likely because they were out-of-state deaths and the records were unavailable to the case abstractors.

Causes of Death

Cause of death reporting within FIMR includes Vital Records-assigned diagnosis codes and is also categorized into four major categories: from an external cause of injury, from a medical condition, undetermined if injury or medical cause, and unknown. If from a medical cause or from an injury cause, the abstractor is then given a drop-down selection of more specific causes. For injury, these include motor vehicle accidents, drowning, asphyxia, etc., as well as an “undetermined” option and an “other” option. For medical causes, this includes 14 specific categories, an “other infection,” “other perinatal condition,” “other medical condition,” an “undetermined medical cause,” and an “unknown” option that then has a free-text field for specific information.

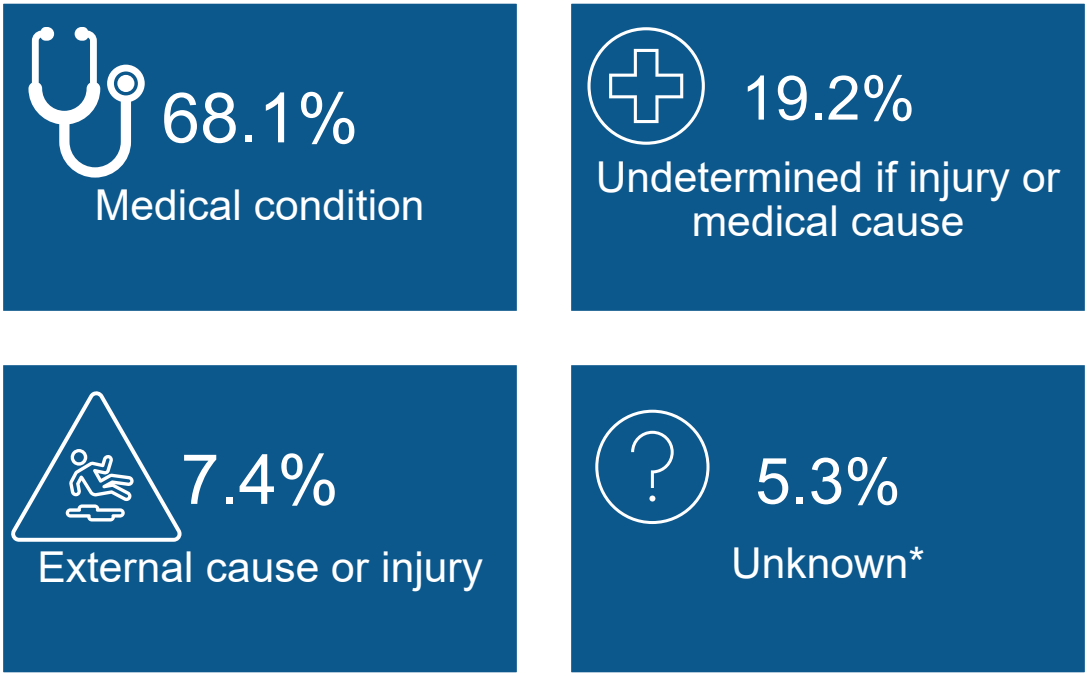


Figure 16. The majority of unknown deaths include cases where all the information is not available for abstraction to the panel to review, including cases where the infant was born and/or died out of state.

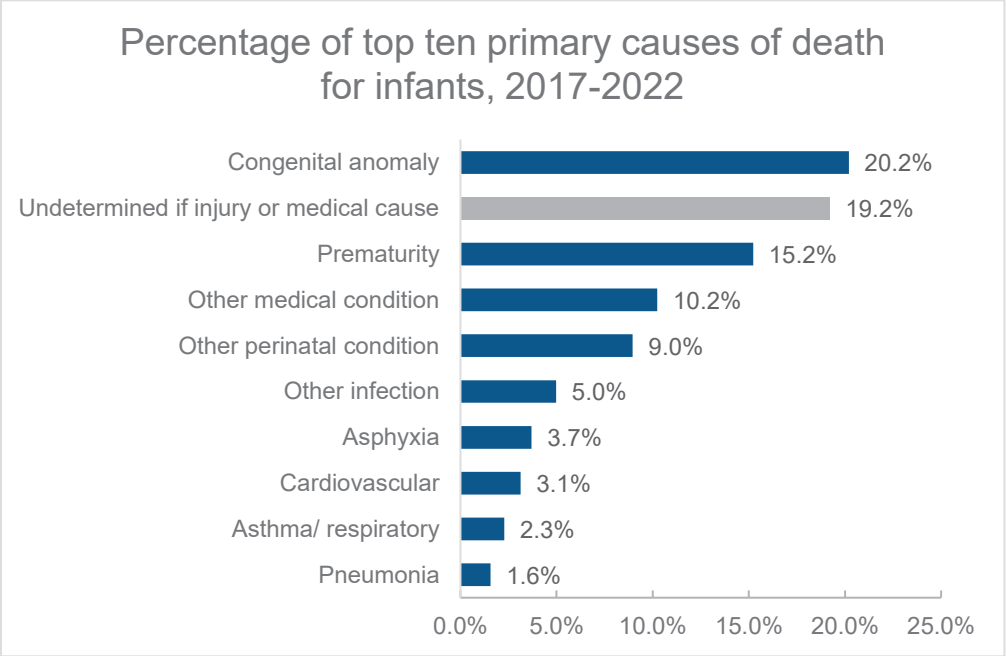


Figure 17. Top ten primary causes of death for infants from 2017 to 2022, accounting for 89.5% of infant deaths. “Undetermined if injury or medical cause” deaths are explored more fully below. Primary cause of death was unknown for 37 cases.

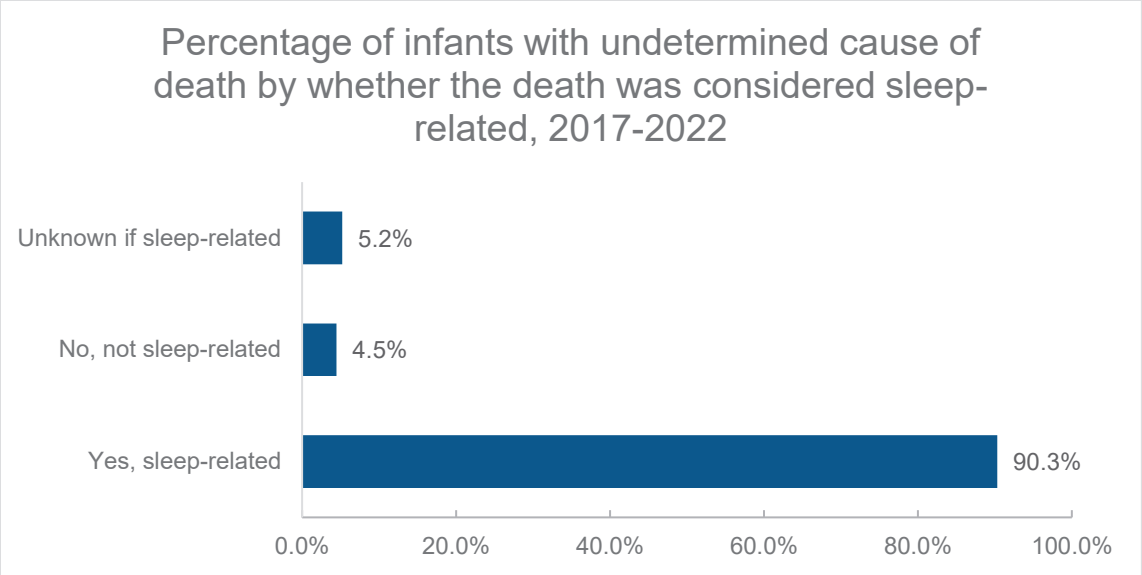


Figure 18. Most undetermined infant deaths are marked as related to sleep or the sleep environment (n=134); one case with cause of death listed as undetermined did not have sleep investigation record completed.

Sleep-Related Deaths

Of the 271 infant cases that left the hospital following delivery, 66.1% (179) of those were classified as sleep-related death, meaning that the infant death was related to sleep or the sleep environment regardless of the primary cause of death. All cases that had a known gestational age were at least 23 weeks or more, although 28.2% of all sleep-related cases were born preterm (before 37 weeks gestation).

Race (n=179)	Sleep-related deaths
Black	19
White	141
Multiracial	19

Table 2. Sleep-related death breakdown by race.

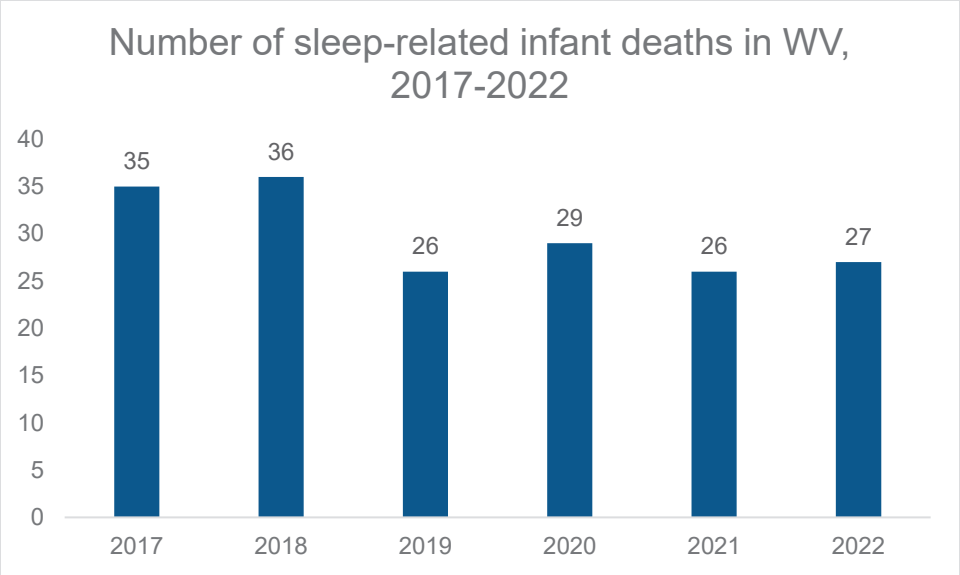
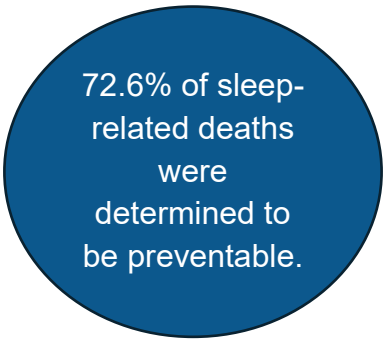


Figure 19. Number of infants who left the hospital and had a death classified as sleep-related per year. “Sleep-related” death in this investigation is defined as being related to sleep or the sleep environment.



Committee review determined 72.6% of these sleep-related deaths could probably have been prevented, 6.1% were determined to be not preventable, and 21.2% of the deaths the team could not determine preventability.

Of sleep-related deaths, in more than a quarter of cases the infant was born preterm (28.2%) or with low birthweight (26.1%). With almost all (93.8%) of these sleep-related deaths, the mother had at least one prenatal visit completed.

Manner of death for the sleep-related deaths included in this analysis include all infant-appropriate categories (excludes suicide): natural, accident, homicide, and undetermined; death investigation for these cases includes many details that help determine manner and cause of death.

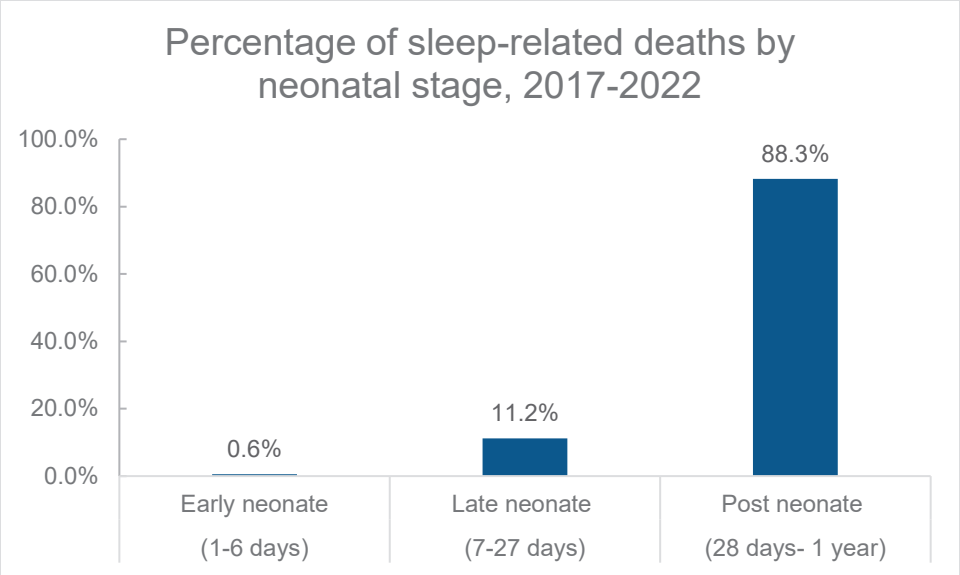


Figure 20. Almost all sleep-related deaths occur in the postneonatal stage.

Three in five (61.6%) of sleep-related infant deaths had documentation of secondhand smoke exposure in their death investigation (n=164). The same proportion (60.7%) were exposed to maternal smoking at some point during pregnancy (n=173).

Figure 21. Smoking during pregnancy or exposure to secondhand smoke after birth are both linked to increased risk for sleep-related death. While maternal e-cigarette use is not documented as frequently in these records- 33.5% of sleep-related cases are missing maternal information for e-cigarette use during pregnancy- the American Academy of Pediatrics cautions against their use as nicotine has been linked to sleep-related infant deaths.[6]

[6] American Academy of Pediatrics, Policy Statement, Seep-Related Infant Deaths: Updated 2022 Recommendations for Reducing Infant Deaths in the Sleep Environment: https://publications.aap.org/pediatrics/article/150/1/e2022057990/188304/Sleep-Related-Infant-Deaths-Updated-2022

Contributing Factors

Of infant deaths captured in FIMR from 2017 to 2022:

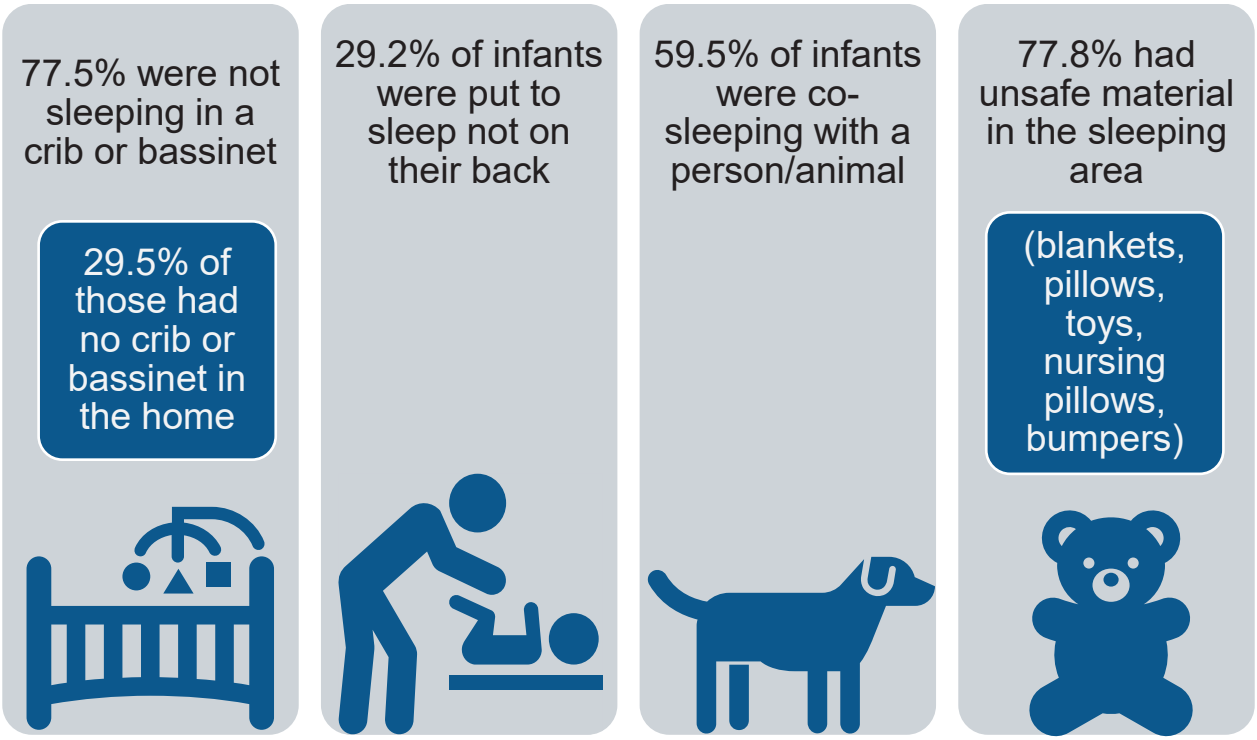


Figure 22. Contributing factors to sleep-related deaths, broken out by category.

More than three quarters (77.5%, n=173) of sleep-related deaths had an infant documented sleeping somewhere else besides a crib or bassinet. Of the cases with this information included (n=112), 29.5% were noted to have no crib or bassinet present in the home.

Of the sleep-related infant deaths, 29.2% (n=168) were known to have been put to sleep on their stomach or on their side.

More than half (59.5%, n=173) of these deaths had an infant documented sleeping on the same surface as a person or animal. About 10.4% (n=173) of sleep-related infant deaths involved an adult falling asleep while feeding an infant; this was evenly split between bottle and breast feeding.

Three in four infants (77.8%, n=171) were documented to have unsafe material in their sleep area, including blankets/other bedding, toys, pillows/cushions, clothes, bumper pads, U-shaped nursing pillows, and other items not recommended.

Case investigation and records indicate that in at least 11 cases the infant supervisor was impaired, either due to drugs (four cases), alcohol (two cases), or distraction (five cases).

Prevention

Deaths are considered preventable if there was a reasonable action by an individual or the community that could have changed the circumstances that led to the infant's death. The NCFRP encourages review panels to consider this broadly when deciding if a death was preventable.

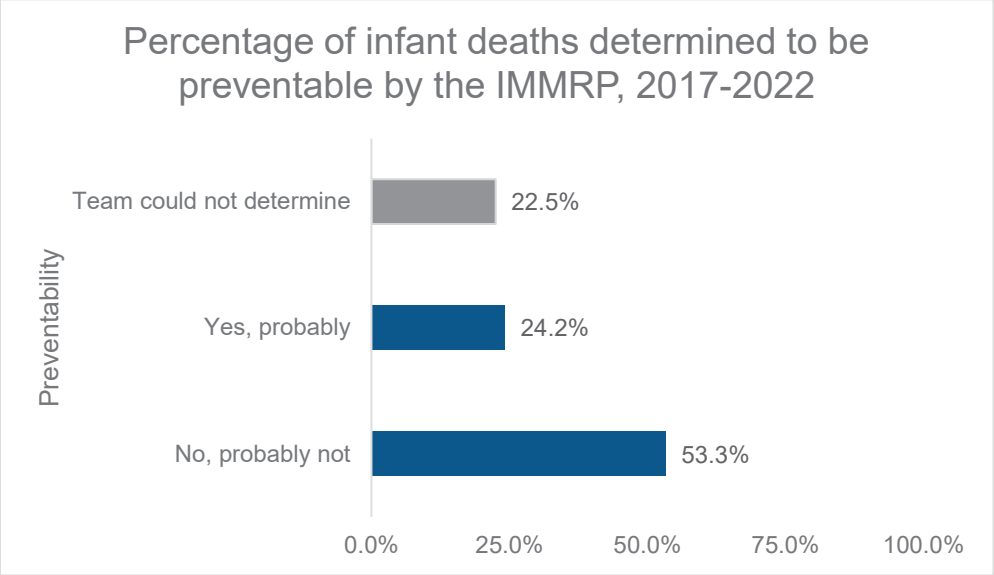


Figure 23. When looking at all infant deaths within FIMR, over half were determined to be not preventable (n=702).

However, when these deaths are separated by cause of death category, it becomes clear that certain causes of death have a much higher chance of prevention. Deaths due to external cause or injury were much more likely to be determined preventable by the Panel than those deaths due to medical conditions. It is also worth considering in the realm of public health what upstream factors can be addressed to prevent these deaths—deaths due to prematurity or low birthweight are difficult to prevent once the infant is born, however many maternal conditions that increase the risk of these can be the focus of public health interventions. Reducing chronic health conditions like diabetes, high blood pressure, or having obesity in the pregnant population, as well as reducing maternal tobacco, alcohol, or substance use are potential avenues to address these deaths. Other work would include increasing access to prenatal care for adolescent pregnancies and increasing Safe Sleep education to teenagers and their support system.

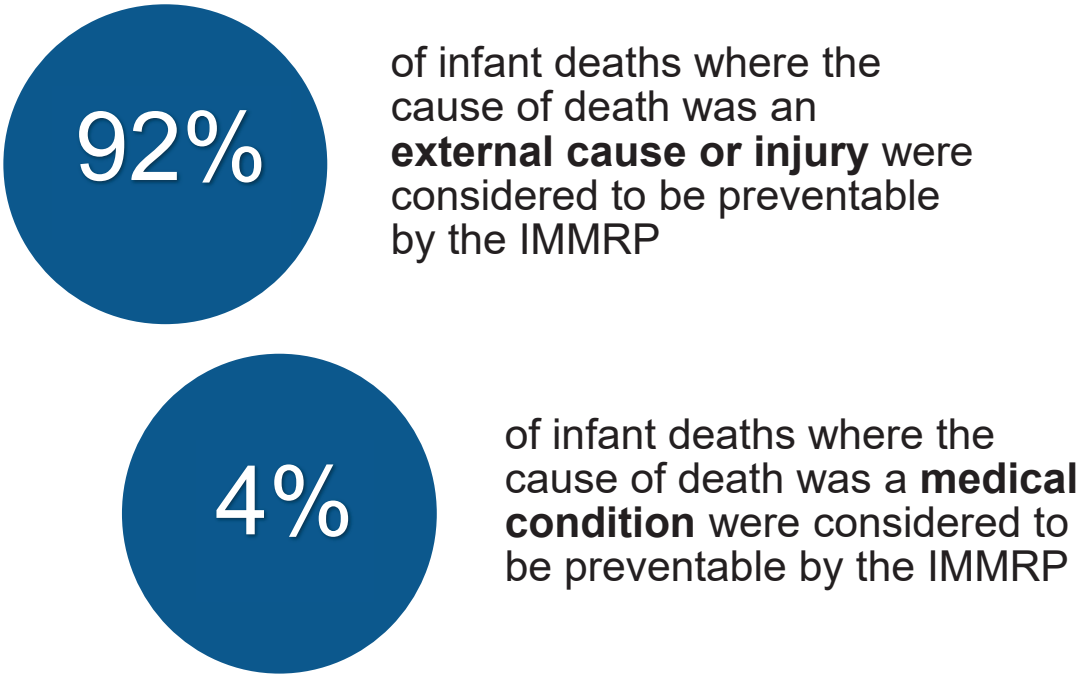


Figure 24. In general, deaths from medical conditions are determined to be not preventable, and deaths from external cause or injury are much more likely to be determined as preventable.

Mortality Review Committee Recommendations:

Recommendations are given for deaths that are seen as preventable in some way, at some level. This level can be among the family, the health care provider, the facility, the community, etc., and may include changes to practices, policies, and procedures, or may recommend the continuation of current prevention activities.

Most recommendations focus on maintaining and strengthening Safe Sleep education across all areas. This includes focusing on who gets the education, how the information is shared (web-based, paper materials, etc.), and how to reinforce the importance of Safe Sleep education with providers and facilities. Education outreach should focus on any potential caretaker, including fathers, grandparents, and extended family, and foster parents as well. Some families do not have a crib or bassinet, so the review panel proposed creation of a state program to provide bassinets to those who are unable to get one, to encourage following Safe Sleep principles.

Some recommendations focus on the health care provider and facilities. This can include evaluation of policies around a positive maternal drug screening and discharge of an

infant, including how safety protocols are implemented and followed, or more education for providers on when to call Child Protective Services.

Lastly, some recommendations focus on access to care. The review panel recommends promoting the use of telehealth as a viable alternative for lack of local obstetric care, which can be challenging in rural communities or if transportation is unavailable. They also recommend possibly having state-funded patient navigators for pregnant mothers in high-risk communities to help connect people with prenatal care, arrange transportation to appointments, educate on symptoms of preterm labor/preeclampsia/etc., and safe sleep training.

2022 Infant Deaths

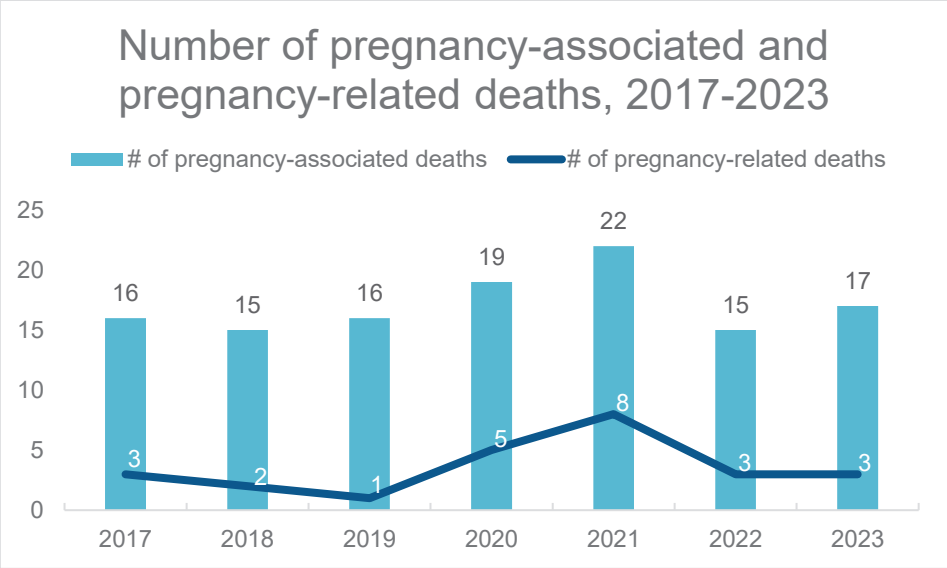
Demographics (N=118)	
Sex	
Male	66
Female	52
Age at time of death (days)	
Day of delivery	36
1-6 days	25
7-27 days	15
28- 1 year	42
Race/Ethnicity	
Asian	1
Black	9
White	105
Multiracial	3
Hispanic or Latino	5

Table 3. 2022 Infant Death Demographics.

Case details	
Never left hospital	75
Death sleep related? (n=113)	27
Committee determination on preventability	
No, not preventable	57
Yes, preventable	21
Team could not determine	40

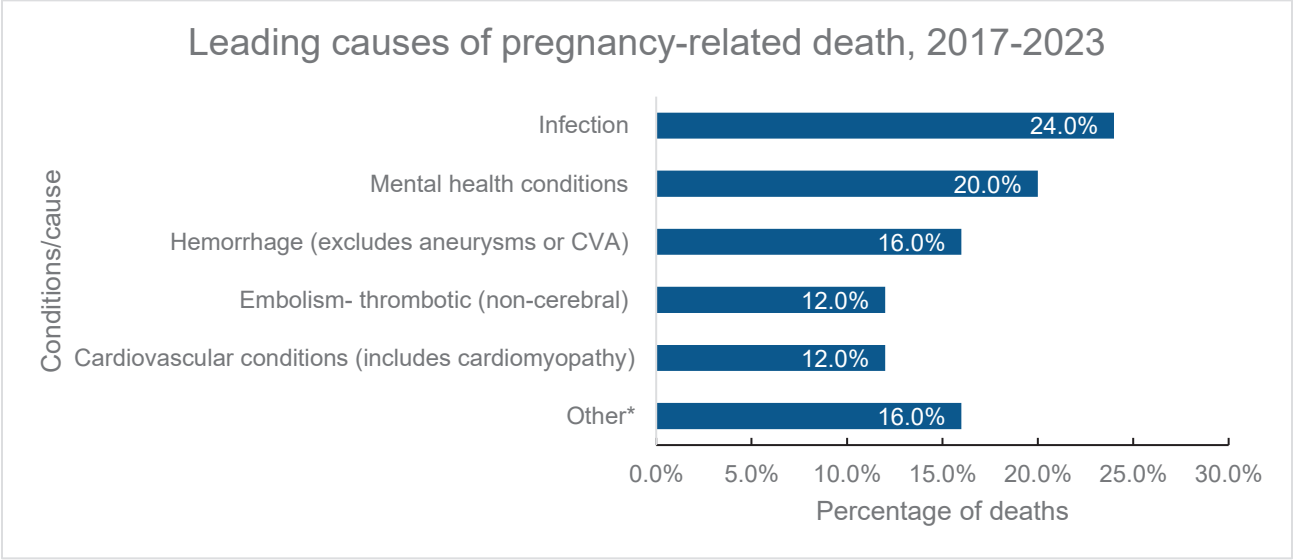
Table 4. 2022 Infant Death Case Details

Executive Summary for 2017-2023 Maternal Mortality Review



The Maternal Mortality Review Committee assessed all **pregnancy-associated** deaths among West Virginia (WV) residents for 2017 to 2023, which includes all deaths that occur during or within one year of pregnancy and determined if they were **pregnancy-related**. Pregnancy related deaths are those deaths that result from a pregnancy complication, a chain of events initiated by the pregnancy or the worsening of an unrelated condition by the physiological effects of pregnancy.

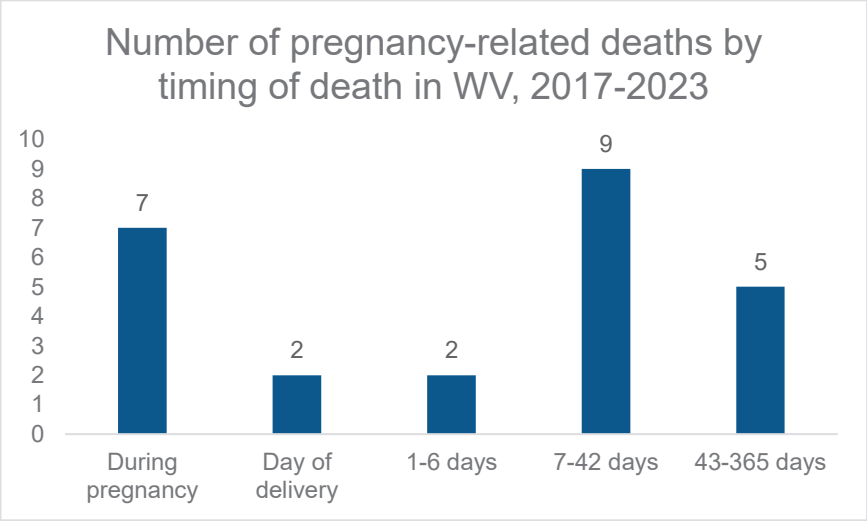
Leading causes of pregnancy-related death in WV for 2017 to 2023 include 1) infection (including COVID-19), 2) mental health conditions, and 3) hemorrhage (excluding aneurysms or cerebrovascular accident). Mental health conditions like depressive



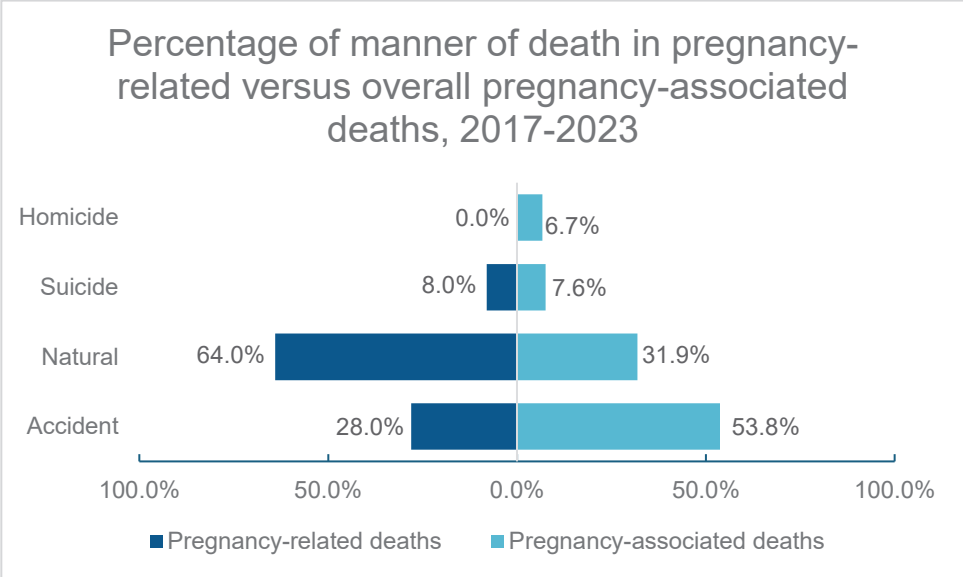
disorder or substance use disorder account for 20.0% of deaths, but some cases may have a different cause of death identified but still have mental health conditions or substance use as a contributing factor. The review committee determined that substance use disorder was a contributing factor in 40.0% of pregnancy related deaths during this

time, and other mental health conditions contributed to 20.0% of deaths. Other leading causes of death include one death classified as amniotic fluid embolism, one death of conditions unique to pregnancy, one death of injury, and one death from unknown cause of death. The top leading causes of death follows relatively closely to national trends published by the Centers for Disease Control and Prevention (CDC) for pregnancy-related deaths[1].

Most (36.0%) pregnancy-related deaths occurred in the period seven to 42 days after pregnancy conclusion, with the period during pregnancy having the second-most deaths (28.0%). Third highest is the period 43 days to one year after the end of pregnancy, representing 20.0% of pregnancy-related deaths.



West Virginia follows CDC guidance in expanding the eligibility to pregnancy-related deaths. By looking at up to a year postpartum and having subject matter experts determine pregnancy-relatedness, it allows for identification of deaths that are not just based on a diagnosis code, but social, economic, and behavioral factors contributing to death.



[1] Centers for Disease Control and Prevention, Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees: https://www.cdc.gov/maternal-mortality/php/data-research/mmrc/index.html

Maternal Multiyear Overview

Overview: 2017-2023 Maternal Fatality Review

This report includes analysis of the 2017-2023 pregnancy-associated deaths and an overview of the 2023 pregnancy-associated deaths. Combining several years together allows the team to see larger trends in the state during this span of time that cannot be seen in a single year of data because statistics become unreliable with smaller numbers.

The Infant and Maternal Mortality Review Panel Program

The WV Infant and Maternal Mortality Review Panel (IMMRP) is a piece of the WV Fatality and Mortality Review Team (FMRT) that includes a team of multidisciplinary experts that review infant and pregnancy-related deaths to understand why these deaths occurred, contributing factors, and whether the deaths could have been prevented. Within the WV Department of Health, Bureau for Public Health, Office of Maternal Child and Family Health (WVDH BPH OMCFH) there is an IMMRP Program that includes case abstractors, analysts, and a program director to facilitate this work and link it to federal maternal and infant health programming. Maternal death review procedures, resources, and training are provided to the state program through a CDC grant, Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM). States and other regions that participate in this work are categorized by the CDC as having Maternal Mortality Review Committees (MMRCs), and utilize the database MMRIA (this stands for Maternal Mortality Review Information Application, pronounced “Maria”), which is housed within the CDC. This database is a secure platform used to abstract cases and build a narrative of the maternal death for committee review. Case identification, abstraction, committee review, and analysis are conducted according to CDC guidance to standardize this process among all participating regions.

Case Eligibility

The Panel is responsible for meeting twice a year to review deaths that meet the eligibility criteria: women of childbearing age who were residents of WV at the time of their death who died either during pregnancy or within one year of being pregnant, regardless of the outcome of the pregnancy. All deaths that meet these criteria are **pregnancy-associated deaths**. The job of the Panel is to review these deaths and decide, based on evidence, whether the death was **pregnancy-related** (meaning the death was the result of a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy[2]), **pregnancy-associated but not -related** (death from a cause that is not related to pregnancy), or **pregnancy-associated but unable to determine pregnancy-relatedness**. Deaths that occurred outside WV are still eligible for review, however records from these other states may not

[2] Centers for Disease Control and Prevention, Maternal Mortality Review Committee Decisions Form v23

be available to case abstractors due to differences in state laws around data sharing. This may impact the reviewers' ability to determine if the death was pregnancy-related as well as other details. The case profile is a comprehensive picture built by program abstractors and may be from many different facilities and agencies and includes medical files, investigations, autopsy results if applicable, and other case-relevant details. Abstractors use this to create a de-identified case narrative that is presented to the Panel for review.

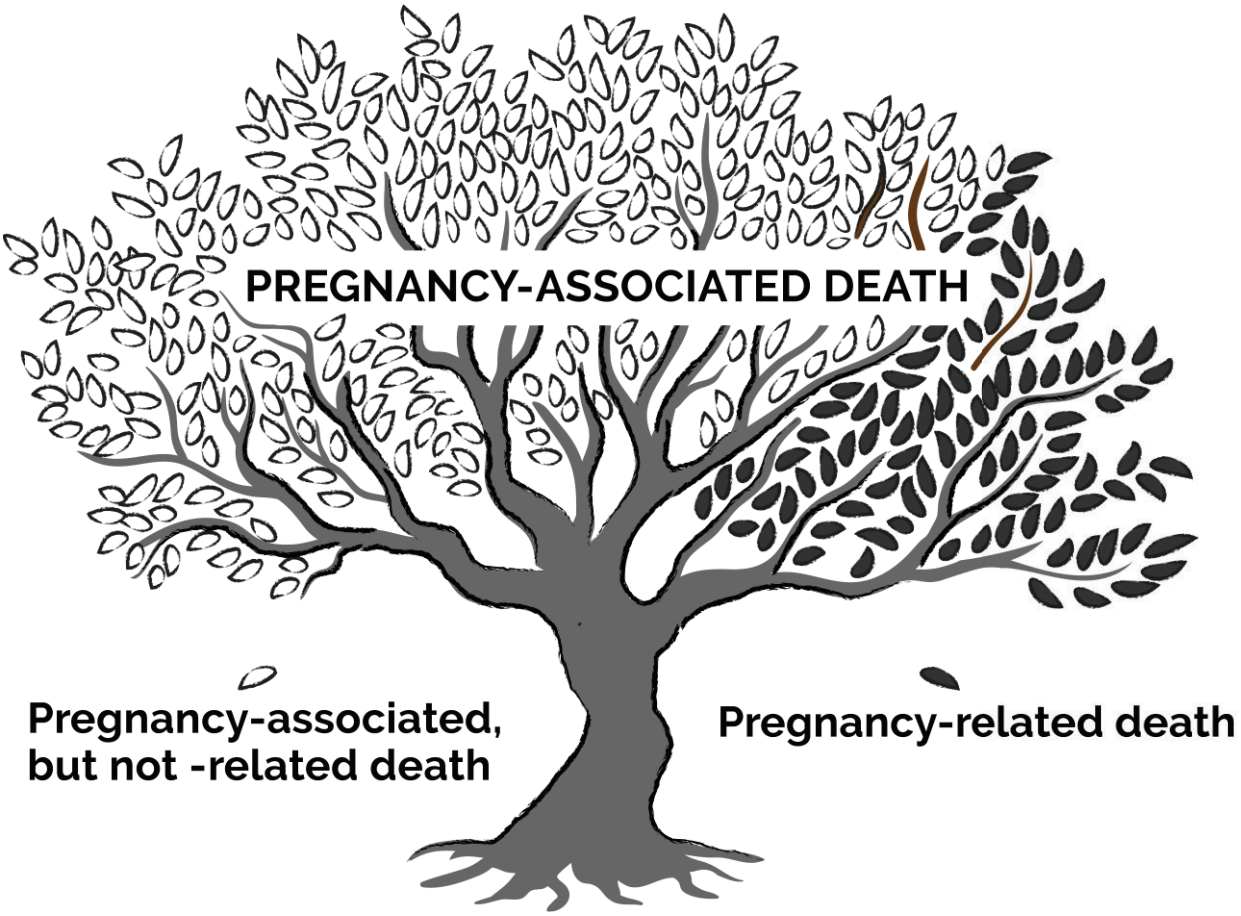


Figure 1. CDC ERASE MM

Case Review and Recommendations

Maternal death review panels are tasked with deciding six key pieces of a case[3]:

1. *Was the death pregnancy-related?*
2. *What was the cause of death?*
3. *Was the death preventable?*
4. *What factors contributed to the death?*

[3] CDC, About Maternal Mortality Review Committees https://www.cdc.gov/maternal-mortality/php/mmrc/index.html

5. *What are the recommendations to address those contributors?*
6. *What is the anticipated impact of those actions if implemented?*

Social and demographic information collected during record abstraction are included, so if the Panel decides it was a pregnancy-related death, they can also decide whether certain circumstances contributed to the death. This includes obesity, discrimination[4], mental health conditions, or substance use disorder. Decisions on the pregnancy-relatedness of a case, contributing factors, and committee recommendations are then recorded in MMRIA.

Case Analysis

Analysis of maternal mortality data in this report was exported from MMRIA and analyzed by the OMCFH IMMRP Program Epidemiologist using Microsoft Excel. All pregnancy-associated data and graphs in this report are limited to WV residents unless indicated otherwise. Live birth data, used for comparison with pregnancy-associated deaths as well as maternal mortality ratio calculation, were accessed from the CDC National Center for Health Statistics, National Vital Statistics System Natality files, housed on the CDC WONDER Online Database, and will be noted when used.

Small Number Reporting

West Virginia is a state with a relatively small population size and has an average of around 17 pregnancy-associated deaths per year. With smaller numbers, greater care must be taken in reporting deaths when linked to multiple characteristics or to smaller regional sizes (like zip code) to protect the identity of the individual. The WV IMMRP follows small number reporting guidance from CDC ERASE MM, where certain characteristics should not be reported out in combination, like county of residence and race. Additionally, when numbers are too small, calculated rates, ratios, and percentages are not included because they may be statistically unreliable. This report follows guidance from the CDC Maternal Mortality Prevention Team (MMPT):

- Rates/ratios: do not report if the numerator is less than eight
- Percentages: do not report if the denominator is less than 10.

In following these guidelines, some years of data do not allow for reporting out a maternal mortality ratio by year or reporting out a maternal mortality ratio by race or ethnicity. Some demographic characteristics cannot be reported out at all at this point in time. To show this data and to explore trends in maternal mortality data, multiple years are included in this analysis. Cases with full committee review and decisions are available for pregnancy-related deaths from 2017 to 2023, or seven years.

[4] Described by the CDC Maternal Mortality Review Committee Decisions Form v23: “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.”

Mortality Ratios

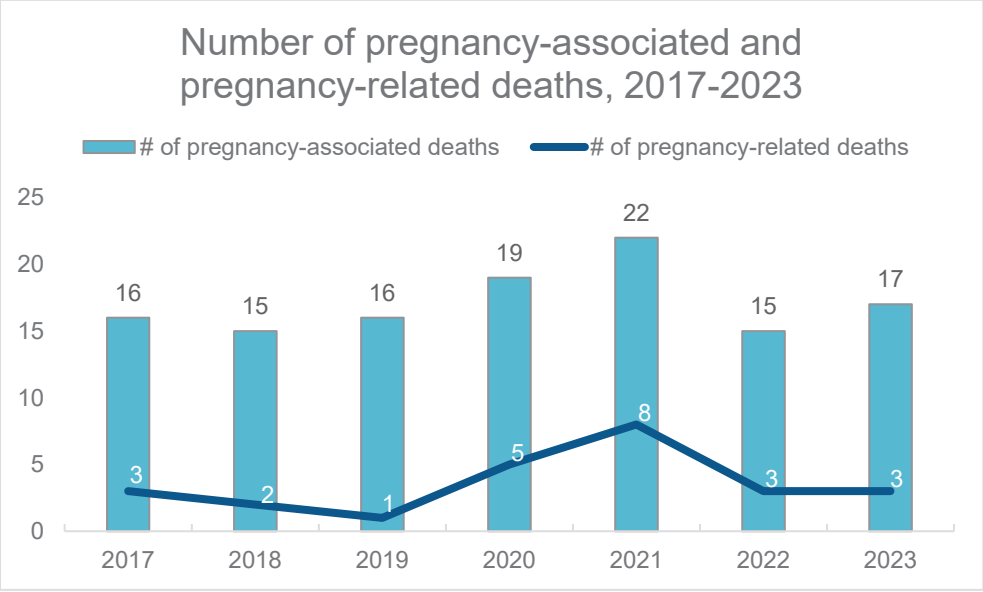
Pregnancy-associated mortality ratio (PAMR): the number of pregnancy-associated deaths per 100,000 live births among WV residents in a span of time.
Pregnancy-related mortality ratio (PRMR): the number of pregnancy-related deaths per 100,000 live births among WV residents in a span of time.

Example: There were 19 pregnancy-related deaths among WV residents reported from 2020 to 2023. During those years, there were 68,056 live births reported (CDC WONDER, Natality). The pregnancy-related mortality ratio for that time among WV residents is 27.9 deaths per 100,000 live births.

$$\text{PRMR: } \frac{Number\ of\ pregnancy\text{–}related\ deaths}{Number\ of\ live\ births} \text{ x } 100{,}000$$

Pregnancy-Associated and Pregnancy-Related Deaths Overview

Like many other states, WV is seeing a decrease in the birth rate. Also, several long-term trends are co-occurring, including women giving birth more frequently later in life[5], an increase in substance use disorder[6], and an increase in chronic health conditions that can threaten the health of the mother[7]. Additionally, the way pregnancy-associated deaths are identified has changed, such as the addition of the pregnancy checkbox on the death certificate. This increases the likelihood a pregnancy-associated death is captured within MMRIA.



[5] ACOG, Pregnancy at Age 35 Years or Older: https://www.acog.org/clinical/clinical-guidance/obstetric-care-consensus/articles/2022/08/pregnancy-at-age-35-years-or-older
[6] CDC, Substance Use During Pregnancy: https://www.cdc.gov/maternal-infant-health/pregnancy-substance-abuse/index.html
[7] March of Dimes, Chronic health conditions and pregnancy: https://www.marchofdimes.org/find-support/topics/planning-baby/chronic-health-conditions-and-pregnancy

Figure 2. WV pregnancy-associated and pregnancy-related deaths followed the national trend of seeing higher numbers around 2020 and 2021. This short-term bump is likely because of several factors, notably the COVID-19 pandemic[8] and the increase in fatal overdoses observed in those years[9].

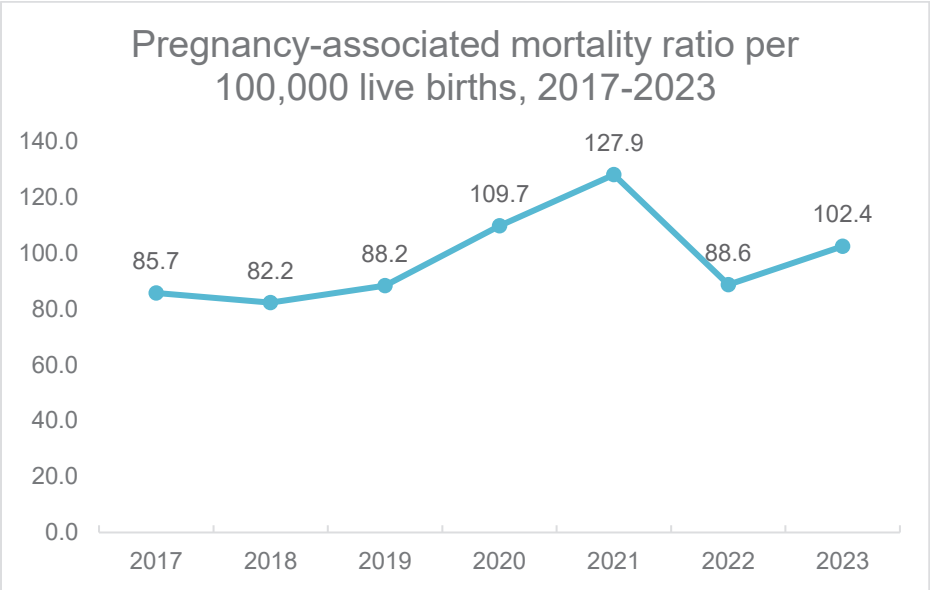


Figure 3. In addition to the increase in fatal drug overdoses and deaths due to COVID-19, the number of live births in 2020 and 2021 for WV residents were also lower than previous years, making the ratio increase more noticeable.

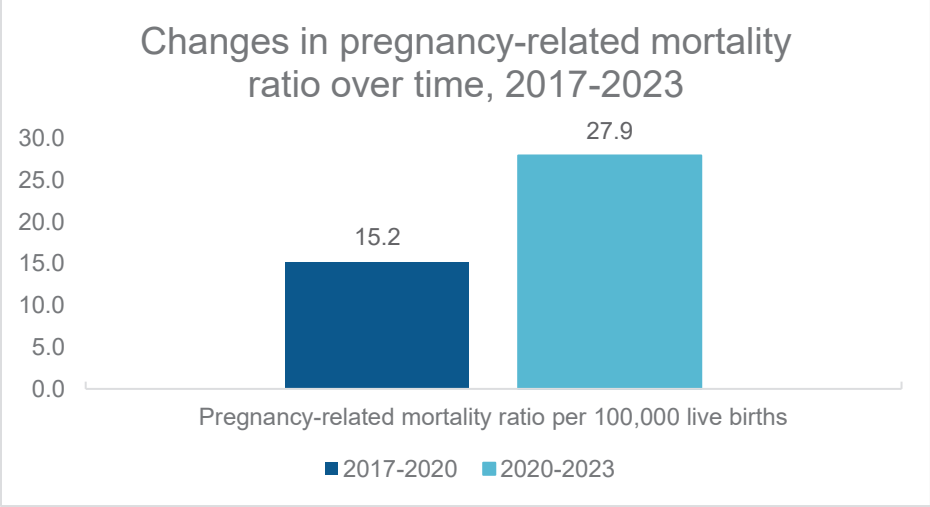


Figure 4. The pregnancy-related mortality ratio for each year in WV cannot be reported due to small numbers, but using two periods of equal time shows a larger, more reliable ratio. Calculating the PRMR shows that the period from 2020 to 2023 had a higher PRMR than from 2017 to 2020. While both time periods overlap the emergence of the COVID-

[8] US Government Accountability Office Report: https://www.gao.gov/products/gao-23-105871
[9] AJPH, Jay et al: https://ajph.aphapublications.org/doi/10.2105/AJPH.2024.307618

19 pandemic in 2020, 2020-2023 has more pandemic-affected years. The COVID-19 vaccine became more accessible to pregnant women in 2021, with the American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine (SMFM) publishing recommendations for pregnant individuals to be vaccinated in July 2021.[10]

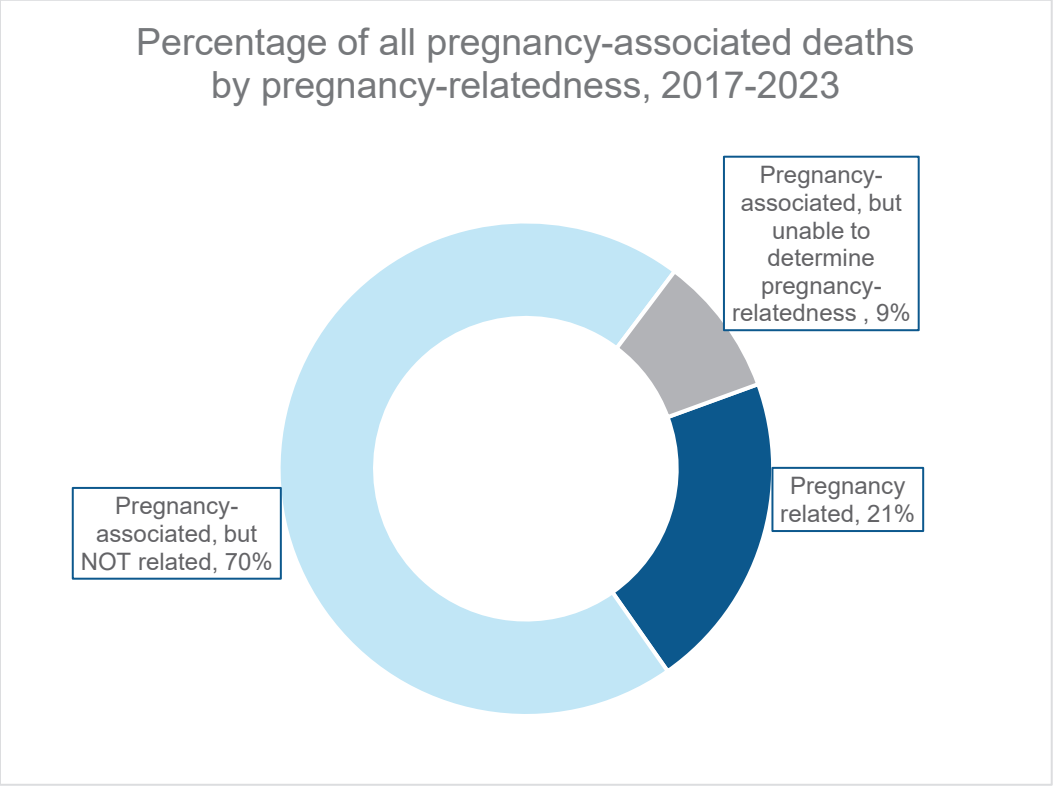


Figure 5. The pregnancy-relatedness of a death is determined by the WV IMMRP, based on the case narrative provided to reviewers from record abstraction.

[10] ACOG and SMFM Recommend COVID-19 Vaccination for Pregnant Individuals: https://www.acog.org/news/news-releases/2021/07/acog-smfm-recommend-covid-19-vaccination-for-pregnant-individuals

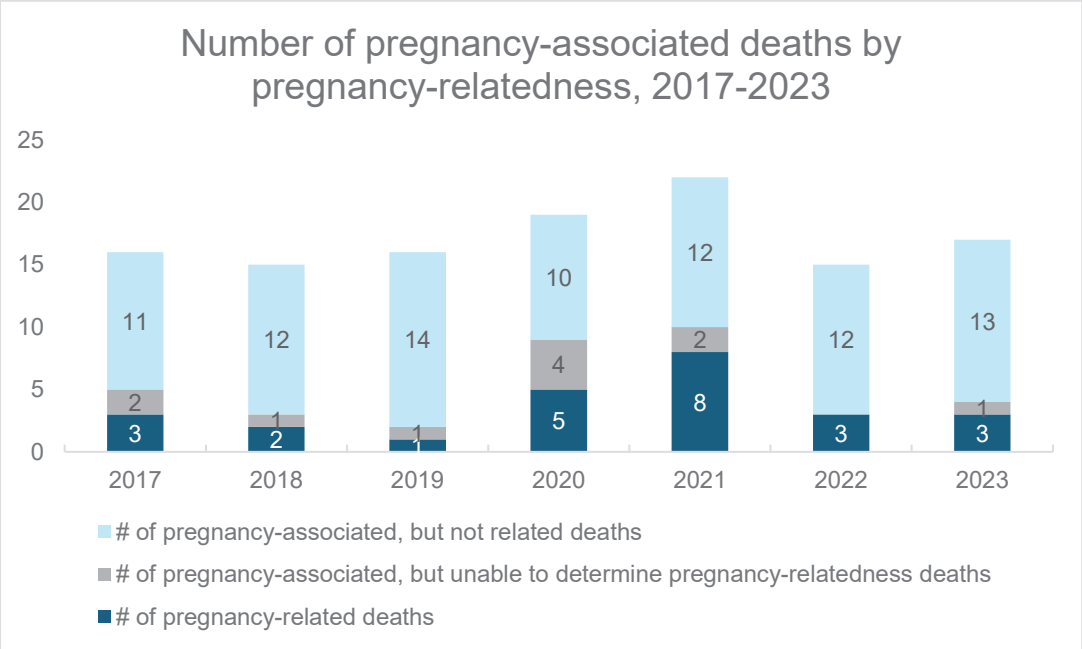


Figure 6. Sometimes it is difficult for reviewers to decide the degree of pregnancy-relatedness of a death. This can be because of incomplete records available, an especially complicated case, or other reasons. Additionally, the CDC Maternal Mortality Review Committee Decisions Form has changed over time, and very recently provided reviewers additional guidance in ways suicide or unintentional overdose may be considered pregnancy-related. Of the 11 deaths with undetermined pregnancy-relatedness during this time, the Panel indicated in many of them that substance use disorder contributed to the death.

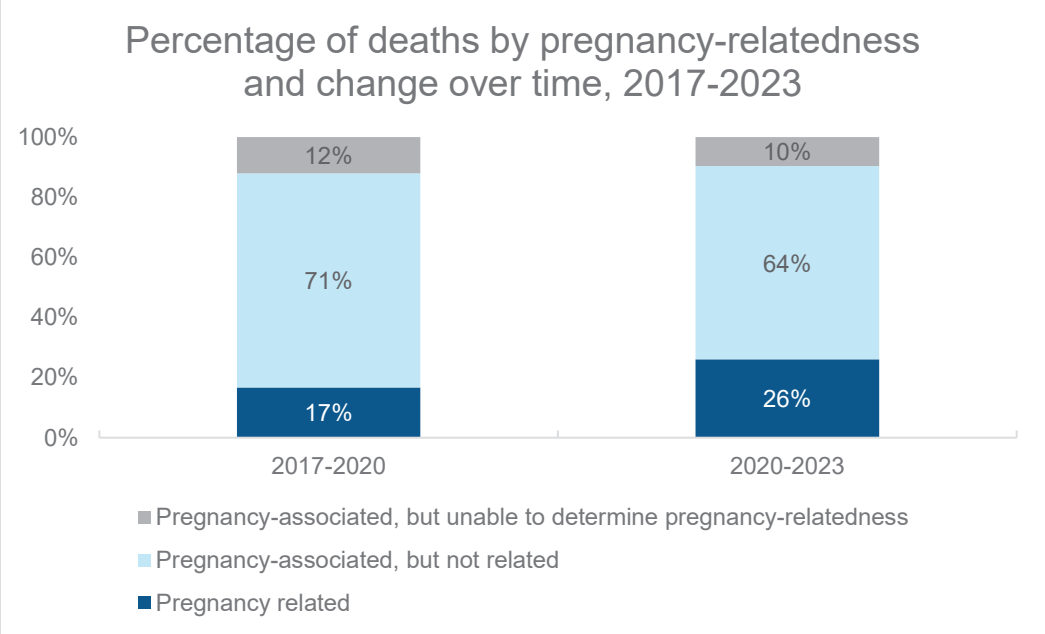


Figure 7. The more recent time period of 2020 to 2023 shows a higher percentage of deaths determined to be pregnancy-related by the WV IMMRP.

Manner of Death

There are five main categories for manner of death—natural, accident, suicide, homicide, and undetermined. The CDC Medical Examiners' and Coroners' Handbook on Death Registration and Fetal Death Reporting defines them as such[11]:

Natural
"due solely or nearly totally to disease and/or the aging process."

Accident
"there is little or no evidence that the injury or poisoning occurred with intent to harm or cause death. In essence, the fatal outcome was unintentional."

Suicide
"results from an injury or poisoning as a result of an intentional, self-inflicted act committed to do self-harm or cause the death of one's self."

Homicide
"occurs when death results from [an injury or poisoning or from] a volitional act committed by another person to cause fear, harm, or death. intent to cause death is a common element but is not required..."

Undetermined
"used when the information pointing to one manner of death is no more compelling than one or more other competing manners of death when all available information is considered.''

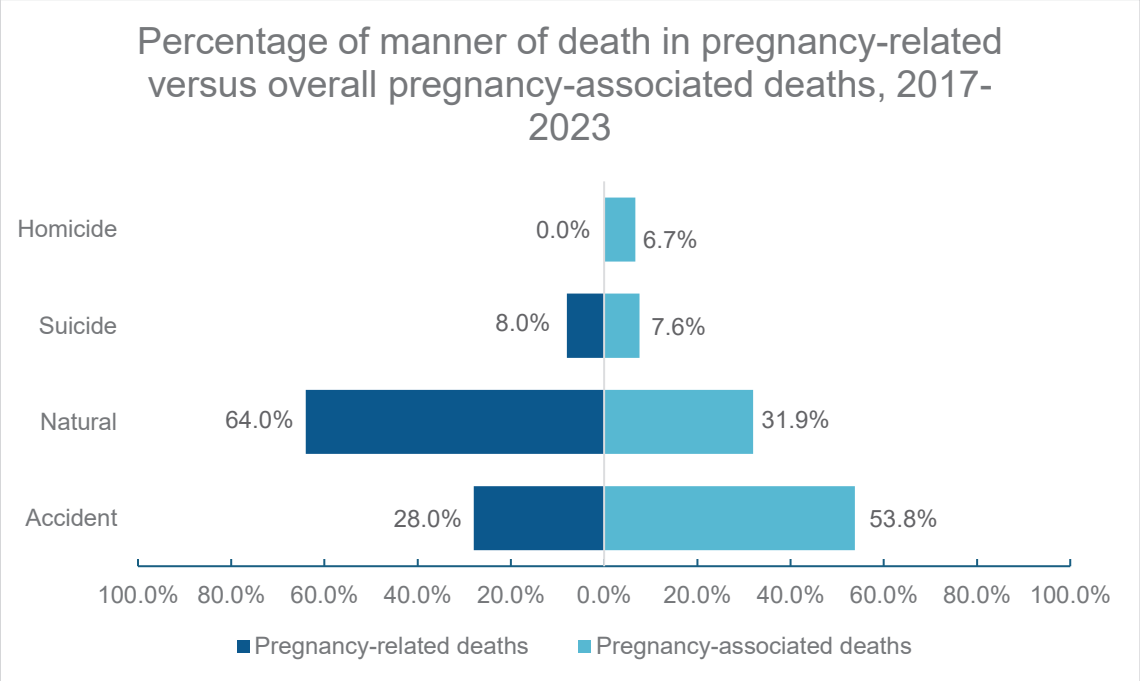


Figure 8. Manner of death for pregnancy-associated deaths (n=119; one record had missing data). This graph shows how the manner of death for 25 pregnancy-related deaths and 119 pregnancy-associated deaths with known manner are distributed

[11] CDC, Medical Examiners' and Coroners' Handbook on Death Registration and Fetal Death Reporting: https://www.cdc.gov/nchs/data/misc/hb_me.pdf

differently. Notably, pregnancy-related deaths see a much higher percentage of natural deaths versus the larger group of pregnancy-associated deaths.

Leading Causes of Pregnancy-Related Deaths

Once a death is determined to be pregnancy-related by the Panel, the reviewers also assign a leading cause of pregnancy-related death. This may not match the underlying cause of death documented on the death certificate, as it is decided by the multidisciplinary review committee and uses the CDC Pregnancy Mortality Surveillance System (PMSS) coding system, which was developed by CDC and ACOG's Maternal Mortality Study Group to standardize grouping.

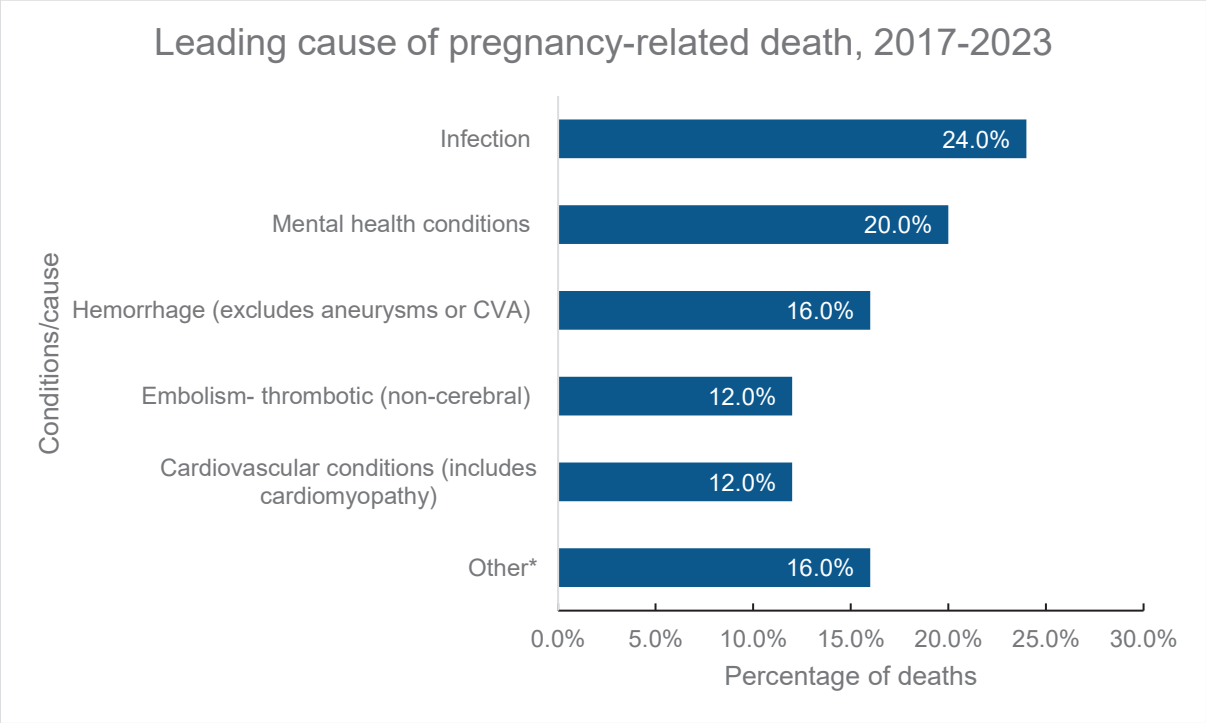
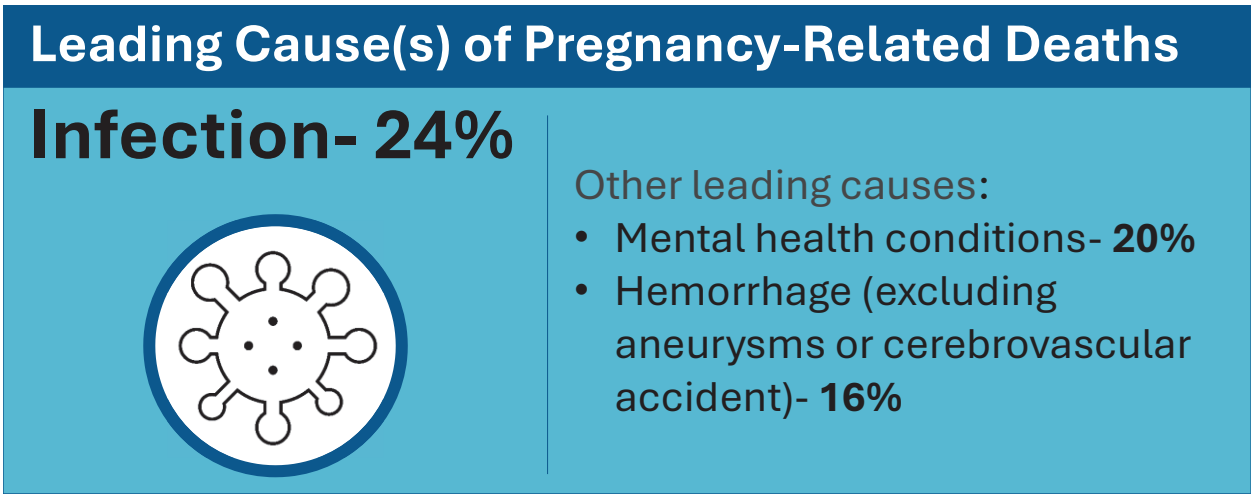


Figure 9 *Other leading causes of death include one death classified as amniotic fluid embolism, one death of conditions unique to pregnancy, one death of injury, and one death from unknown cause of death.

The categories for the above chart are groups of specific causes of death codes that are sorted according to the PMSS coding. Sorting these individual codes into overarching categories allows for small numbers to still show trends in causes of death. As an example, mental health conditions as a category is made up of several codes, including depressive disorder, anxiety disorder, bipolar disorder, psychotic disorder, substance use disorder, and other psychiatric conditions/not otherwise specified. The top three leading causes of death were infection; mental health conditions; and hemorrhage, excluding aneurysms or cerebrovascular accident (CVA, also known as a stroke). This generally

matches the national trend, highlighting that from 2017 to 2021 the top four categories were mental health conditions, infection, cardiovascular conditions, and hemorrhage[12].



Infection

From 2017 to 2023, six of 25 (24.0%) pregnancy-related deaths were due to infection. The most common individual cause among that group was COVID-19, representing four deaths. The other two deaths include sepsis/septic shock and other infection/not otherwise specified. National MMRC data for 2020 and 2021 also reflect COVID-19 as one of the largest causes of pregnancy-related deaths.

Mental Health Conditions

From 2017 to 2023, five of the 25 pregnancy-related deaths were due to mental health conditions. Three of those had a leading cause of pregnancy-related death listed as substance use disorder, and two were listed as depressive disorder. In 2020, more specific mental health conditions were added to the MMRIA Committee Decisions Form, and the current form includes a flowchart for reviewers to code underlying cause of death for suicide and overdose, as well as an additional document developed in 2023 for reviewers to guide deciding pregnancy-relatedness for suicide and unintentional

[12] CDC, Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees: https://www.cdc.gov/maternal-mortality/php/data-research/mmrc/index.html

overdose[13]. Based on this guidance, more deaths may be classified in the future as pregnancy-related that would not have been previously. Examples of hypothetical situations that would now be determined as pregnancy-related:

- if an individual was unable to access addiction or mental health treatment due to pregnancy
- if an individual had decreased their drug use during pregnancy only to relapse and overdose due to decreased tolerance after pregnancy concluded
- if an individual had pre-existing mental health conditions that increased in severity in the postpartum period leading to suicide

While there are currently not enough cases to look at pregnancy-related deaths and overdose mortality, pregnancy-associated deaths show a pattern similar to the overall population of WV residents. This includes the spike of overdose deaths around 2020 and 2021, associated with the COVID-19 pandemic. Several reasons for this increase include heightened stress and anxiety, unemployment or financial distress, increased social isolation, interruption of service or missing intervention opportunities, and others[14].

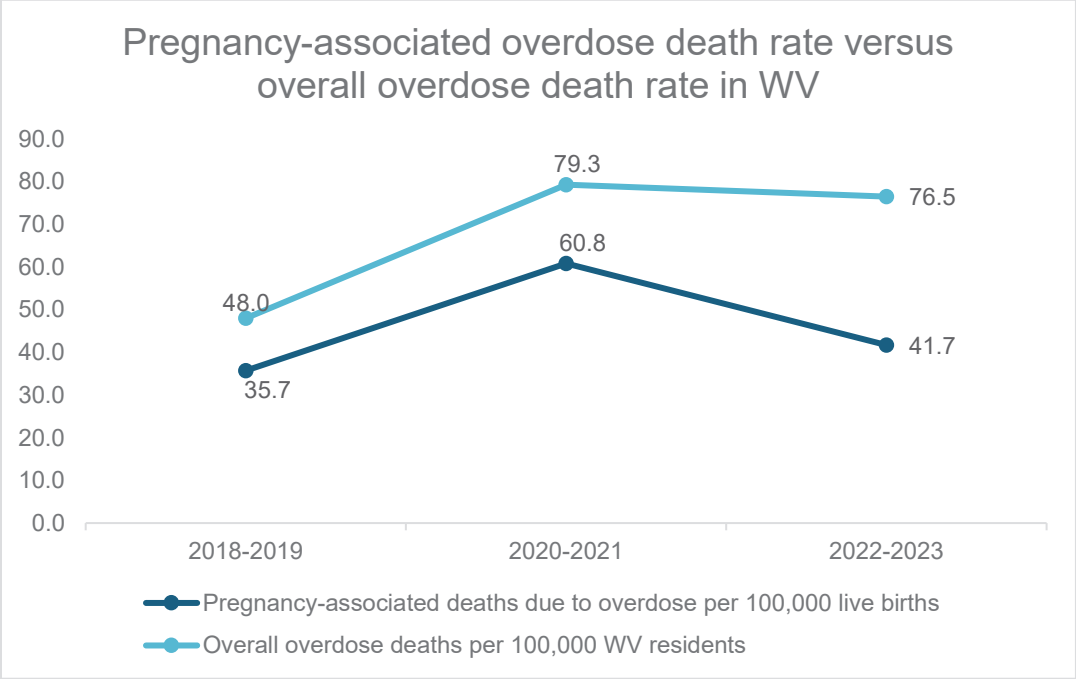


Figure 10. Pregnancy-associated deaths are classified based on diagnosis codes present on the death certificate included in the MMRIA file and are per 100,000 live births. Overall, overdose deaths are based on diagnosis codes present and are per 100,000 WV residents; the rate is the crude rate (not age-adjusted). Diagnosis codes for inclusion of

[13] Arch Womens Ment Health, Smid et al.: https://pmc.ncbi.nlm.nih.gov/articles/PMC11000257/
[14] CDC, State Unintentional Drug Overdose Reporting System Report: https://www.cdc.gov/overdose-prevention/media/pdfs/SUDORS-Data-Brief-2.pdf

both are X40-44, X60-64, X85, and Y10-14[15]. Overdose death data for the overall resident population are from the CDC National Center for Health Statistics, National Vital Statistics System, Mortality files on the CDC WONDER Online Database.

Timing of Death

While the majority of pregnancy-related deaths (56.0%) occurred at least one week after delivery, 28.0% of deaths occurred during pregnancy. This is very different from the timing of death for the overall group of pregnancy-associated deaths, where 61.0% of deaths with known timing of death relative to pregnancy (n=118) were 43 days to a year after pregnancy conclusion. There are not enough pregnancy-related cases to establish a pattern regarding pregnancy-related cause of death and the timing of death at this time.

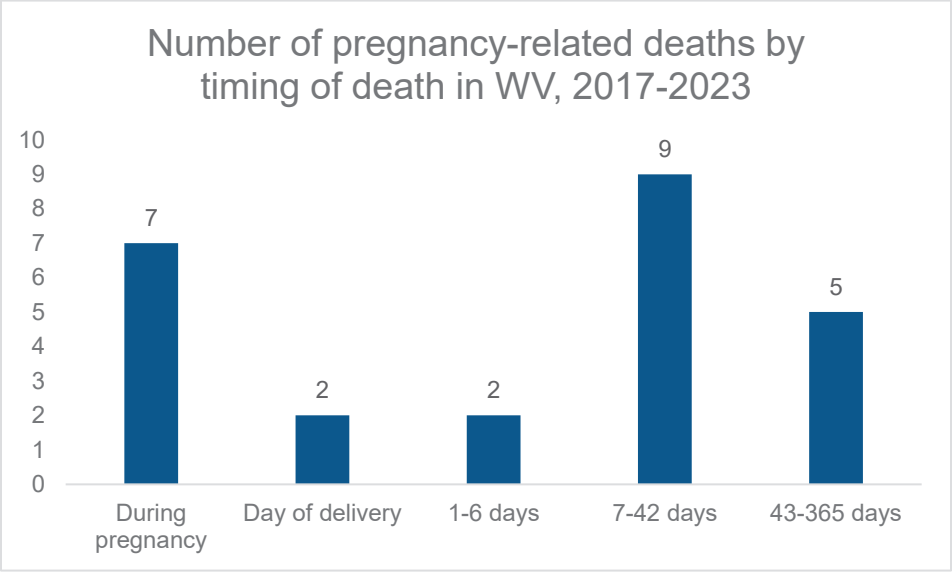
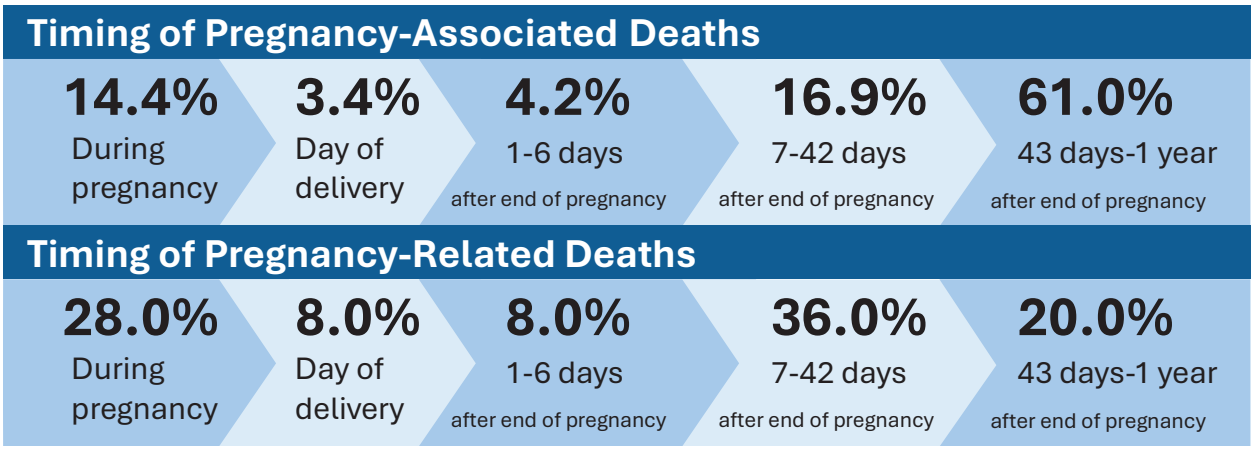


Figure 11. Most pregnancy-related deaths occurred in the period seven to 42 days after pregnancy conclusion. The second deadliest time period was during pregnancy.



[15] CDC, National Center for Health Statistics, National Vital Statistics System, Provisional Drug Overdose Death Counts: https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm

Demographics

Maternal Age

From 2017 to 2023, the US and WV both saw a declining birth rate. The number of live births have been decreasing in the state each year. The percentage of all births that were to teen mothers in WV was 12.3% in 2003 and saw a decrease of over 50% by 2023. In fact, the percentage of total births by women less than 25 years of age has been steadily decreasing since 2017, while increasing for women 25 years of age and older. One thing to note with this trend is that older maternal age is associated with a higher risk of adverse pregnancy outcomes[16]. In WV, although individuals aged 30 to 34 represent less than a quarter of live births, they make up the largest portion of pregnancy-related deaths.

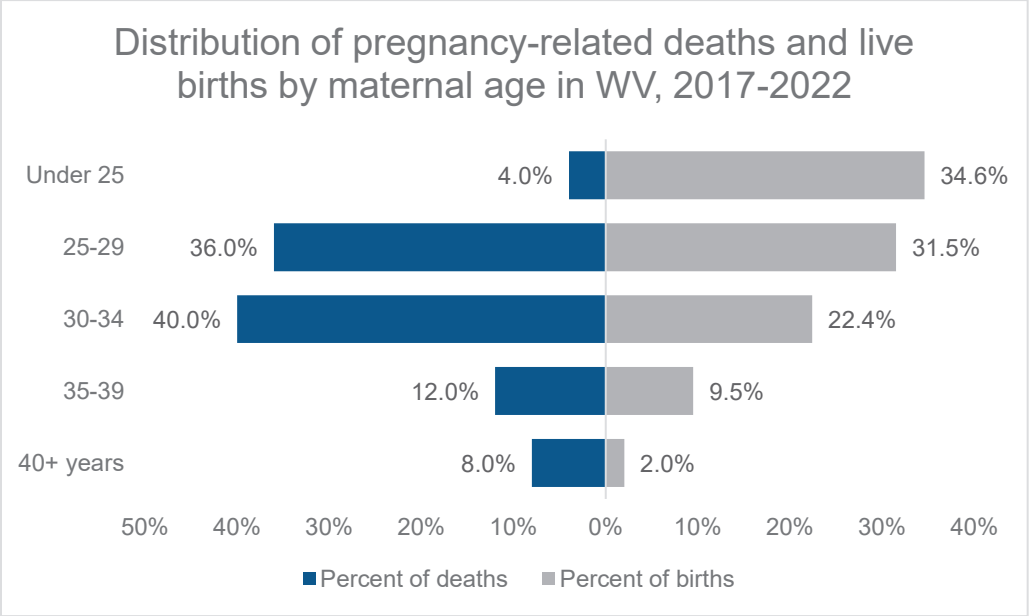


Figure 12. Pregnancy-related deaths and live births by maternal age

Race

It is difficult to provide analysis on pregnancy-related mortality by race using single year data because of privacy restriction and data reliability around small numbers. Examining data from 2017 to 2023, of the 25 pregnancy-related deaths, two were recorded as Black. While this does not meet the threshold for reporting a pregnancy-related mortality ratio (less than eight), this does represent 8% of pregnancy-related deaths in WV during this time. This is disproportionate to the percentage of live births to Black mothers during that same time.

Black women represented 8.0% of pregnancy-related deaths compared to 3.6% of live births.

[16] ACOG, Pregnancy at Age 35 Years or Older: https://www.acog.org/clinical/clinical-guidance/obstetric-care-consensus/articles/2022/08/pregnancy-at-age-35-years-or-older

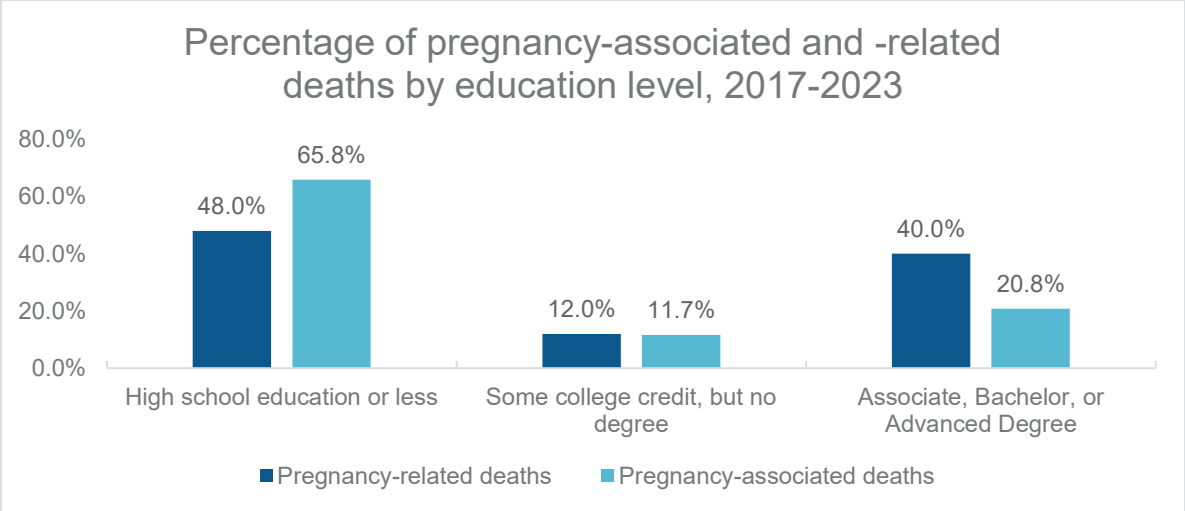
Maternal Race	Number of pregnancy-associated deaths	Number of pregnancy-related deaths
Black	4	2
White	111	23
Multiracial	2	0
Unknown	3	0

Table 1. Pregnancy-associated and -related deaths by race 2017-2023

This is similar to national MMRC data that is available for 2021. Of all the pregnancy-related deaths reviewed by MMRCs in 2021, non-Hispanic Black individuals were overrepresented in pregnancy-related deaths. According to the CDC and based on national data, Black mothers are three times more likely to die from a pregnancy-related cause than White mothers[17].

Education Level

Many pregnancy-associated and pregnancy-related deaths had a high school education or less (65.8% and 48.0%, respectively). Enrollment in higher education (any level after 12th grade, including certificate programs, two-year college programs or higher) is seen as a positive indication of expanded employment potential, higher income level, and improved health and well-being[18]. Education and other factors like income and occupation are often used in public health to determine an individual's socioeconomic status, which can be used to help inform a group's relationship to certain health behaviors like smoking.[19]



[17] CDC, Working Together to Reduce Black Maternal Mortality: https://www.cdc.gov/womens-health/features/maternal-mortality.html

[18] US Department of Health and Human Services, Healthy People 2030, Enrollment in Higher Education: https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/enrollment-higher-education

[19] CDC, Socioeconomic Differences in Cigarette Smoking Among Sociodemographic Groups: https://www.cdc.gov/pcd/issues/2019/18_0553.htm

Figure 13. *Percentages for pregnancy-associated deaths may not add up to 100.0% because of missing records for two individuals (n=118).

Insurance Type

Analysis by insurance status can be difficult for pregnancy-associated and especially pregnancy-related deaths. Insurance status is documented several times in the MMRIA record, including during prenatal visits and during delivery. Some deaths will not have prenatal insurance status because the individual died before they knew they were pregnant, or they did not seek prenatal care. However, considering that more than one in four pregnancy-related deaths occurred during pregnancy, that information may not apply to those deaths. Sometimes a death while the person is still pregnant results in a delivery, and insurance status during delivery is recorded on the birth/fetal death certificate. Other deaths, such as early in the pregnancy or an ectopic pregnancy, do not result in a birth/fetal death certificate.

Delivery payer	Count (n=22)	Percentage (%)**
Private Insurance	6	27.3%
Medicaid	14	63.6%
Self-Pay	1	4.5%
Other	0	0.0%
Unknown	1	4.5%

Table 2. Pregnancy-related deaths and principal source of payment for this delivery. Three pregnancy-related deaths are excluded where the individual was pregnant at the time of death and there was no delivery.
**Percentages may not add up to 100.0% due to rounding.

Pregnancy-Related Deaths and Contributing Factors

For every pregnancy-related death reviewed, reviewers also decides whether there were certain circumstances that contributed to the death. Four questions are asked:

- Did **obesity** contribute to the death?
- Did **discrimination** contribute to the death?
- Did **mental health conditions,** other than substance use disorder, contribute to the death?
- Did **substance use disorder** contribute to the death?

For each of these, the potential selections are “yes,” “probably,” “no,” and “unknown.” Selections are based on the extensive case narrative built by abstractors for each death. Per CDC, discrimination covers an individual’s group, class, or category they belong to and can manifest as differences in care, clinical communication and shared decision-making.

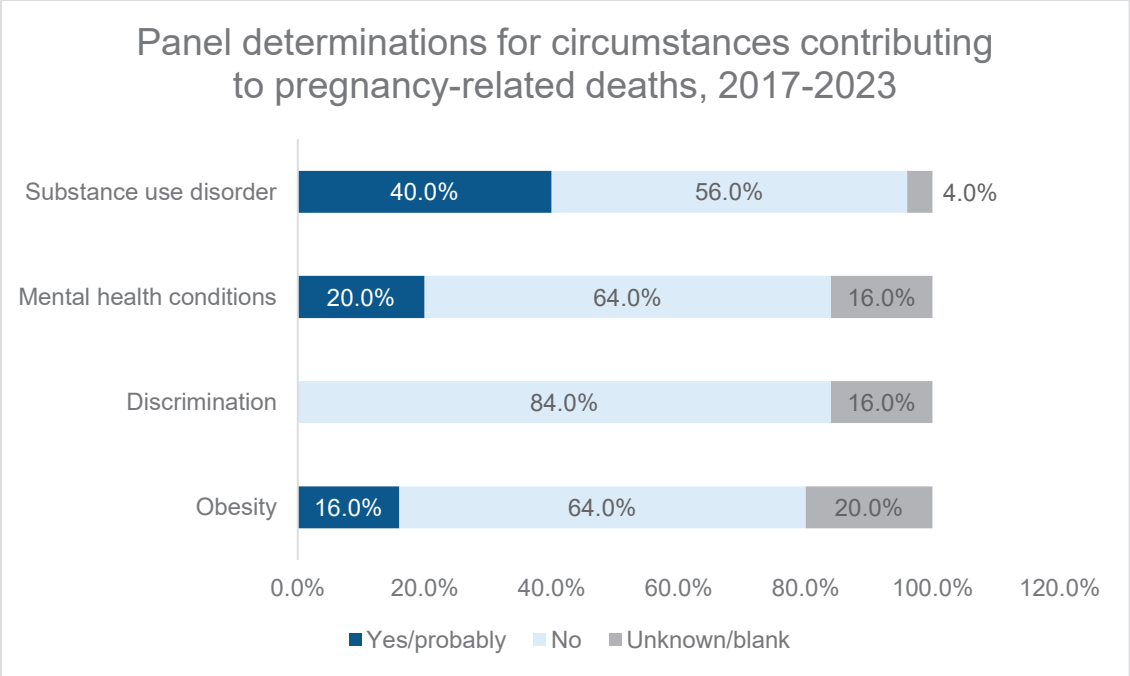
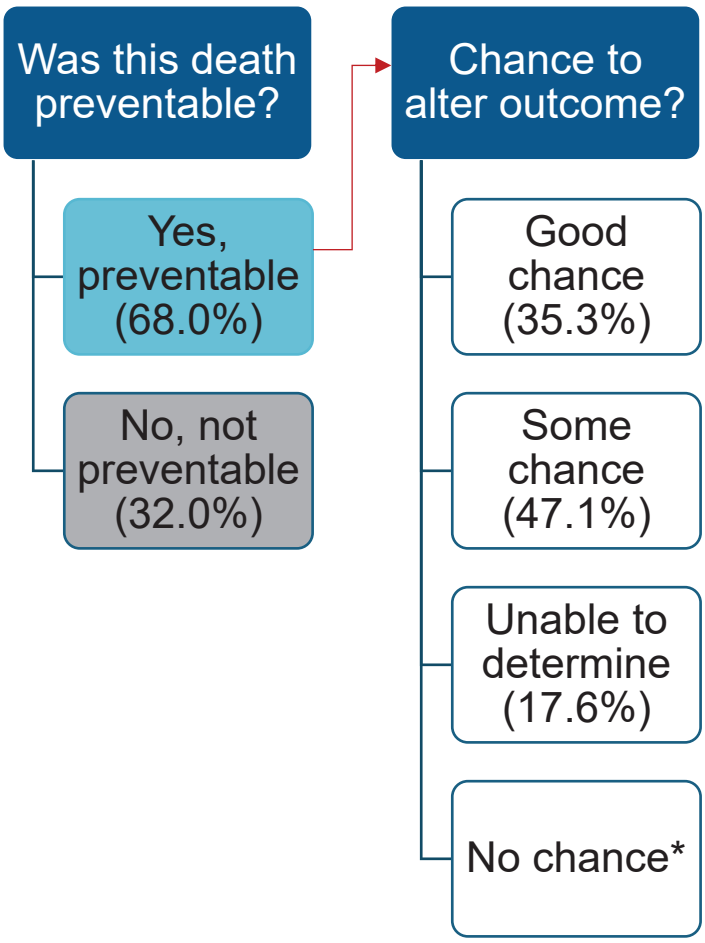


Figure 14. For all pregnancy-related deaths, it was determined that substance use disorder was at least probably a contributor to 40.0% of cases.

Pregnancy-Related Deaths and Preventability

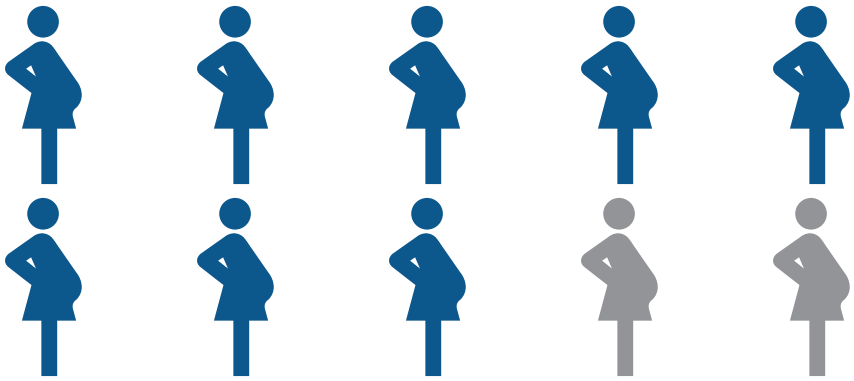
Of all pregnancy-related deaths in WV from 2017-2023, the Panel determined that 68% (17) of them were preventable. That's more than **two out of every three** pregnancy-related deaths.

According to the CDC, a death is **preventable** if there was at least some chance it could have been avoided with reasonable changes to patient, family, provider, facility, system, and/or community factors.



*For deaths determined to be preventable, “no chance” to alter outcome is not a potential selection.

Of those determined to be preventable, the Panel decided that more than 80% of cases had at least some chance of the deaths being prevented-- 35.3% of cases had a “good chance,” and 47.1% “some chance.” The Panel was unable to determine the remainder.



Panel Recommendations

Category of recommendation	Number of cases*
Patient/family	1
Community	2
Provider	4
Facility	6
System	6
Prevention level if implemented	**Number of cases***
Primary (prevent incidence)	7
Secondary (prevent progression)	3
Tertiary (prevent complications)	3

Table 3. *Number of cases will not add up to N (25), as some cases do not have recommendations and some cases have multiple recommendations.

One of the main tasks of the Panel when reviewing deaths is to consider factors that contributed to a death, and make recommendations to address those factors. Recommendations can address different levels, from the patient and their family to systems- or community-level interventions.

Most recommendations focus on access to quality care, as well as strengthening resources around mental health conditions including substance use disorder. With this leading cause of death category accounting for 20.0% of pregnancy-related deaths so far, these have the potential for high impact in WV. Interventions like increasing access to naloxone for postpartum women or education on decreased drug tolerance after a period of sobriety are some of the recommendations for facilities and providers. These same levels can also focus on mental health care in general for pregnant or postpartum women by increasing screening for postpartum depression before discharge and at follow-up, as well as increasing education on safe firearm storage for families, particularly in cases where pregnant and parenting people are at higher risk of suicide.

Other recommendations related to overall access and quality of care include Medicaid coverage for community health workers and doulas to assist with high-risk pregnancies and postpartum care. Health care facilities are also recommended to increase education and training for identification of emergent situations and timing to care for pregnant trauma cases.

2023 Maternal Deaths

Of the three deaths the Maternal Mortality Review Committee determined were pregnancy-related, the leading cause of death for two were hemorrhage (excluding aneurysms or CVA) and the third was mental health conditions. Two out of three deaths were determined to be preventable, with a determination that there was some chance or a good chance to alter the outcome.

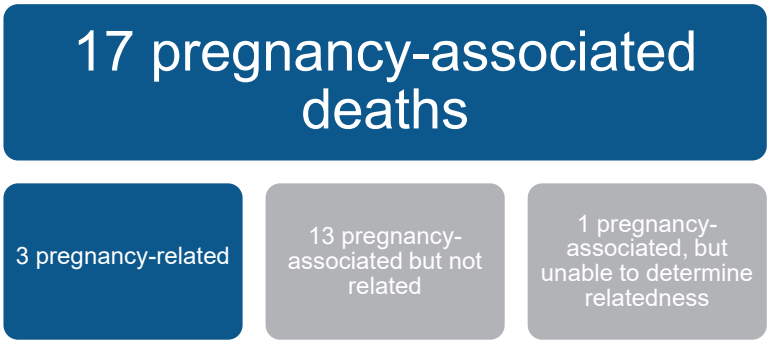


Table 4. Demographic characteristics of pregnancy-associated deaths for 2023

Demographics	
Age	
>25	3
25-29	3
30-34	8
35+	3
Total	17
Median	31
Education	
Less than high school diploma or GED	6
High school diploma or GED	9
Some college credit, but no degree	0
College degree	1
Total	16
Race	
Black	1
Multiracial	1
White	14
Total	16
Ethnicity	
Hispanic	0
Non-Hispanic	16
Total	16

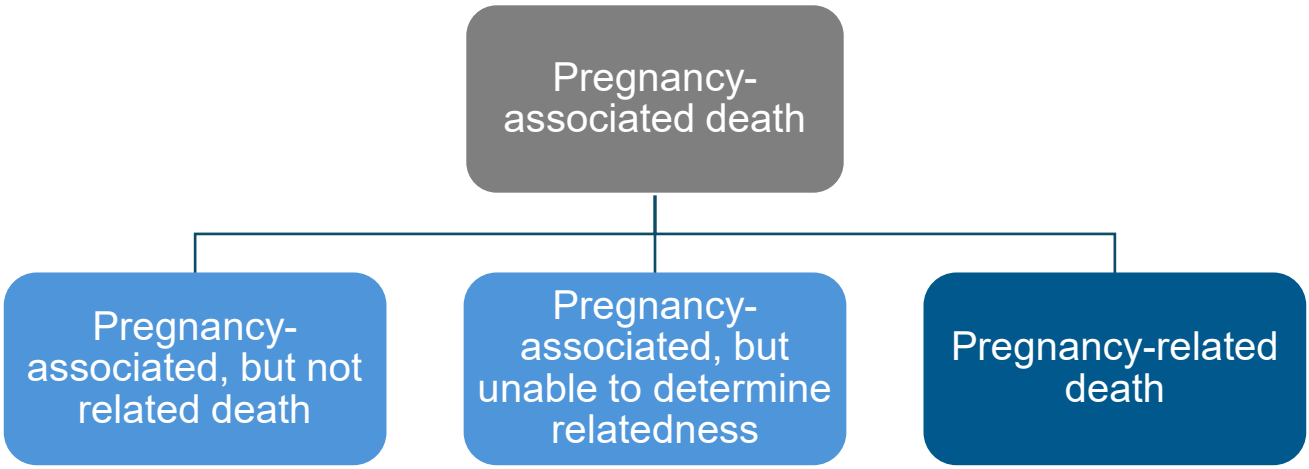
Some sections do not represent the complete total (17) as some records are missing information.

Table 5. Case information for pregnancy-associated deaths for 2023

Case Information	
Timing of Death	
Pregnant at time of death	2
Day of delivery	1
1-6 days after pregnancy	3
7-42 days after pregnancy	1
43 days-1 year after pregnancy	10
Total	17
Delivery Payer	
Private Insurance	2
Medicaid	10
Not applicable	4
Total	16
Cause of death	
Mental health or substance use disorder	8
Injury*	3
Cancer	2
Hemorrhage (excluding aneurysms or CVA)	2
Other	2
Total	17

*Injury deaths include both unintentional as well as homicide death.

Terminology: Maternal Death Review



Pregnancy-associated: death occurred during pregnancy or within one year of the end of a pregnancy; this can be from any cause and is the starting point for reviewing a death

Pregnancy-related: death occurred during pregnancy or within one year of the end of a pregnancy and was the result of a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy

Pregnancy-associated, but not –related death: death occurred during pregnancy or within one year of the end of pregnancy, but the cause was not related to pregnancy

Source: Centers for Disease Control and Prevention, Maternal Mortality Review Committee Decisions Form v24.3

Child Fatality Review Panel

A Child Fatality Review Panel is maintained and includes subject matter experts (Child Protective Services (CPS), law enforcement, medical personnel, social and behavioral health, education, etc.) specific to child fatalities some of whom also serve on the FMRT. The case review and analysis process for child fatalities is coordinated and housed in the OCME. The panel is responsible for reviewing the facts and circumstances surrounding deaths of all children under the age of 18 who were residents of the State of West Virginia at the time of their death and to report findings and recommendations to the FMRT.

Child Fatality Case Review Process

The WVDH, BPH and OCME (investigators, forensic pathologists, fatality and mortality review panel (FMRP) program manager, and staff) conduct an initial screening of all fatalities to determine if the case meets the definition of a preventable child fatality and to verify residency status. Data is obtained from the BPH, HSC to ensure all cases are screened. Case reviews are completed for all child deaths that are determined to be preventable for any person under the age of 18 and who was a West Virginia resident at the time of death. The manner of death for cases reviewed by the panel can be the result of an accident, homicide, suicide, or an undetermined manner of death. Deaths that are attributable to natural disease are not typically selected for a panel review unless information reveals the potential for the death to have been prevented.

Once cases are determined to be preventable and the decedent is verified to be a West Virginia resident, the FMRP staff ensures all cases meet the definition of a closed case. Closed cases meet the following criteria: 1) the potential offender is dead, 2) an individual has been convicted in a court case arising from the death or 3) a determination is made that no further legal action (criminal) will be taken in a particular death case.

Case reviews are conducted in confidential meetings. All panel members and invited guests are required to sign an agreement to abide by the confidentiality standards specified in the FMRT statute. Prior to case review by the panel, a request for records is sent to all agencies that were identified as having relevant information. The collected information typically includes demographic information, autopsy reports, criminal and civil court histories of the victim and offender, CPS information, media reports, information regarding the use of legal or advocacy services, and the details of the incident including those occurring both prior to and following the death.

The panel members present a case summary during the monthly meeting, which is followed by a panel discussion, which aims to address the following matters for each incident:

- What were the hazardous events that led to the fatality?
- Were there any opportunities to prevent the fatality?
- Is training or education needed as it relates to specific areas or occupations?
- How does the incident relate to other reviewed incidents?
- Are there policies relevant to the incident that need to be reviewed or changed?
- Are there lessons or educational messages to be derived from the incident?

As part of the review, the panel identifies which systems, if any, the victim and/or the offender had contact with prior to, during, or after the death which can help the panel identify possible recommendations for system improvement and reduce or eliminate preventable child deaths in West Virginia.

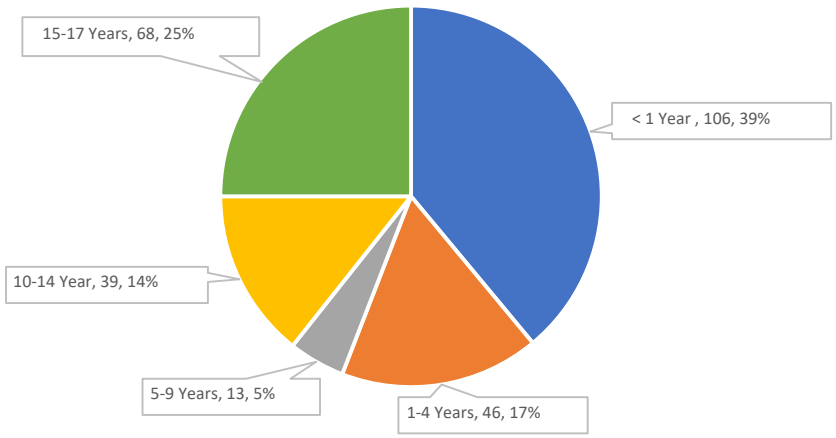
2021 – 2024 Child Fatality Data Summary

For calendar years 2021 to 2024, the panel reviewed 272 fatalities of children who were West Virginia residents at the time of their deaths and determined them to be preventable.

Demographics

Of the 272 preventable child deaths presented in Figure 1 and reviewed by the panel, 106 (39%) were infant deaths, defined as a death prior to the child's first birthday.

Figure 1: Child Fatality by Age 2021 - 2024 (n=272)



A more detailed analysis of the infants who died in 2021 and 2022, which were reviewed by the CFRP and included in this report, can be found in the IMMRP section outlined in the prior section of this report.

Figure 2 shows 164 (60%) of the child deaths were male and 108 (40%) were female. Figure 3 shows 228 (84%) of the 272 decedents were White children, followed by 21 (8%) children identified as having two or more races, 15 (6%) Black children, six (2%) children identified as unknown race, and two (1%) Asian children.

Figure 2: Child Fatality by Sex 2021 - 2024 (n=272)

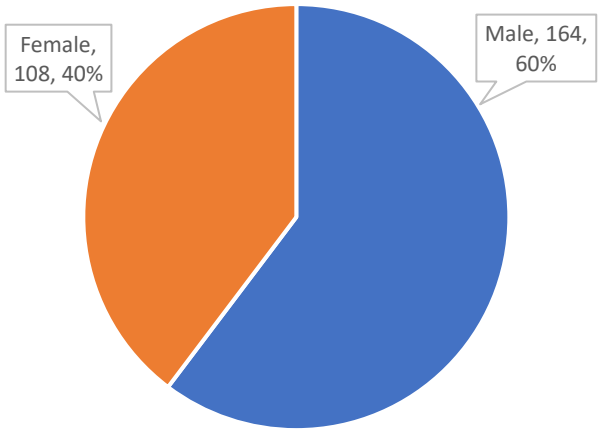
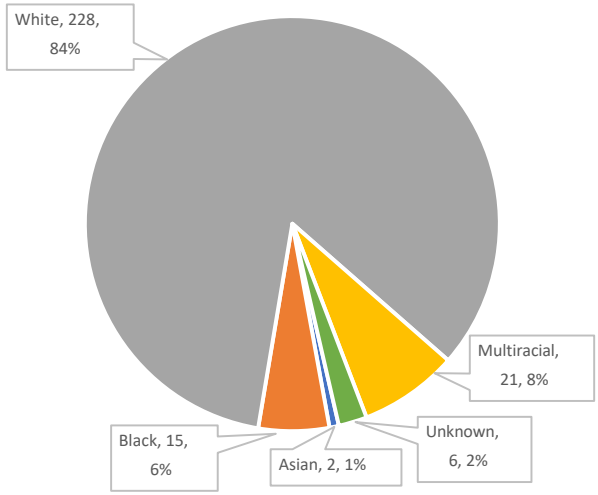
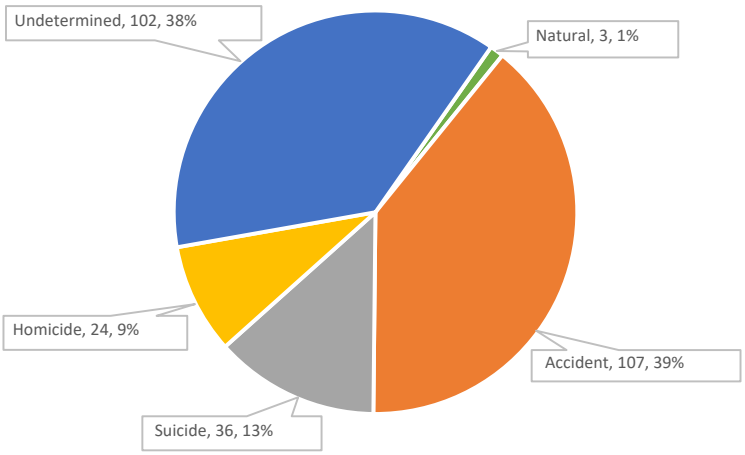


Figure 3: Child Fatality by Race 2021 - 2024 (n=272)



Manner of Death

Figure 4: Manner of Death 2021 - 2024 (n=272)



Manner of death data is displayed in Figure 4 and is categorized as accident, suicide, homicide, or undetermined as certified on the final death certificate. For calendar years 2021 to 2024, 107 (39%) of the preventable deaths from birth to age 17 were the result of an accident. Of the 272 preventable deaths, 102 (38%) were undetermined, meaning the manner was unable to be determined by the medicolegal death investigation. Suicides accounted for 36 (13%) of the cases and 24 (9%) were determined to be homicide. Three natural deaths were found to be preventable due to the presence of external non-natural contributing factors.

Figure 5 shows the manner of death by age group. Infants under the age of one comprised most deaths (n=106) with the manner of death classified as undetermined (n=78). Similarly, at the national level, infant mortality rates are much higher than the mortality rate for children aged 1 to 17.[1]

Figure 5: Manner of Death by Age Group 2021 - 2024
(n=272)

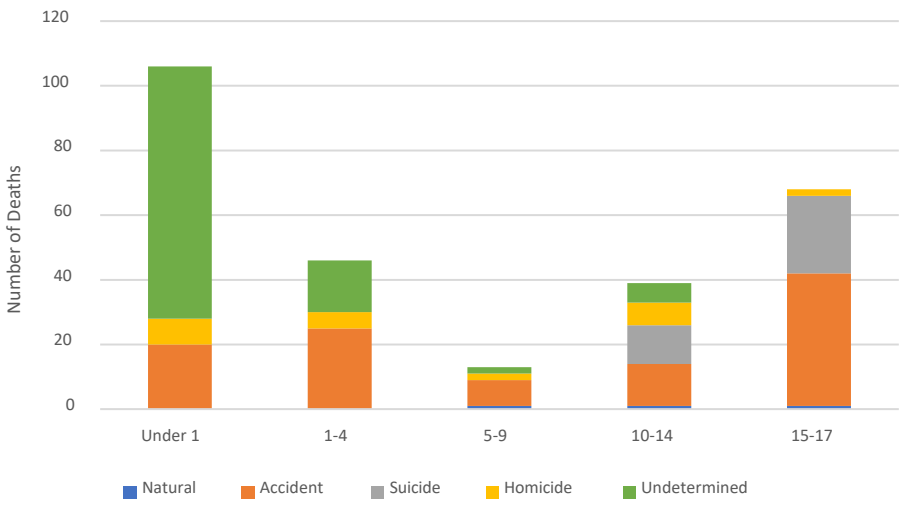
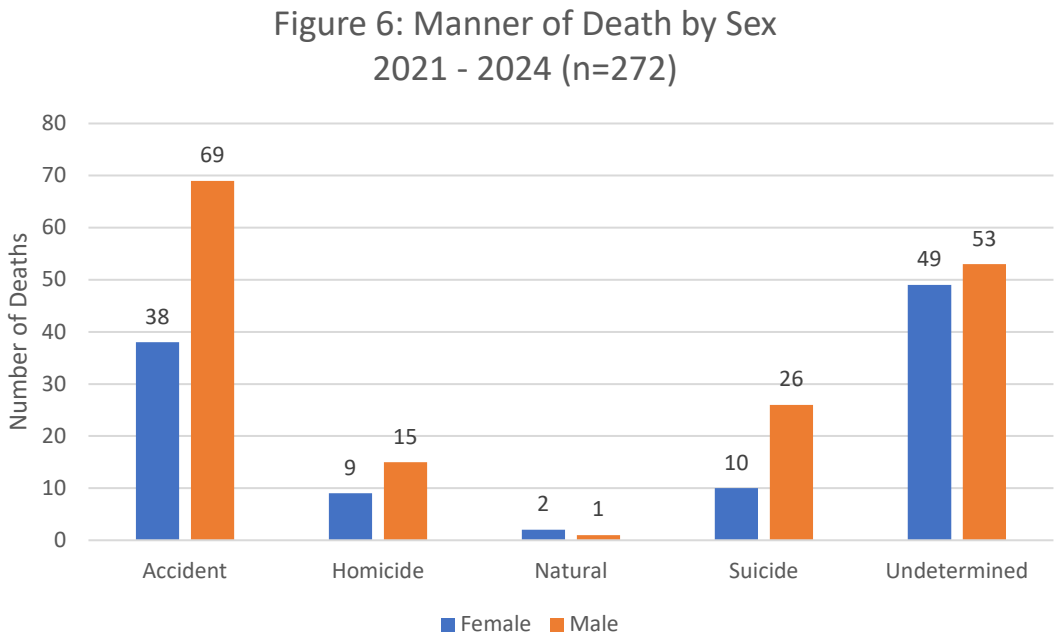


Figure 6 shows manner of death and sex of the child. Most children died due to an accident (n=107), or the manner of death was undetermined (n=102). A total of 24 (9%) children were victims of homicide and 36 (13%) children died of suicide, with males completing suicide more frequently than females. This aligns with national suicide rates which show that, according to the CDC, in 2023, males were almost four times more likely to die of suicide than females.[2]



Manner and Cause of Death

Table 1 shows 93 (34%) of the preventable deaths had a manner of death as undetermined and a cause of death unknown. Seventy-six of these deaths were infants, under the age of one. When looking at the cause of death across all manners of death, motor vehicle accidetns represent 18 % (n=48) and bodily force or weapon 17% (n=46). Suicide was the manner of death in 36 (13%) cases with decedents ranging from 11 to 17 years of age. Of the suicides in which the cause of death was bodily force or weapon (n=18), all utilized a firearm. The category of fire, burn, or electrocution represents 12 deaths that were due to a fire in the home, with none of the homes having a smoke alarm present. Of note, for the 19 downing deaths, the case reiew revealed the absence of a gate or fence around the water source (n=12) and a lack of adult supervision (n=8).

Table 1: Cause of Death by Manner and Age Group, 2021 – 2024 (n=272)

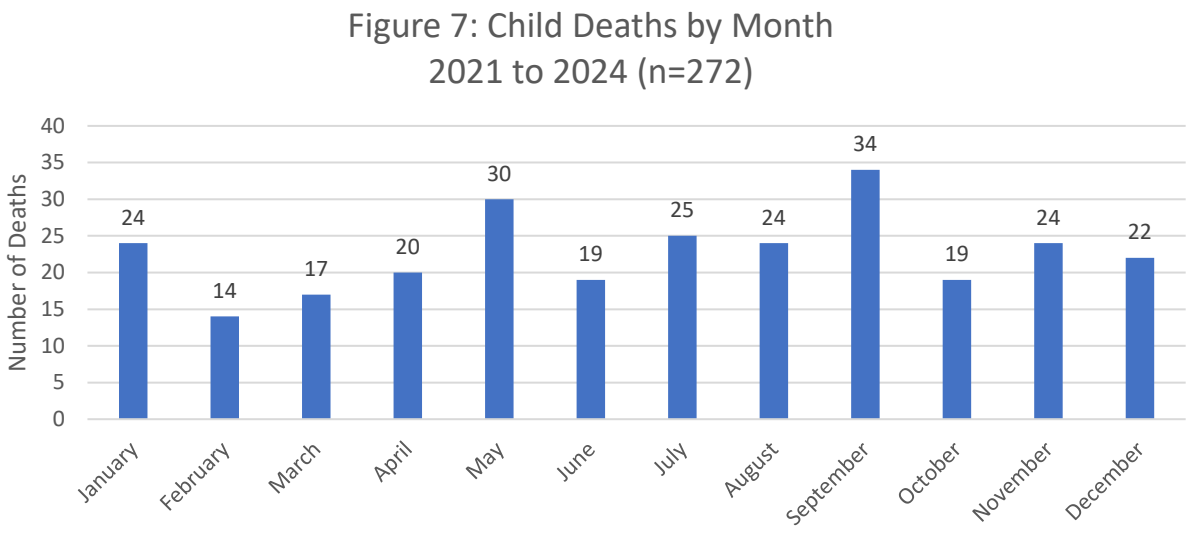
Manner	Cause	Under 1	1-4	5-9	10-14	15-17
Accident	Motor Vehicle Related	0	6	2	9	29
	Fire, Burn, or Electrocution	0	6	2	1	2
	Drowning	1	11	4	2	0
	Asphyxia	12	1	0	0	0
	Bodily Force or Weapon	0	2	0	0	1
	Fall or Crush	1	0	0	0	0
	Poisoning, Overdose or Acute Intoxication	0	1	0	0	8
	Other Injury	3	0	1	1	1
	Unknown	3	1	0	0	0
Suicide	Motor Vehicle Related	0	0	0	0	2
	Asphyxia	0	0	0	6	7
	Bodily Force or Weapon	0	0	0	6	12
	Poisoning, Overdose or Acute Intoxication	0	0	0	0	2
	Other Injury	0	0	0	0	1
Homicide	Fire, Burn, or Electrocution	1	0	0	0	0
	Bodily Force or Weapon	6	5	2	7	2
	Poisoning, Overdose or Acute Intoxication	1	0	0	0	0
Undetermined	Any Medical Cause	1	0	0	1	0
	Drowning	0	1	0	0	0
	Asphyxia	0	1	0	1	0
	Bodily Force or Weapon	1	0	0	2	0
	Poisoning, Overdose or Acute Intoxication	0	1	0	0	0
	Unknown	76	13	2	2	0
Natural		0	0	1	1	1

Note 1: The utilization of Undetermined as a Manner of death by a medical examiner occurs in cases where there are competing possibilities with regard to the other four (4) choices of Manner that are available for utilization on the West Virginia death certificate (Natural, Accident, Homicide, Suicide). Circumstances or evidence exists that indicate elements of two or more of the manners are present in the particular case, however, there is not enough evidence to make a clear choice between the possibilities, rendering the appropriate classification as Undetermined with regard to Manner of Death. There are also cases in which there is a significant lack of evidence available to the certifying medical examiner to determine the Manner of Death, making the appropriate classification in such cases Undetermined with regard to Manner of Death.

Note 2: The utilization of Unknown in the Cause of Death determination indicates that there is an absence of evidence upon examination of the decedent by the medical examiner and in the totality of the medicolegal death investigation upon its completion that is sufficient, in the professional opinion of the medical examiner, to definitively determine Cause of Death in a particular case.

Distribution of Deaths for Various Categories

Figure 7 shows all preventable deaths that occurred for each month from 2021 to 2024, with the highest frequency occurring in the months of September (n=34) and May (n=30). The winter season has generally seen lower frequency during this time period, with February seeing the lowest frequency (n=14) for the 2021 to 2024 period.

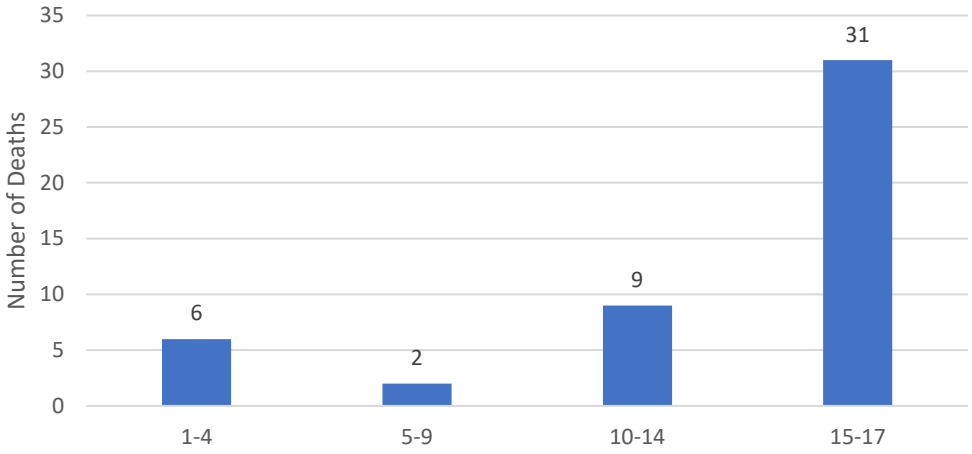


Motor Vehicle Related Deaths

During the 2021 to 2024 period, 48 (18%) children ages one to 17 died in West Virginia because of a motor vehicle accident as either the driver, passenger, or as a pedestrian. According to the West Virginia Division of Motor Vehicles 2022 Annual Report,[3] for calendar years 2020 to 2021, pedestrian fatalities doubled from 18 to 36 and traffic fatalities increased from 267 to 280. However, it is worth noting that the number of unrestrained fatalities slightly decreased from 2020 to 2021. Although WV requires all individuals under the age of 18 to complete an All-Terrain Vehicle (ATV) Safety Awareness Program, ATVs were involved in the deaths of 12 (25%) of the 48 children under the age of 18 who died as a result of a motor vehicle accident.

Figure 8 depicts child deaths involving motor vehicles by age categories, of which 31 (65%) were ages 15-17. The data correlates with the national statistics regarding motor vehicle accidents, which show that the risk of motor vehicle crashes is higher among 16–19-year-old children than among any other age group.[4]

Figure 8: Motor Vehicle Related Deaths by Age
2021 - 2024 (n=48)



Homicide Deaths

In calendar years 2021 to 2024, homicide was determined to be the manner of death in 24 (9%) of the overall 272 child fatalities in West Virginia, ranging in age from under one year to 16 years old; a decrease compared to the 14 percent in calendar year 2020. Of these children, 19 were White, four identified as having 2 or more races, and for 1 child the race was unknown. The victims included 15 males and nine females. This decrease aligns with the overall state trend. According to the CDC, homicide was the manner of death for 114 individuals in WV in 2021, 105 individuals in 2022, and 88 individuals in 2023, with death rates decreasing from 6.9 (per 100,000) in 2021 to 5.4 (per 100,000) in 2023.[5]

References

1. Kochanek KD, Murphy SL, Xu J, Arias E. Mortality in the United States, 2022. Centers for Disease Control and Prevention. https://www.cdc.gov/nchs/products/databriefs/db492.htm#section_5
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3. West Virginia Governor's Highway Safety Program. *West Virginia Highway Safety Program Annual Report 2022*. 2022. https://transportation.wv.gov/DMV/DMVFormSearch/WVGHSP_ANNUAL_REPORT_FFY2022.pdf
4. National Safety Council. Injury Facts, Age of Driver. https://injuryfacts.nsc.org/motor-vehicle/overview/age-of-driver/
5. Centers for Disease Control and Prevention. Homicide Mortality. https://www.cdc.gov/nchs/state-stats/deaths/homicide.html

Domestic Violence Fatality Review Panel

A Domestic Violence Review Panel is maintained and includes subject matter experts (domestic violence prevention and support organizations, law enforcement, medical personnel, adult protective services, social and behavioral health, corrections, etc.) specific to domestic violence fatalities some of whom also serve on the FMRT. The case review and analysis process for domestic violence fatalities is coordinated and housed in the OCME. The panel is responsible for reviewing the facts and circumstances surrounding all deaths that occurred in West Virginia of victims or suspected victims of domestic violence, including suicides, for those 18 years of age or older and to report findings and recommendations to the FMRT.

Domestic Violence Case Review Process

The WVDH, BPH and the OCME conduct an initial screening of all fatalities to determine if the case meets the definition of domestic violence based on information available at the time the case is presented to the OCME. The National Coalition Against Domestic Violence (NCADV) defines domestic violence as the willful intimidation, physical assault, battery, sexual assault, and/or other abusive behavior as part of a systematic pattern of power and control perpetuated by one intimate partner against another. This violence could include behaviors such as stalking, intimidation, threats, physical violence, sexual violence, emotional abuse, psychological abuse, or economic deprivation. The panel does not limit the definition of domestic violence to intimate partners only. The definition includes family members as well as roommates sharing a dwelling.

Additionally, domestic violence fatalities reviewed by the panel were determined to meet the definition of domestic violence set forth in the West Virginia State Code Article 27. Prevention and Treatment of Domestic Violence Part 2: Definitions §48-27-202. Some fatalities reviewed may have had elements of domestic violence identified in the victims' lives but were not found to be domestic violence-related deaths. The panel does not claim that all domestic violence-related fatalities that occurred in the reporting year have been identified. Case reviews are completed for individuals 18 years of age or older and where the manner of death is classified by the OCME as a homicide, a suicide, undetermined, or an accident. The FMRP ensures that all cases meet the definition of a closed case. Closed cases are those that meet the following criteria: 1) the potential offender is dead, 2) an individual has been convicted in a court case arising from the death, or 3) a determination is made that no further legal action (criminal) will be taken in a particular death case. For these reasons mentioned, most cases are reviewed several years following the actual event.

Case reviews are conducted in confidential meetings. All panel members and invited guests are required to sign an agreement to abide by the confidentiality standards specified in the FMRT statute. Prior to case review by the panel, a request for records is sent to all agencies identified as having relevant information. Collected information typically includes demographic information, autopsy reports, criminal and civil court histories of the victim and offender, other known history of intimate partner violence, media reports, information regarding the use of legal or advocacy services, and the details of the incident including those occurring both prior to and following the death.

The panel members present a summary of the information collected for each case reviewed during the monthly meeting. This is followed by a panel discussion, which aims to address the following matters for each incident:

- Was the fatality the result of a domestic violence incident as defined by the State statute?
- What were the perilous events that led to the fatality?

- Were there any opportunities to prevent the fatality?
- Is training or education needed as it relates to specific areas or occupations?
- How does the incident relate to other reviewed incidents?
- Are there policies relevant to the incident that need to be reviewed or changed?
- Are there lessons or educational messages to be derived from the incident?

As part of the review, the panel identifies which systems, if any, the victim and/or the offender had contact with before, during, or after the death, which can help the panel identify possible recommendations for system improvement and reduce or eliminate preventable deaths resulting from domestic violence.

2020 & 2021 Domestic Violence Fatality Data Summary

For calendar years 2020 & 2021, 755 cases were identified with suspected evidence of domestic violence, of which 250 were reviewed by the panel. 185 (74%) cases were determined to be domestic violence-related fatalities; 65 (26%) were ruled out during panel review.

Demographics

Figure 1 shows 181 (72%) of the 250 deaths reviewed were males, while 69 (28%) of the 250 deaths reviewed were females. According to the National Coalition Against Domestic Violence (NCADV)[1] Nationally, one in four women and one in seven men have experienced violence by an intimate partner, affecting more than 12 million people in the U.S. annually. Gun presence in domestic violence situations increases a woman's risk of homicide by 500%, with more than half killed by family members or intimate partners.

Figure 1: Domestic Violence Associated Fatalities by Sex, 2020 & 2021 (n=250)

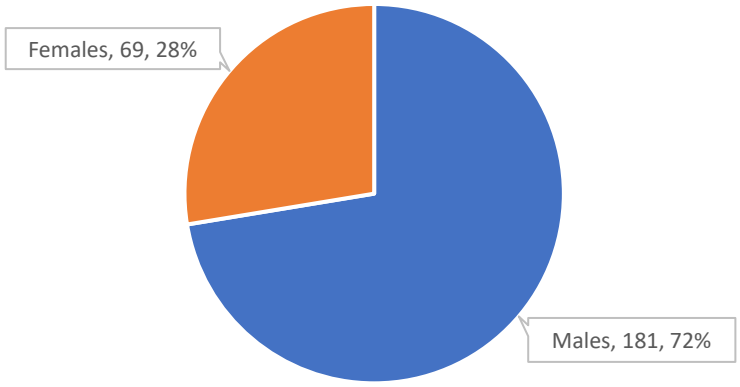
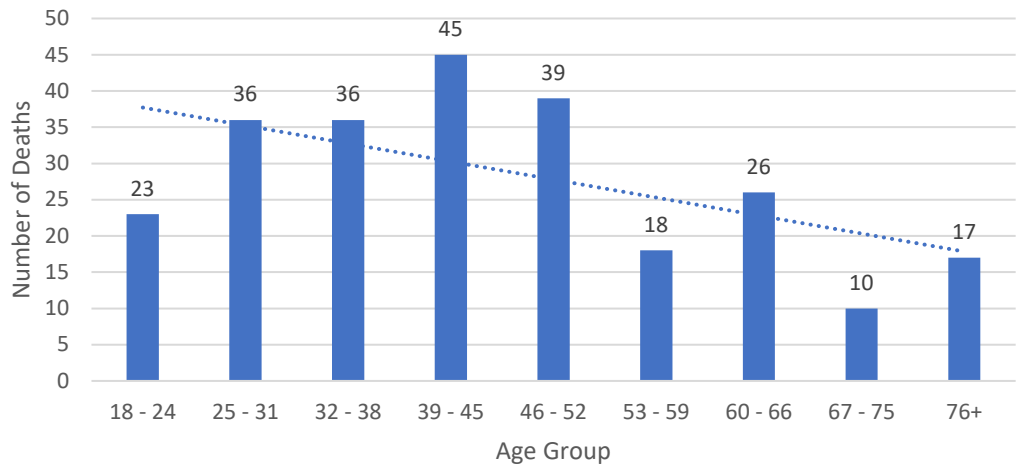


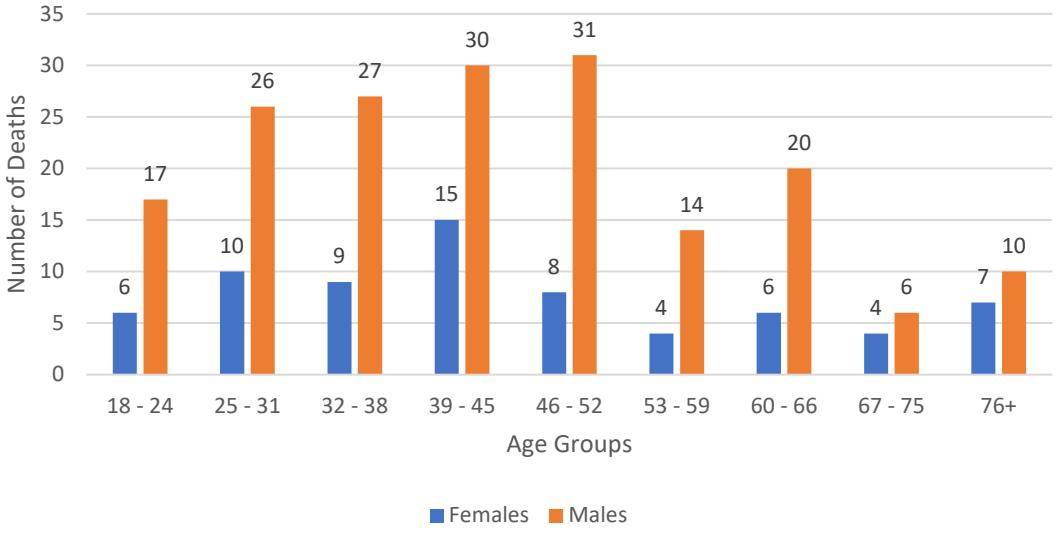
Figure 2 displays the trends for domestic violence associated fatalities by age groups. The ages of domestic violence victims in 2020 and 2021 in West Virginia ranged from 19 years to 94 years old. The peak age range for domestic violence fatalities was between 39 and 45 years old. Interesting to note, the 46 to 52, 60 to 66, and 76+ age groups increased in comparison to 2019. Overall, the percentage of domestic violence associated fatalities more than doubled for 60 to 76+ year olds in comparison to 2019.

Figure 2: Domestic Violence Associated Fatalities by Age, 2020 & 2021 (n=250)



To further examine the trends, Figure 3 compares the fatalities by age as well as sex. As age increased, the differences between the two sexes generally decreased. The difference in fatalities by sex is highest for 25- to 52-year-olds, while it is the lowest for 67 to 76+ year olds. These findings suggest that there may be missed opportunities to intervene in intimate partner violence prior to escalation to fatality. Nationally, intimate partner violence rates are highest for females between the ages of 18 and 34.[1] Further research is needed to investigate circumstances associated with increased risk of intimate partner violence cases to inform the development of effective prevention strategies.[2]

Figure 3: Domestic Violence Associated Fatalities by Age and Sex, 2020 & 2021 (n=250)



When looking at deaths by race, almost all the decedents were White. In Figure 4, 223 (89%) of the reviewed decedents were White. 17 individuals (7%) percent were Black, 3 individuals were Asian (1%), one biracial (<1%), and six individuals (2%) were identified as other. Nationally, minority races are at a higher risk of domestic violence. In the Black community, 43.7% of women and 39.3% of men report experiencing intimate partner rape, physical violence, and/or stalking.[3]

Figure 4: Domestic Violence Associated Fatalities by Race, 2020 to 2021 (n=250)

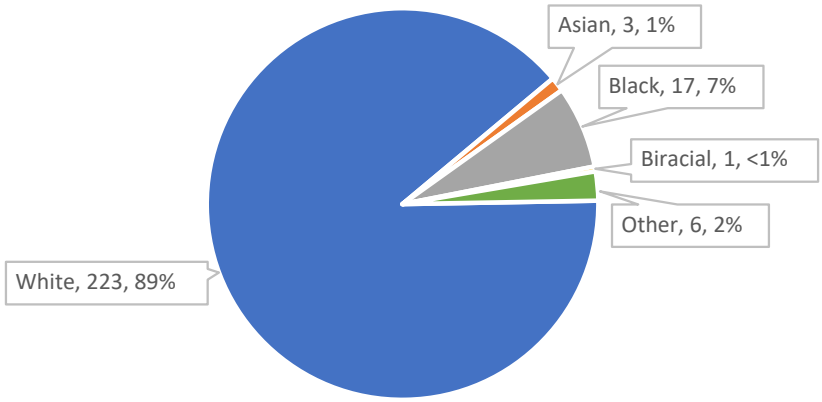
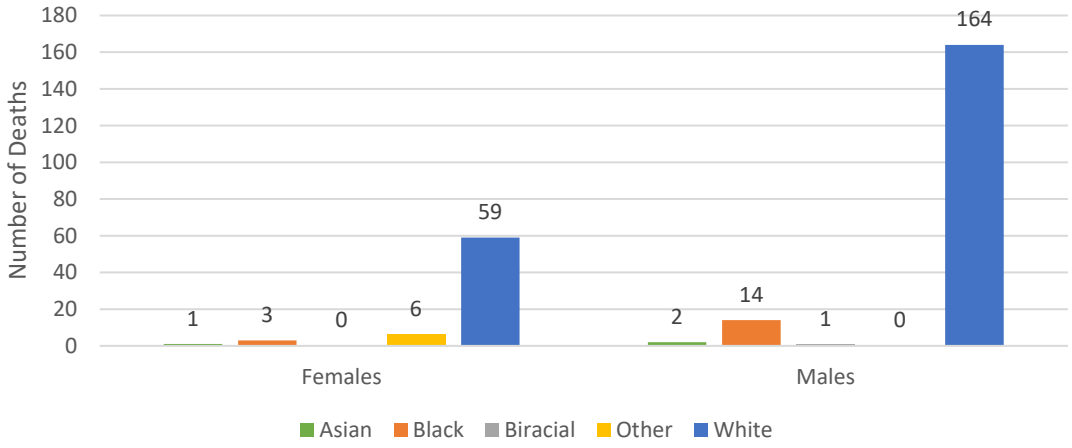


Figure 5 shows domestic violence deaths by both race and sex. White male deaths accounted for 164 (66%) deaths, followed by White females accounting for 59 (24%) of the reviewed deaths. Black males accounted for 14 (6%) deaths, while Black females accounted for three deaths (1%). West Virginia's population is largely white.[4] Nationally, women of color are at a higher risk of domestic violence than their white female peers.[5] According to the Blackburn Center, domestic violence is the leading health issue facing Black women today.[5]

Figure 5: Domestic Violence Associated Fatalities by Race and Sex, 2020 to 2021 (n=250)



Manner of Death

Manner of death is broken into five categories: accident, homicide, natural, suicide, and undetermined. Figure 6 shows that most of the domestic violence deaths that were reviewed in West Virginia for calendar years 2020 and 2021 were suicides. Suicides accounted for 137 of the 250 reviewed deaths, or 55%. The link between domestic violence and suicide is often overlooked. However, there is some indication that those who have experienced domestic violence are at a higher risk of suicide than those who have not.[6] Suicide as the manner of death was followed by homicides, accounting for 90 (36%) of the deaths reviewed. 13 deaths (5%) were categorized as an undetermined manner, nine deaths (4%) were determined to be accident with regard to manner, and one death was determined to be natural.

Figure 6: Manner of Death for Domestic Violence Associated Fatalities, 2020 & 2021 (n=250)

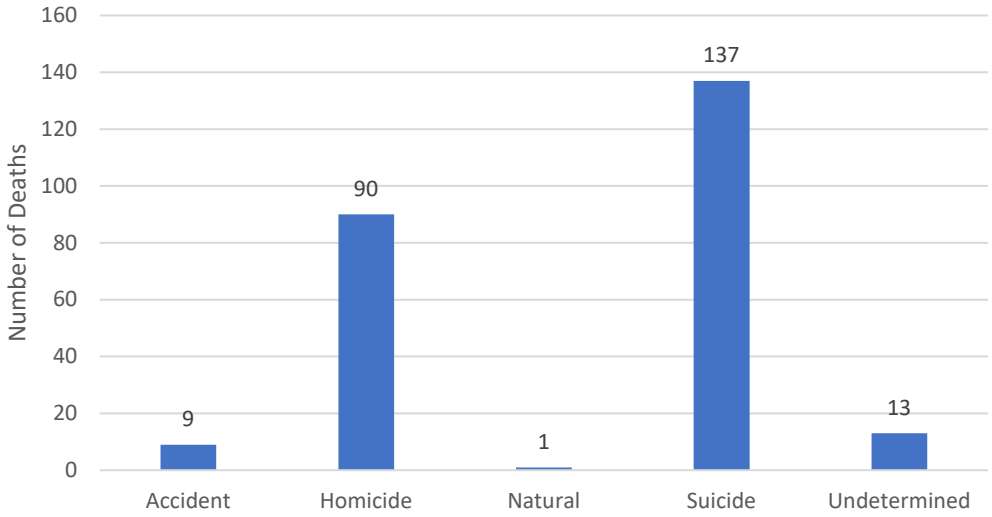
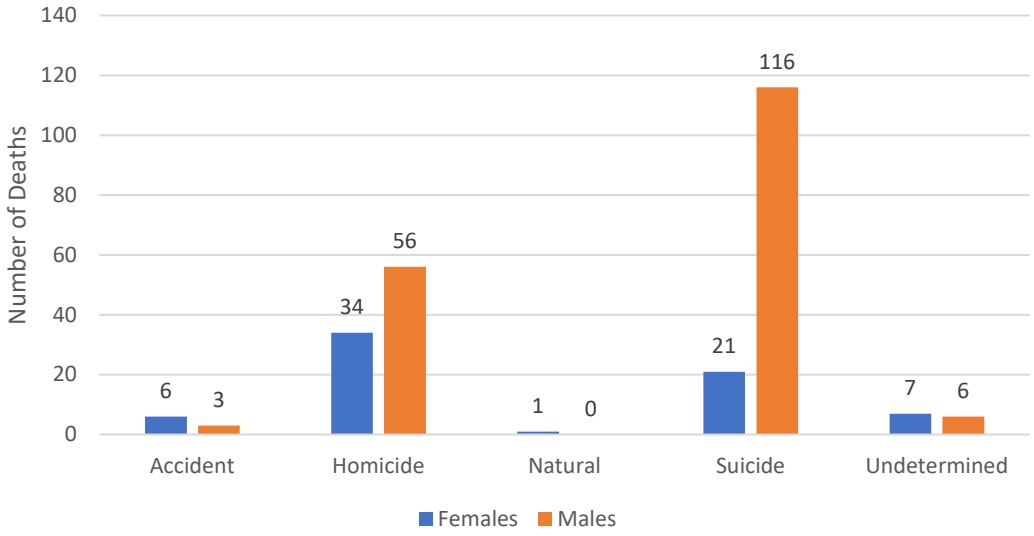


Figure 7 compares manner of death and sex. The data show that males are most likely to die by suicide when related to domestic violence deaths. Male suicides accounted for 116 (46%) reviewed deaths. Female suicides accounted for 21 (8%) of the deaths reviewed, which is a 13% decrease from 2019. According to the Emerge Center Against Domestic Abuse, female survivors of domestic abuse are seven times more likely to contemplate suicide than women who have not experienced domestic violence.[6] Male homicides accounted for 56 (22%) deaths and female homicides accounted for 34 (14%) deaths. 13 deaths had an undetermined manner, 6 males and seven females. Nine deaths were accidents, three males and six females. Finally, there was one female death determined to be natural with regard to manner of death.

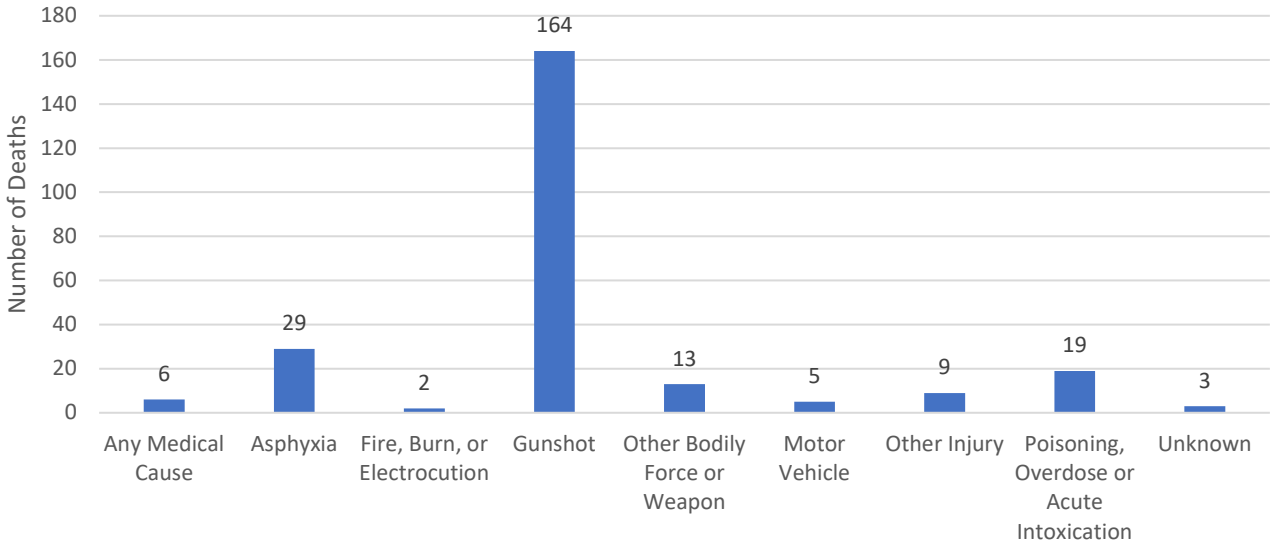
Figure 7: Manner of Death for Domestic Violence Associated Fatalities by Sex, 2020 & 2021 (n=250)



Cause of Death

Domestic violence related deaths were broken into nine categories for cause of death, as seen in Figure 8, based on frequency. The most prevalent cause of death was gunshot, which accounted for 164 (66%) of all reviewed deaths.

Figure 8: Cause of Death for Domestic Violence Associated Fatalities, 2020 & 2021 (n=250)



Child Present at the Scene

Forty-three (17%) of the 250 deaths reviewed had at least one child present at the death scene. This does not necessarily mean that the child witnessed the death, but that they were present when the death occurred. This is an issue of significant importance, as research has shown that children who experience childhood trauma, including domestic violence, may be at a greater risk of tobacco use, substance abuse, suicide attempts, obesity, depression, and poor self-rated health.[7] Further, children who are exposed to domestic violence, either as a witness or a victim, are at a higher risk of being in an abusive situation in adulthood. It is reported that in homes where domestic violence occurs, children witness it between 80% to 90% of the time. In homes where intimate partner violence occurs, an estimated 30% to 60% of children are also victims of abuse.[8]

References

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2. AbiNader MA, Graham LM, Kafka JM. Examining Intimate Partner Violence-Related Fatalities: Past Lessons and Future Directions Using U.S. National Data. *Journal of Family Violence*. 2023;doi:10.1007/s10896-022-00487-2
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5. Blackburn Center. Black Women & Domestic Violence. https://www.blackburncenter.org/post/2020/02/26/black-women-domestic-violence
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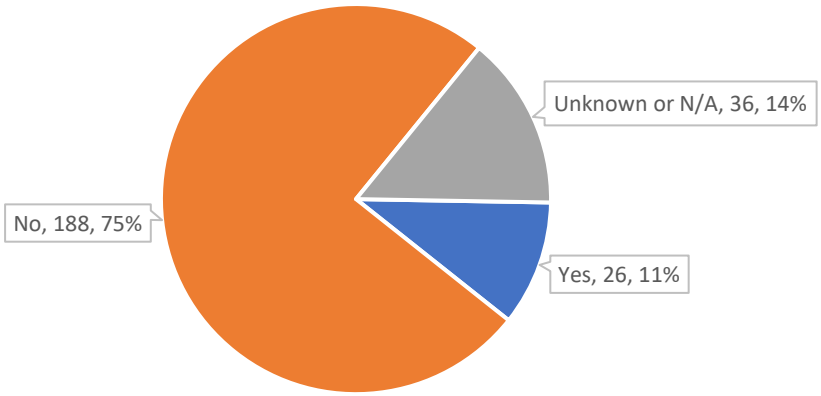
7. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*. 1998;14(4):245-58. doi:10.1016/s0749-3797(98)00017-8
8. Postmus JL, DiBella B. *Children Exposed to Intimate Partner Violence* 2016. https://www.fatherhood.gov/sites/default/files/resource_files/e000003652.pdf

2020 & 2021 Domestic Violence – Additional Fatality Data

Veteran Status

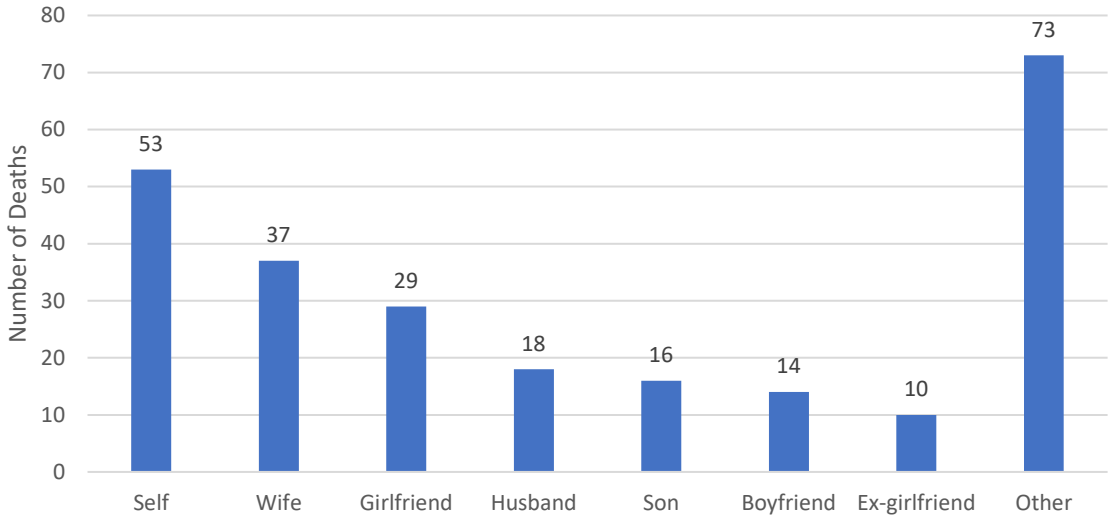
The following data are provided graphically, in the absence of further analysis, to provide stakeholders with some additional data points that indicate some areas for future research and analysis that may be pertinent to understanding additional factors in the area of domestic violence fatalities.

Figure 1: Domestic Violence Associated Fatalities by Veteran Status, 2020 & 2021 (n=250)

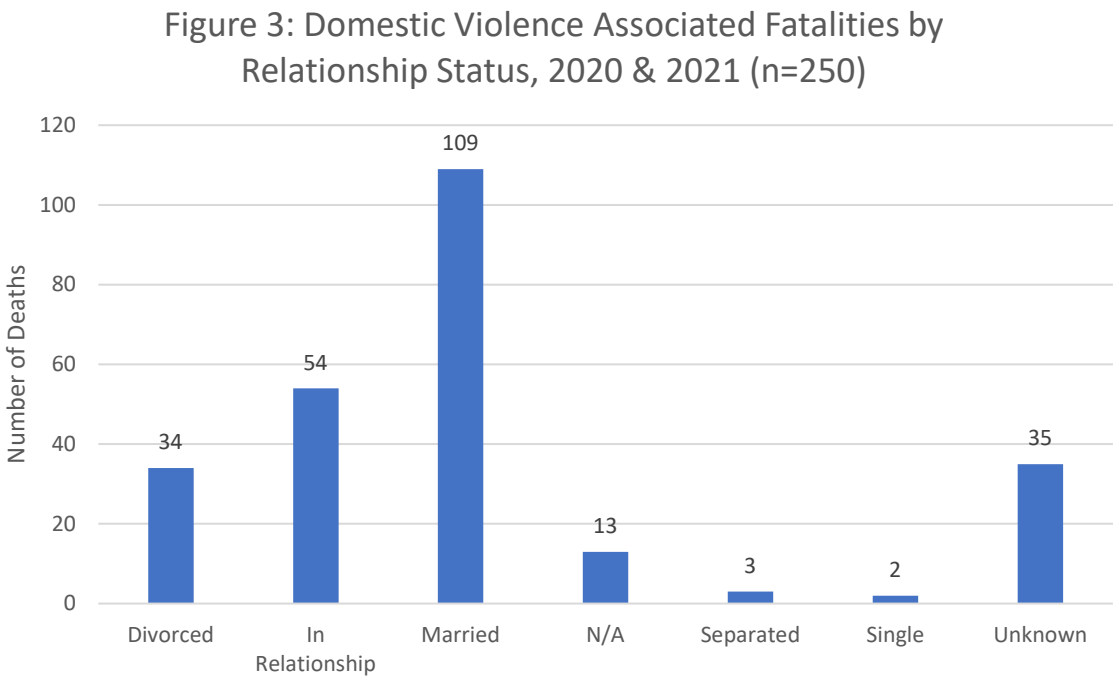


Relationship to Victim

Figure 2: Domestic Violence Associated Fatalities by Relationship of Perpetrator to Victim, 2020 & 2021 (n=250)



Relationship Status



County of Death and County of Residence, 2020 & 2021

The following table is sorted by county of death. Shading represents the county of death quartiles.

	Count for County of Death (n=250)	Count for County of Residence (n=250)	2021 Population Estimate [a]
Kanawha County	37	31	178,071
Monongalia County	16	9	106,537
Berkeley County	15	16	126,194
Cabell County	14	10	93,422
Logan County	11	11	31,852
Harrison County	10	9	65,412
Wood County	9	10	83,820
Lewis County	8	8	16,877
Mercer County	8	8	59,163
Preston County	8	8	34,309
Raleigh County	8	12	73,800
Jefferson County	7	4	58,550
Nicholas County	7	8	24,438
Randolph County	7	5	27,902

Mineral County	6	5	26,913
Wayne County	6	3	38,563
Fayette County	5	6	40,059
Greenbrier County	5	5	32,705
Marion County	5	6	56,056
Boone County	4	3	21,361
Marshall County	4	4	30,204
Upshur County	4	4	23,812
Wyoming County	4	4	21,031
Hardy County	3	3	14,150
Jackson County	3	3	27,789
Putnam County	3	3	57,365
Roane County	3	3	13,933
Taylor County	3	5	16,534
Barbour County	2	1	15,447
Calhoun County	2	2	6,172
Hampshire County	2	3	23,351
Hancock County	2	2	28,604
Monroe County	2	2	12,394
Pleasants County	2	1	7,610
Webster County	2	2	8,270
Braxton County	1	1	12,297
Brooke County	1	1	22,080
Clay County	1	2	7,914
Doddridge County	1	1	7,745
Grant County	1	1	10,998
Mason County	1	1	25,281
McDowell County	1	1	18,415
Mingo County	1	1	23,055
Morgan County	1	1	17,304
Ohio County	1	1	41,817
Out of State	1	14	NA
Pocahontas County	1	1	7,888
Summers County	1	1	11,869
Lincoln County	0	1	20,197
Unknown	0	3	NA

[a] https://www.census.gov/data/tables/time-series/demo/popest/2020s-counties-total.html