



West Virginia Fatality and Mortality Review Team

Annual Report 2024

Child Fatality Review Panel CY2020

Domestic Violence Fatality Review Panel CY2019

Infant and Maternal Mortality Review Panel

Maternal Deaths CY2021 and CY2022

Infant Deaths CY2021 and CY2022 (partial)

December 1, 2024

West Virginia Fatality and Mortality Review Team
Annual Report 2024



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Table of Contents

Acknowledgement	5
Fatality and Mortality Review Team Membership	5
Executive Summary	6
Fatality and Mortality Review Team Recommendations.....	7
Description of Case Review Panels and Case Review Process.....	7
Panel 1: Child Fatality Review Panel	7
Child Fatality Case Review Process	7
Panel 2: Domestic Violence Fatality Review Panel	8
Domestic Violence Case Review Process.....	8
Panel 3: Infant and Maternal Mortality Review Panel.....	9
Maternal Case Review Process	10
Infant Case Review Process.....	10
2020 Child Fatality Data Summary.....	11
Demographics.....	11
Manner of Death.....	12
Manner and Cause of Death	13
Distribution of Deaths for Various Categories.....	14
Motor Vehicle Deaths	15
Homicide Deaths	15
2019 Domestic Violence Fatality Data Summary.....	16
Demographics	16
Manner of Death	19
Cause of Death.....	20
Child Present at the Scene.....	21
2021 Maternal Fatality Data Summary	21
Manner of Death	22
Cause of Death.....	22
Maternal Age	23
Maternal Education.....	24
Maternal Employment	24
Maternal Marital Status.....	24
Maternal Insurance Coverage	25
Maternal Prenatal Care	26
Pre-Existing Mental Health Conditions	26
Time of Death	27
Cause of Death Among Pregnancy-Related Maternal Mortalities	27
2022 Maternal Fatality Data Summary	28
Manner of Death	28
Cause of Death.....	29

Maternal Age	29
Maternal Education.....	29
Maternal Employment	29
Maternal Marital Status.....	30
Maternal Insurance Coverage	30
Maternal Prenatal Care	31
Pre-Existing Mental Health Conditions	31
Time of Death	32
Cause of Death Among Pregnancy-Related Maternal Mortality	32
2020 Infant Fatality Data Summary	33
Demographics	33
Manner of Death in Infants	34
Causes of Death in Infants	35
2021 Infant Fatality Data Summary	39
Manner of Death	39
Cause of Death	39
Sleep Related Deaths	40
Infant Race	41
Infant Age at Time of Death	43
Manner of Death by Infant Age at Time of Death	43
Cause of Death by Infant Age at Time of Death	44
Maternal Prenatal Care	45
Insurance Coverage.....	45
Preventability	45
2022 Infant Fatality Data Summary (preliminary and partial year)	46
Manner of Death	46
Cause of Death	47
Sleep Related Deaths	47
Infant Race	48
Infant Age at Time of Death	50
Manner of Death by Infant Age at Time of Birth	50
Cause of Death by Infant Age at Time of Death	51
Maternal Prenatal Care	51
Insurance Coverage.....	52
Preventability	52
Definitions	53

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Executive Summary

The Fatality and Mortality Review Team (FMRT) is a statutory body enabled by the West Virginia State Legislature under W. Va. Code §61-12A. During the 2024 Regular Session of the State Legislature, W. Va. Code §61-12A was amended, with the passage of House Bill 4874, to include the following revisions.

- Established the State Health Officer as the chairperson responsible for convening and coordinating meetings of the FMRT (at least quarterly);
- Refined the scope of the case reviews to include the categories listed below and eliminated the requirement for review of deaths due to unintentional prescription or pharmaceutical drug overdoses:
 - Deaths resulting from domestic violence
 - Deaths of all infants and all women who die during pregnancy, at the time of birth or within one year of the birth of a child, and the deaths of children under 18 years of age;
- Established requirements expanding review team membership; and
- Required annual reporting beginning December 1, 2024, to include the previous year's data.

The newly established FMRT is operating in its first year since the legislative changes took effect and the process of reorganizing is ongoing under the leadership of the State Health Officer who now serves as the Chair. The FMRT is housed within the West Virginia Department of Health (WVDH), Bureau for Public Health (BPH) but works in coordination with three subject matter case review panels that operate with the expertise and support from the Office of Maternal, Child and Family Health (OMCFH), the Health Statistics Center (HSC) and the Office of the Chief Medical Examiner (OCME). The diagram below describes how the FMRT worked in conjunction with the three subject matter case review panels to produce this year's report. Over the next year, the FMRT will guide continued quality improvement to streamline the process, specifically focusing on ensuring alignment with national standards for case review and guiding targeted analyses that promote public health action.

Fatality and Mortality Review Team

- Members designated by statute but include expertise from the three panels
- Meet quarterly to advise the review process, review case data summary, inform analyses, recommend policy and programming improvements, and approve the annual report

Panel 1: Child Fatality Review

- Members designated by areas of expertise
- Daily case record review and abstraction
- Monthly meetings of panel to review case data
- Average number of child fatality cases reviewed annually: 82

Panel 2: Domestic Violence Review

- Members designated by areas of expertise
- Daily case record review and abstraction
- Monthly meetings of panel to review case data
- Average number of domestic violence fatalities reviewed annually: 122

Panel 3: Infant and Maternal Mortality Review

- Members designated by areas of expertise
- Daily case record review by nurse abstractors
- Quarterly meetings of panel to review case data
- Average number of maternal deaths annually: 20
- Average number of infant deaths reviewed annually: 100

Fatality and Mortality Review Team Recommendations

For the upcoming year and after review of the case summary data presented by the Infant and Maternal Mortality Review Panel and the Child and Domestic Fatality Review Panels, the FMRT is recommending the following:

1. Establish a centralized coordinating unit within the BPH to oversee all case review panels and ensure alignment between the case review panels and the FMRT.
2. Clearly define the role of each review panel and the population of focus, and standardize protocols, terms and definitions in alignment with national standards when available.
3. Conduct targeted analyses of deaths determined to be preventable with a focus on identifying disparities among populations and key drivers of risk.
4. Utilize and expand on the data in the 2024 report to develop a series of white papers on the top modifiable risk factors and major themes, some of which are highlighted below:
 - a. Sleep-related deaths among infants;
 - b. Deaths attributed to motor vehicle accidents and bodily force/weapons among children; and
 - c. Mental health among children, pregnant women and adults, specifically addressing suicide and substance use disorder.

Description of Case Review Panels and Case Review Process

Panel 1: 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 the manner of death could not be determined. 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. Because death investigations can take time to complete, most child fatality cases are reviewed three years following the date of death.

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.

Panel 2: 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 [3]. This violence could include behaviors such as stalking, intimidation, threats, physical violence, sexual violence, emotional abuse, psychological abuse, or economic deprivation [3]. 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 up 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 deaths resulting from domestic violence.

Panel 3: Infant and Maternal Mortality Review Panel

An Infant and Maternal Mortality Review Panel (IMMRP) is maintained and includes subject matter experts specific to infant and maternal fatalities some of whom also serve on the FMRT. The case review and analysis process are housed within the WVDH, BPH, OMC FH. The review process is a method of understanding the diverse factors that contribute to preventable deaths and identifying and implementing interventions to address these factors. The knowledge gained from the reviews may be used to enhance services, influence public health policy, and direct planning efforts intended to lower mortality rates.

Maternal Case Review Process

The WVDH, BPH, OMC FH obtains case information for all West Virginia resident maternal deaths from the West Virginia HSC. The HSC identifies maternal deaths by linking death certificates for women aged 10-50 years with birth certificates and fetal death certificates or by pregnancy indication on the death certificate. Additional maternal deaths are identified by ICD 10 diagnostic codes A34-Obstetrical tetanus or O00–O99 – pregnancy, childbirth and the puerperium. All maternal deaths occurring during pregnancy or within 365 days of pregnancy conclusion are designated as pregnancy-associated and further investigated.

Cases for review are limited to women of childbearing age who were residents of West Virginia at the time of their death and whose death occurred in West Virginia. Access to data for mothers who died in other jurisdictions is governed by the laws of the state in which the death occurred and is only included in case reviews when data is available. However, aggregate data for mothers who died in other jurisdictions is included in official HSC Vital Statistics reports and included in the state’s maternal mortality rate calculation published nationally by the Centers for Disease Control and Prevention (CDC).

Once cases are identified as potentially pregnancy-associated, medical records are obtained from all health care facilities providing care before, during, and after the pregnancy conclusion. Hospital records at the time of death and autopsy reports are included when applicable. Data is collected and case narrative development is done using the Maternal Mortality Review Information Application (MMRIA, or “Maria”). MMRIA is a CDC data system designed to facilitate maternal mortality review committee functions through a common data language. This standardized data collection tool assists committees in understanding the causes of maternal mortality and eliminating preventable pregnancy-related deaths. Once record abstraction and data entry are completed, a de-identified case summary document can be exported for each case that provides all information obtained during the abstraction process. These documents provide a complete picture of the pregnancy and death obtained from the records for each maternal death.

This work is partially funded through the five-year cooperative agreement Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) with the CDC. Case identification, abstraction, narrative development, case reviews, and data analyses are conducted using the guidance provided by ERASE MM¹. All maternal mortality data included in this report was exported from MMRIA and analyzed by the OMC FH Division of Epidemiologic Evaluation and Population-based Surveillance (DEEPS) using Microsoft Excel and SAS 9.4.

Infant Case Review Process

The WVDH, BPH, OMC FH obtains infant case information for all resident infant deaths from the West Virginia HSC. The HSC identifies infant deaths by linking birth and death certificates for infants in their first year of life.

Case reviews are limited to live-born infants who were residents of West Virginia at the time of their death and whose deaths occurred in West Virginia. Access to data for infants who died in other jurisdictions is governed by the laws of the state in which the death occurred and only included in case reviews when data is available. However, aggregate data for infants who died in

¹ <https://www.cdc.gov/maternal-mortality/php/state-strategies/index.html>

other jurisdictions is included in official HSC Vital Statistics reports and included in the state's infant mortality rate calculation which is published nationally by the CDC.

Once cases are identified, medical records are obtained from all health care facilities providing care before, during, and after pregnancy conclusion. Hospital records at the time of death and autopsy reports are included when applicable. Due to perinatal influences of the mother's health and maternal risk factors, maternal medical information obtained during pregnancy is also reviewed. Information is entered into the National Fatality Review – Case Reporting System (NFR – CRS) Fetal Infant Mortality Review (FIMR) System. FIMR is a standardized data collection tool to assist in understanding the causes of infant mortality and eliminating preventable deaths. Once record abstraction and data entry are completed, a de-identified case summary document can be exported for each case that provides all information obtained during the abstraction process. These documents provide a complete picture of the pregnancy and death obtained from the records for each infant death.

The purpose of these reviews is to conduct a comprehensive multidisciplinary review of infant deaths to understand how a wide array of local social, economic, public health, educational, environmental, and safety issues relate to the tragedy of fetal and infant loss. Case identification, abstraction, narrative development, case review, and data analysis are conducted using the guidance provided by the National Center for Fatality Review and Prevention². Data in this report were exported from the FIMR System and analyzed by the OMCFH DEEPS using Microsoft Access, Microsoft Excel, and SAS 9.4.

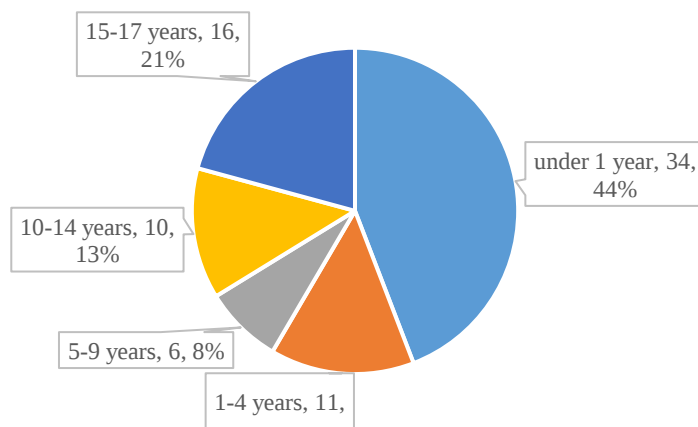
2020 Child Fatality Data Summary

For calendar year 2020, the panel reviewed 77 fatalities of children who were West Virginia residents at the time of their deaths and determined them to be preventable deaths.

Demographics

Of the 77 preventable child deaths presented in Figure 1 and reviewed by the panel, 34 (44%) were infant deaths, defined as a death prior to the child's first birthday.

Figure 1: Child Fatality by Age
2020 (n=77)



² <https://ncfrp.org/fimr/>

A detailed analysis of the infants who died in 2020 which were reviewed by the OCME can be found in the section titled *2020 Infant Fatality Data Summary*, preceding the Infant Mortality Review analysis for years 2021 and 2022.

Figure 2 shows 61% of the child deaths are male and 39% are female. Figure 3 shows 68 (88%) of the 77 decedents were White children, followed by four (5%) Black children, three (4%) children identifying as having two or more races, and two (3%) children identifying as other/unknown.

Figure 2: Child Fatality by Sex, 2020
(n=77)

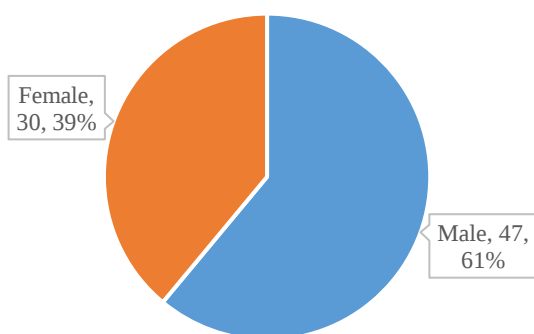
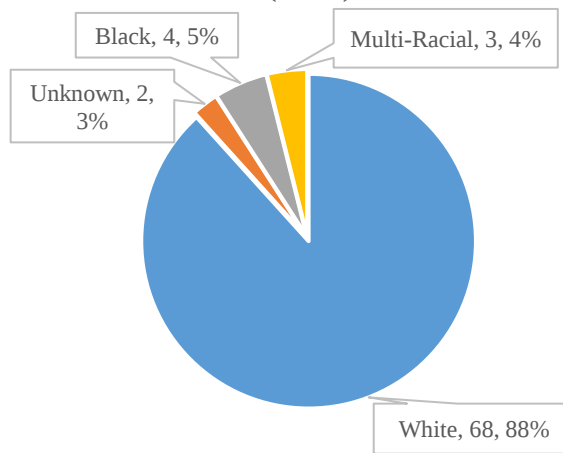


Figure 3: Child Deaths by Race, 2020
(n=77)



Manner of Death

Manner of death data is displayed in Figure 4 and is categorized as natural, accident, suicide, homicide, or undetermined. In 2020, 39% (30) of the preventable deaths from birth to age 17 were undetermined, meaning that the manner was unable to be determined by the medicolegal death investigation. 34% (26) of preventable deaths were the result of an accident and one in seven were a result of homicide. Suicides accounted for seven cases and three natural deaths were found to be preventable due to the presence of external non-natural contributing factors.

Figure 4: Manner of Death, 2020 (n=77)

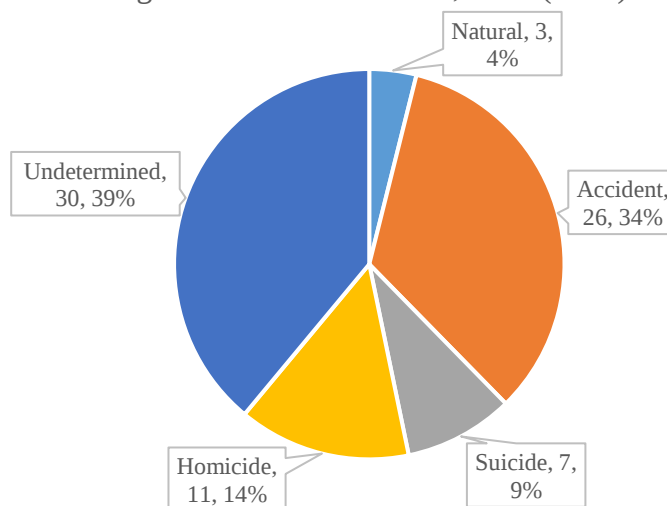


Figure 5 shows the manner of death by age group. Infants under the age of one comprised most deaths with the manner of death classified as undetermined.

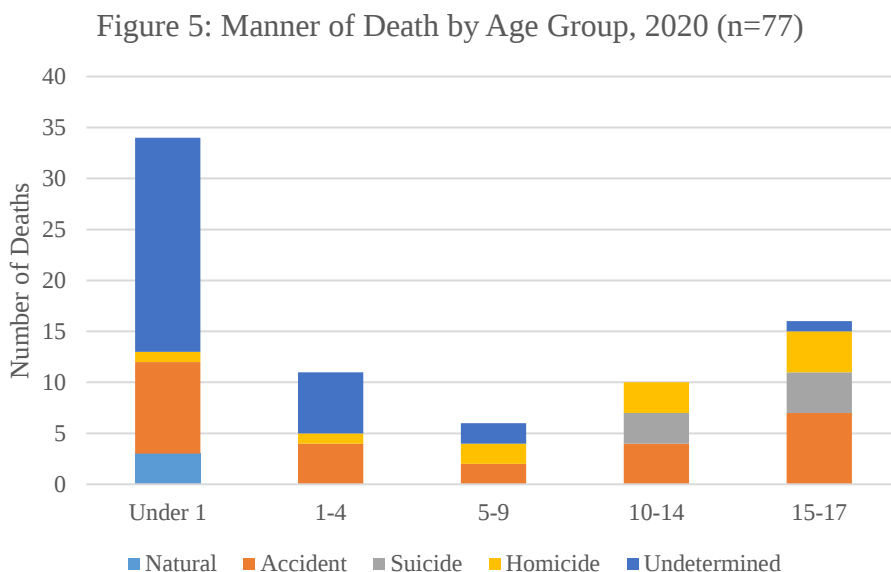
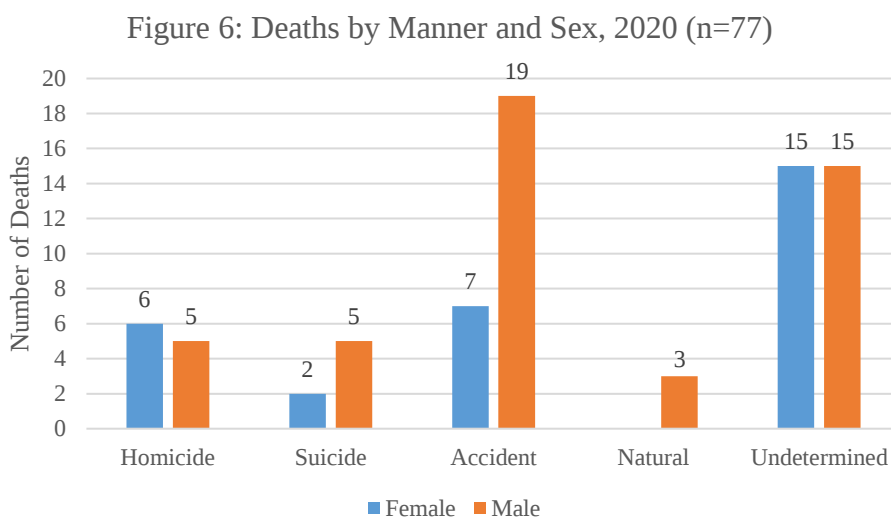


Figure 6 shows deaths by manner of death and sex of the child. Eleven children were victims of homicide. Research has shown a marked increase in homicides for 2020; up 30% or higher in many populations. Males completed suicide slightly more than females.



Manner and Cause of Death

Table 1 shows 32% (25 of 77) of preventable deaths had a manner of death as undetermined and a cause of death unknown. Twenty of these deaths were infants. When looking at the cause of death across all manners of death, bodily force or weapon represents 21% (16) followed by motor vehicle accidents at 14% (11). Suicides was the manner of death in seven cases with decedents ranging from 13- 17 years of age. Of the suicides in which cause of death was bodily force or

weapon, all utilized a firearm. Fire, burn or electrocution represents six deaths due to fire in the home with only one of the homes having a smoke alarm present. Of note, for the two drowning deaths, the case review revealed the absence of a gate or fence around the water source and a lack of adult supervision.

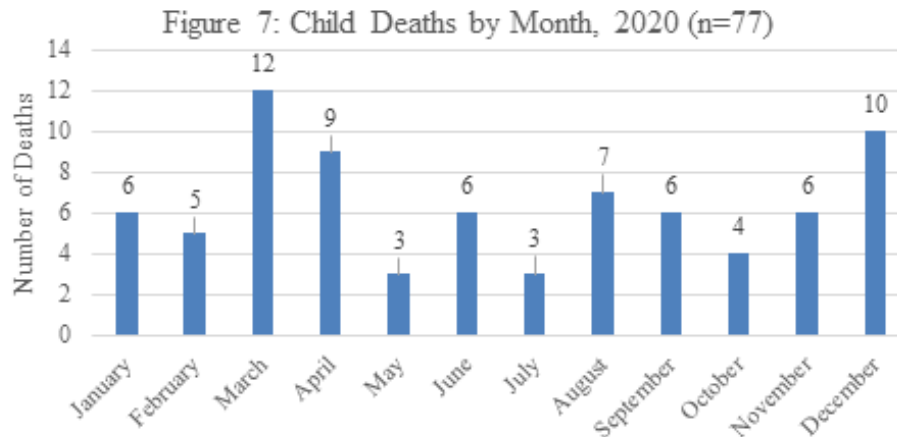
Table 1: Causes of Death by Manner and Age Group						
Manner	Cause	Under 1	1-4	5-9	10-14	15-17
Accident:	Any Medical Cause	1	0	0	0	0
	Motor Vehicle	0	1	0	3	7
	Fire, Burn or Electrocution	0	1	0	1	0
	Drowning	1	0	1	0	0
	Asphyxia	1	0	0	0	0
	Bodily Force or Weapon	0	1	0	0	0
	Poisoning or Overdose	0	1	0	0	0
	Other Injury	6	0	1	0	0
Suicide:	Asphyxia	0	0	0	1	2
	Bodily Force or Weapon	0	0	0	2	2
Homicide:	Bodily Force or Weapon	1	1	2	3	4
Undetermined:	Any Medical Cause	1	0	0	0	0
	Fire, Burn or Electrocution	0	3	1	0	0
	Unknown	20	3	1	0	1
Natural:		3	0	0	0	0

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 mediological 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

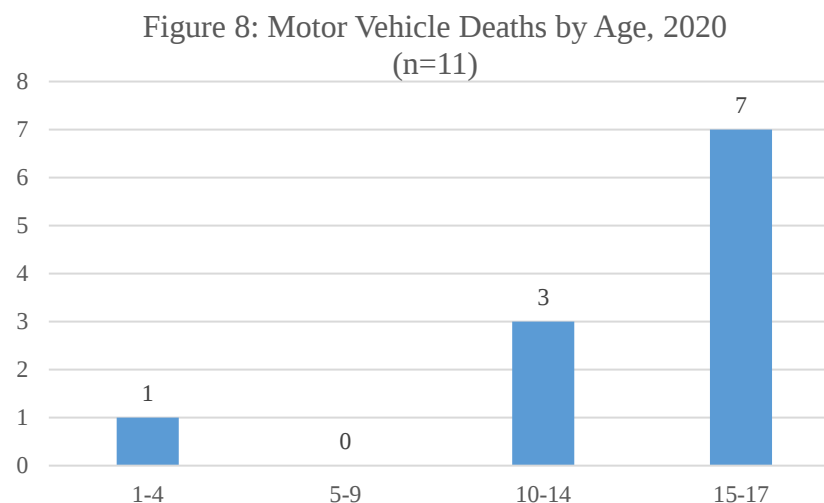
Figure 7 shows all preventable deaths that occurred for each month in 2020. The winter season has generally seen lower numbers of deaths in recent years. Also of note, March and April 2020 saw much higher numbers than usual and December saw a spike in deaths compared to the summer and fall months prior. This may be attributed to continued stressors during the COVID-19 Pandemic.



Motor Vehicle Deaths

In 2020, eleven 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 2021 Annual Report (reviewing vehicle data from 2020), there was a slight increase in traffic fatalities from the previous year overall [12]. All-terrain vehicles (or ATV's) contributed to the deaths of three children under the age of 17 in 2020.

Figure 8 depicts child deaths by motor vehicles by age categories of which 64% were ages 15-17. The data correlates with the national statistics regarding motor vehicle accidents, which shows that the risk of motor vehicle crashes is higher among 16–19-year-old children than among any other age group [7].



Homicide Deaths

In 2020, homicide was attributed as the cause of death of 11 children in West Virginia, ranging in age from under one year to 17 years old, marking a notable increase compared to previous years. Of these children, 10 were White, and one was Black. The victims included five males and six females. Research has shown a 30% increase or higher in homicides during 2020¹. This may be attributed largely to added stressors during the COVID-19 Pandemic⁴.

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2019 Domestic Violence Fatality Data Summary

For calendar year 2019, 250 cases were identified with suspected evidence of domestic violence of which 178 were reviewed by the panel. One hundred and two (102) (57%) cases were determined to be domestic violence-related fatalities, with 63 (35%) being ruled out during panel review. The panel was unable to determine if the death was domestic violence-related for thirteen (7%) of the cases reviewed.

Demographics

In 2019, of the 178 domestic violence associated deaths reviewed by the panel were males. Figure 9 shows 127 of the 178 deaths reviewed were males, while 51 of the 178 deaths reviewed were females. Nationally, the National Coalition Against Domestic Violence (NCADV) shows that on average, one in three women and one in four men have experienced violence by an intimate partner [3]. The presence of a gun in domestic violence situations increases the risk of homicide for women by 500%. More than half of women killed by gun violence are killed by family members or intimate partners [3].

Figure 9: Domestic Violence Associated Fatalities by Sex, 2019 (n=178)

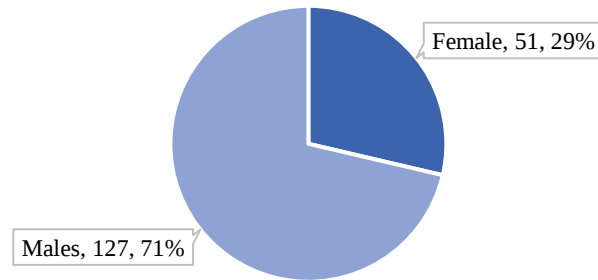
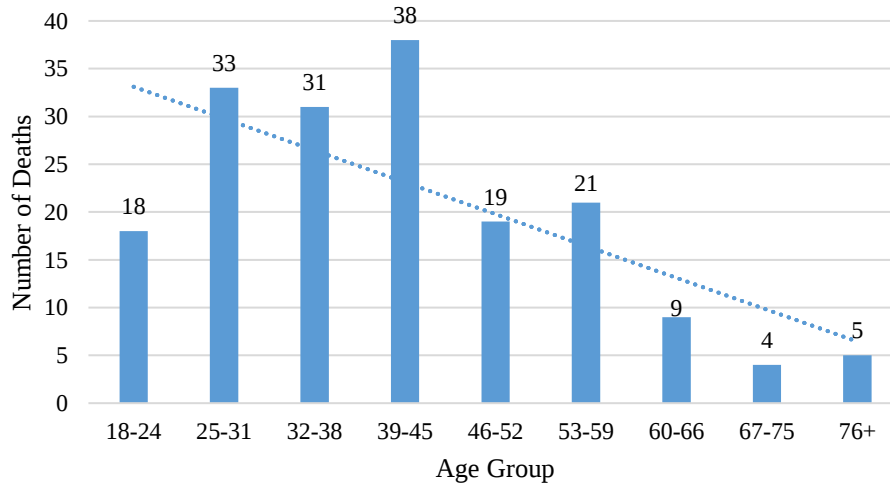


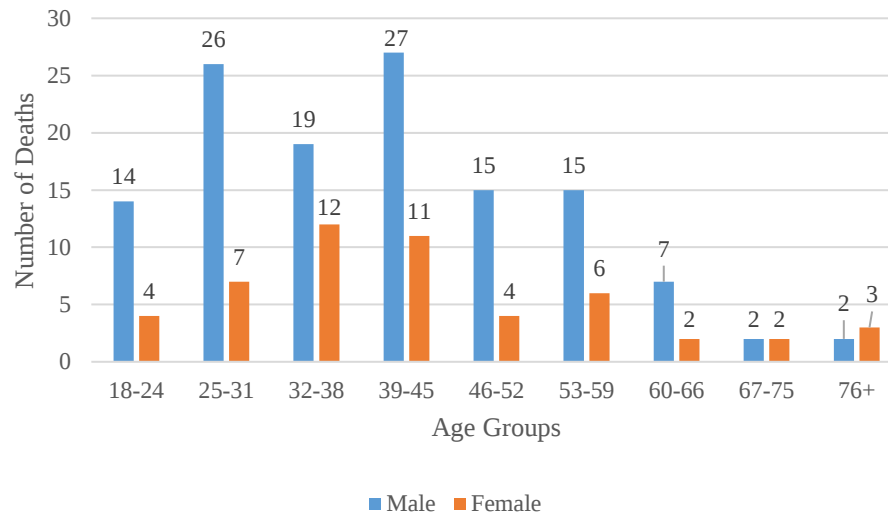
Figure 10 displays the trends for domestic violence associated fatalities by age. Age groups used were six-year increments. The ages of domestic violence victims in West Virginia ranged from 18 years to 83 years old in 2019. The peak age range for domestic violence fatalities was between 39 and 45 years old. Interesting to note, the 25-31, 32-38, and 39-45 age groups have all significantly increased in 2019. Also, there was a significant drop in the number of deaths beginning from age 46 on.

Figure 10: Domestic Violence Associated Fatalities by Age, 2019 (n=178)



To further examine the trends, Figure 11 compares the fatalities by age as well as sex. As age increased, the differences between the two sexes generally decreased. It is interesting to note a significant increase for both male and female deaths in the 39–45-year-old age group for 2019. These findings suggest that there may be missed opportunities to intervene in intimate partner violence (IPV) prior to escalation to fatality. Further research is needed to investigate circumstances associated with increased risk in IPV cases to inform the development of effective prevention strategies [1].

Figure 11: Domestic Violence Associated Fatalities by Age and Sex, 2019 (n=178)



When looking at deaths by race, almost all the decedents were White. In Figure 12, 97% or 172 of the reviewed decedents were White. Five individuals or 3% were Black. Minority races are at a higher risk of domestic violence [12]. In the Black community, 45.1% of women and 40.1% of men report experiencing either physical or sexual violence or stalking by an intimate partner [12].

Figure 12: Domestic Violence Associated Fatalities by Race, 2019 (n=178)

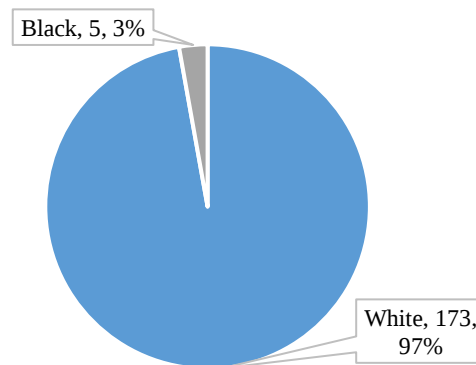
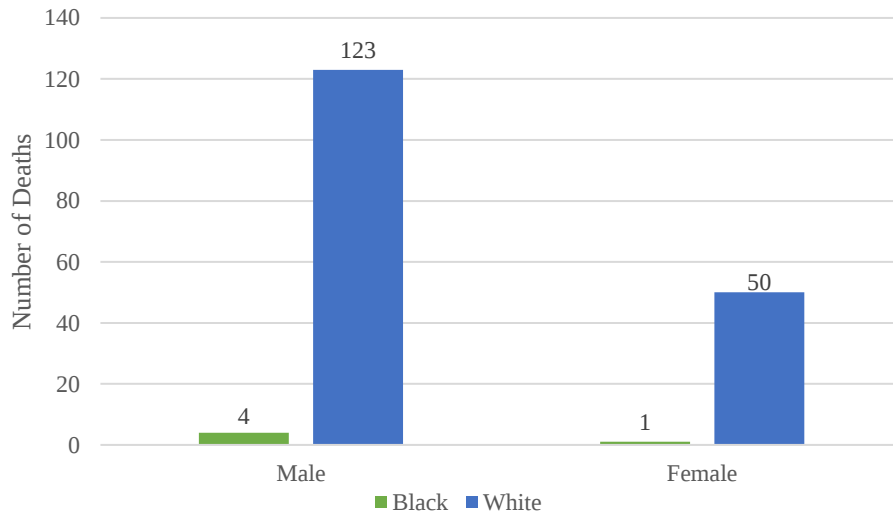


Figure 13 shows domestic violence deaths by both race and sex. White male deaths accounted for 69%, or 123 deaths, followed by White females accounting for 28%, or 50 reviewed deaths. Black males accounted for 2.5%, or four deaths. Finally, there was one Black female death that made up 0.5%. Although the population of West Virginia is largely white [12], women of color are at a higher risk of domestic violence than their white female peers. Per the NCADV, 51.3% of Black women who die due to homicide are killed in relation to intimate partner violence [9]. According to the Blackburn Center, domestic violence is the leading health issue facing Black women today [12].

Figure 13: Domestic Violence Associated Fatalities by Race and Sex, 2019 (n=178)



Manner of Death

Manner of death is broken into five categories: accident, homicide, suicide, natural, and undetermined. Figure 14 shows that most of the domestic violence deaths that were reviewed in West Virginia for calendar year 2019 were suicides. Suicides accounted for 106 of the 178 reviewed deaths, or 60%. 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 [5]. Suicide as the manner of death was followed by homicides at 26% with 47% of the deaths reviewed, falling within that category. Twelve deaths (7%) were ruled undetermined, ten deaths (6%) were ruled accidents, and three deaths (1%) were determined to be natural.

Figure 14: Manner of Death for Domestic Violence Associated Fatalities, 2019 (n=178)

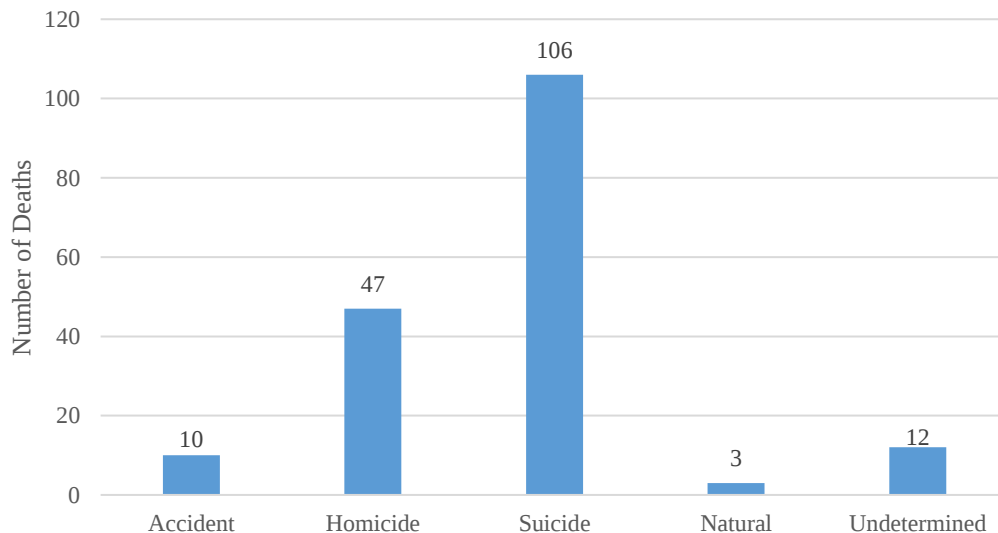


Figure 15 compares the manner of death and sex. The data show that males are most likely to die by suicide when related to domestic violence deaths. Male suicides accounted for 47% or 69 reviewed deaths. In several of these instances, the male decedent was a perpetrator of domestic violence. While this may not be a victim in the traditional sense, the death was still attributed to domestic violence. Female suicides accounted for 21% or 37 of the deaths reviewed, which is a significant increase from 2018. 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 [5]. Male homicides accounted for 19.0% or 34 deaths and female homicides accounted for 7% or 13 deaths. Twelve deaths were undetermined, seven males and five females. Ten deaths were accidents, six males and four females. Finally, there were three deaths ruled natural, all of whom were male.

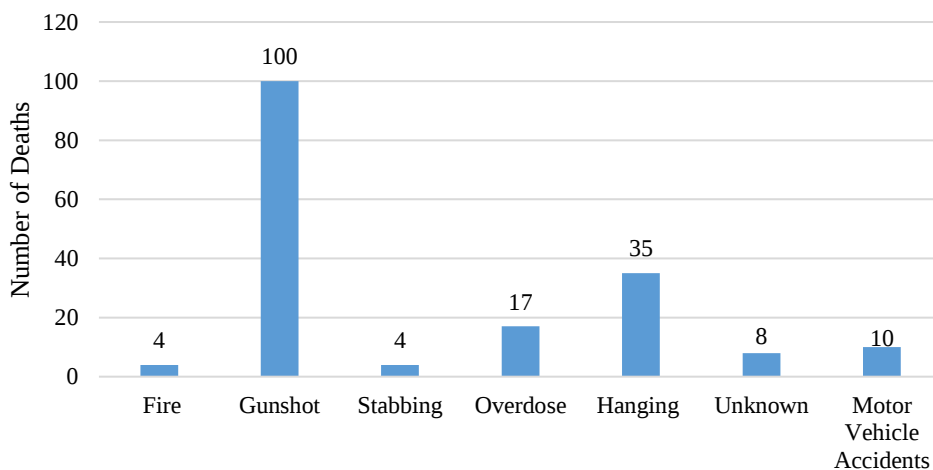
Figure 15: Manner of Death for Domestic Violence Associated Fatalities by Sex, 2019 (n=178)



Cause of Death

Domestic violence related deaths were broken into seven categories for cause of death, as seen in Figure 16, based on frequency. The most prevalent cause of death was gunshot wounds, which accounted for 100 deaths or 56% of all reviewed deaths.

Figure 16: Cause of Death for Domestic Violence Associated Fatalities, 2019 (n=178)



Child Present at the Scene

Twenty-one (12%) of the 178 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, are at a greater risk of tobacco use, substance abuse, obesity, cancer, heart disease, depression, and unintended pregnancy [6]. Further, children who are exposed to domestic violence, either as a witness or victim, are at a higher risk of being in an abusive situation in adulthood [10]. It is reported that in homes where domestic violence occurs, children witness it between 80 to 90 percent of the time. An estimated 30 to 60 percent of children are also victims of abuse [10].

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2021 Maternal Fatality Data Summary

In 2021, there were 22 pregnancy-associated maternal deaths. Eight (36.4%) were determined to be pregnancy-related, 12 (54.5%) that were pregnancy-associated but not related, and two (9.1%) could not determine whether pregnancy is related or associated.

Maternal Fatalities by Race

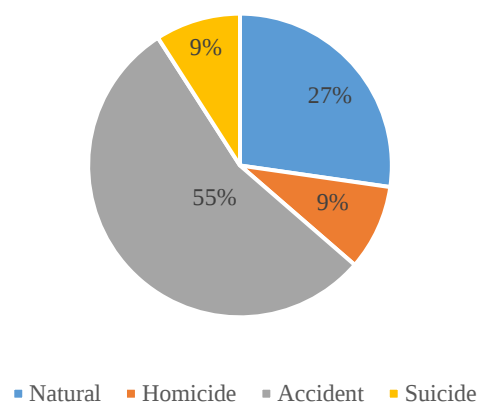
Maternal race is collected on each maternal death as listed on the death certificate and maternal race is collected on the birth certificate of the infant. The categories of race collected are: White or Caucasian, Black or African American, Asian, Hawaiian or Pacific Islander, Native American or Aleutian, two or more races, all other races, and unknown. As reported by the CDC, Black women are three times more likely to die from a pregnancy-related cause than White women. Multiple factors contribute to these disparities, such as variation in quality health care, underlying chronic conditions, structural racism and implicit bias. Social determinants of health prevent many people from racial and ethnic minority groups from having fair opportunities for economic, physical, and emotional health.

Of the 22 pregnancy associated deaths in 2021, all decedents were White women. West Virginia's breakdown of population by race as reported in the 2021 Vital Statistics reports shows of the 17,189 annual births, 91.8% (15,776) were born to mothers reporting race as White, 3.2% (550) were born to mothers reporting race as Black or African American, 1.1% (195) were born to mothers reporting race as Asian, Hawaiian or Pacific Islander, 0.2% (26) were born to mothers reporting race as Native American or Aleutian, and 2.5% (429) were born to mothers reporting race as two or more races. Due to the small population size of the state and local communities as well as the proportion of West Virginia residents that represent non-white racial and ethnic minority populations, identifying health disparities among populations requires a multi-year analysis which will be a focus for the FMRT in the coming year.

Manner of Death

Figure 17 displays the manner of death as: 12 (55%) accidental, six (27%) natural, two homicides (9%) and two (9%) suicides.

Figure 17: Pregnancy-Associated Deaths by Manner of Death, 2021 (n=22)

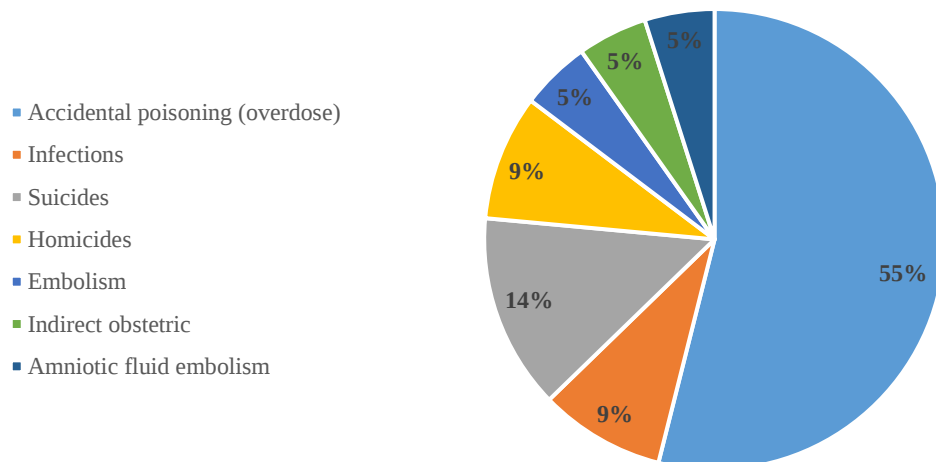


Cause of Death

Figure 18 displays cause of death with 12 (55%) pregnancy-associated deaths as accidental poisoning (overdose), two (9%) were infections, three (14%) were suicides, two (9%) were

homicides, one (4.5%) was an embolism, one (4.5%) was caused by indirect obstetric causes, and one (4.5%) was caused by an amniotic fluid embolism.

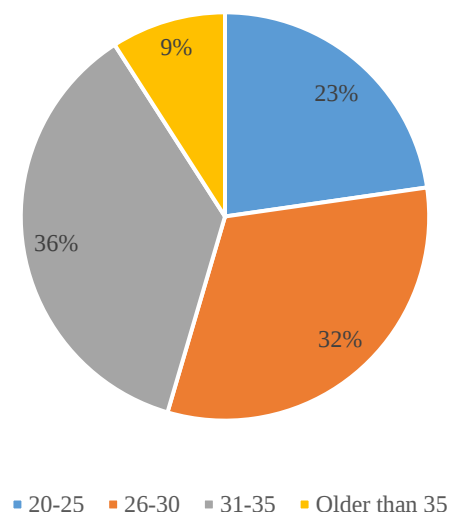
Figure 18: Pregnancy-Associated Deaths by Cause of Death, 2021
(n=22)



Maternal Age

Figure 19 displays a breakdown of the 22 pregnancy-associated deaths by maternal age with five (23%) decedents ages 20-25, seven (32%) decedents were 26-30 years of age, eight (36%) decedents were 31-35 years of age, and two (9%) decedents were older than 35 years of age.

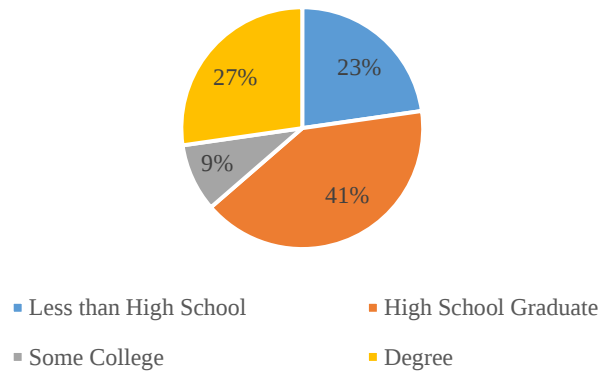
Figure 19: Pregnancy-Associated Death by Age, 2021 (n=22)



Maternal Education

Of the pregnancy-associated deaths that occurred in 2021, Figure 20 shows that five (22.7%) decedents had less than a high-school education, nine (40.9%) decedents had at least a 12th grade education, two (9.1%) decedents had some college, and six (27.3%) decedents had a college degree.

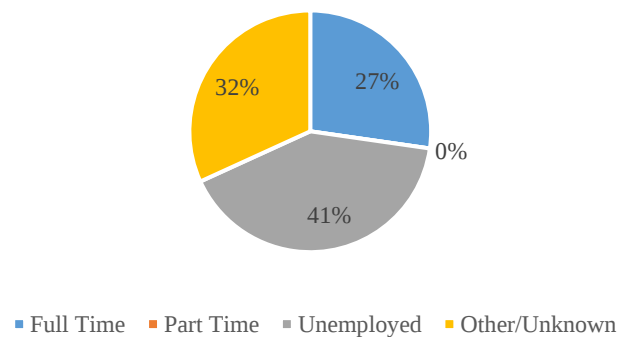
Figure 20: Pregnancy-Associated Deaths by Education, 2021 (n=22)



Maternal Employment

In 2021, six (27.3%) of the decedents worked full time, none worked part time, nine (40.9%) were unemployed, and in seven (31.8%) cases the decedent's employment status was other or unknown at the time of their death as shown in Figure 21.

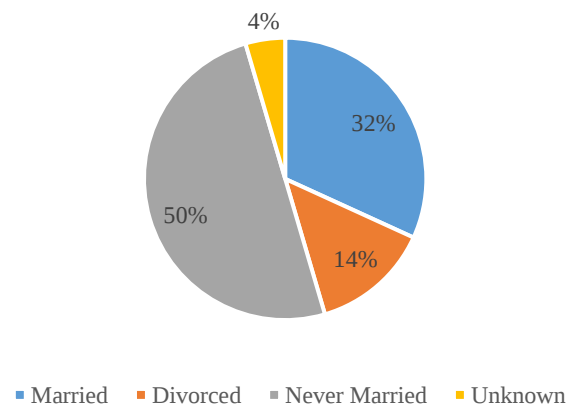
Figure 21: Pregnancy-Associated Death by Employment Status, 2021 (n=22)



Maternal Marital Status

In 2021, 11 (50%) of the maternal decedents had never been married, seven (32%) were married, three (14%) were divorced, and the marital status of one (4%) decedent was unknown as shown in Figure 22. Of the total resident births in West Virginia in 2020, 45.4% of women reported the marital status as not married and 54.6% of women reported the marital status as married.

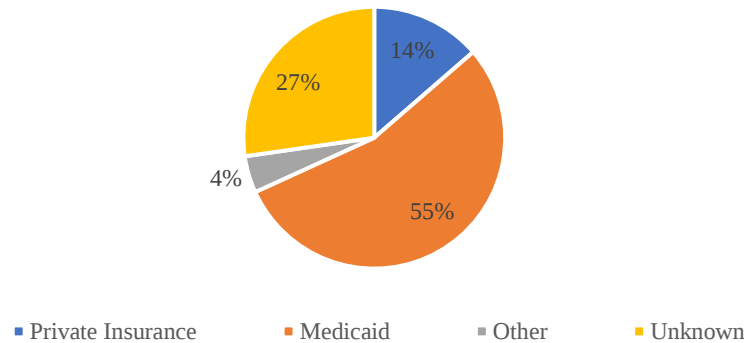
Figure 22: Pregnancy-Associated Deaths by Marital Status, 2021 (n=22)



Maternal Insurance Coverage

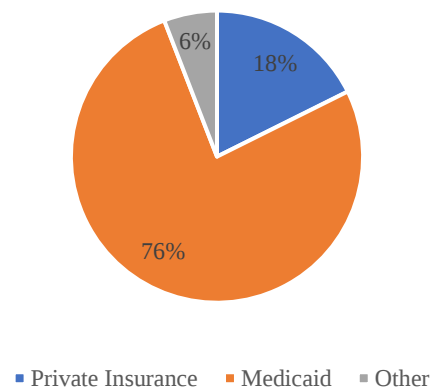
In 2021, Figure 23 displays pregnancy-associated deaths by prenatal insurance coverage. Medicaid was the primary insurer of prenatal care for 12 (55%) of the decedents; three (14%) of the decedents had private insurance for prenatal care; one (4%) decedent listed other for the insurance coverage; and the coverage was unknown for six (27.3%) of the decedents.

Figure 23: Maternal Deaths by Prenatal Insurance Coverage, 2021 (n=22)



In 2021, five decedents were pregnant at the time of their death and died prior to delivery and are not reflected in the data presented in Figure 24. Of the remaining 17 decedents for the infant delivery insurance analysis, Medicaid was the primary insurer for 13 (76.5%) of the decedents' infant's deliveries; private insurance was the primary insurer for three (17.6%) of the deliveries; one (5.9%) was listed as other.

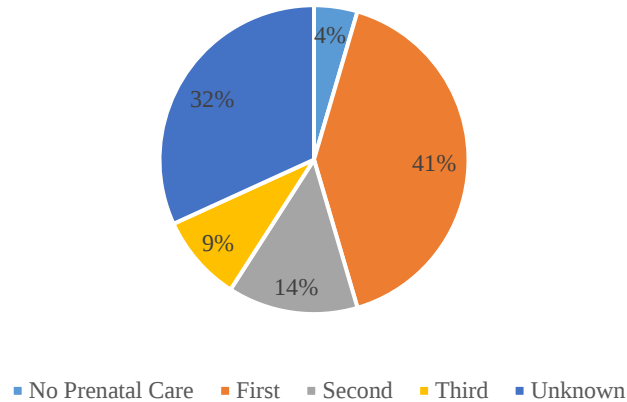
Figure 24: Pregnancy-Associated Deaths by Delivery Insurance Coverage, 2021



Maternal Prenatal Care

Nine (41%) decedents began prenatal care in the first trimester, three (14%) began in the second trimester, two (9%) decedents began in the third trimester, one (4%) had no prenatal care, and seven (32%) decedents had an unknown start of prenatal care as seen in Figure 25.

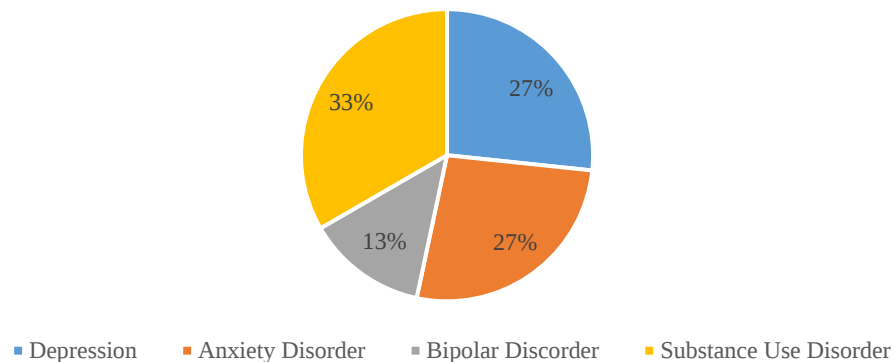
Figure 25: Pregnancy-Associated Deaths by Prenatal Care, 2021 (n=22)



Pre-existing Mental Health Conditions

In 2021, 15 (68%) of the maternal decedents had documented pre-existing mental health conditions. Of those, five (33%) of those were diagnosed with substance use disorder, four (27%) were diagnosed with depression, four (27%) were diagnosed with an anxiety disorder, and two (13%) were diagnosed with bipolar disorder. See Figure 26.

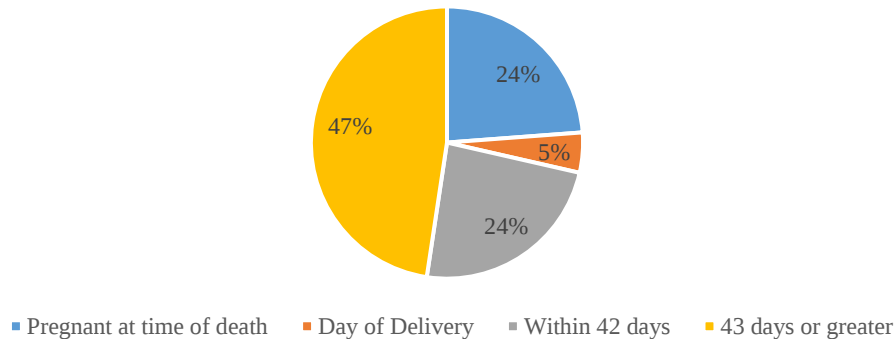
Figure 26: Pregnancy-Associated Deaths by Pre-existing Mental Health Condition, 2021 (n=15)



Time of Death

As illustrated in Figure 27, five (23.8%) deaths occurred concurrently with fetal demise; one (4.8%) death occurred on the day of the infant's delivery, five (23.8%) deaths occurred less than 42 days postpartum; 10 (47.6%) deaths occurred greater than 42 days postpartum; and one did not have time of death indicated.

Figure 27: Pregnancy-Associated Deaths by Time of Death, 2021 (n=21)



Cause of Death Among Pregnancy-Related Maternal Mortalities

The maternal mortality review panel members determined that eight (36.4%) of the deaths were pregnancy-related. The leading causes of death among those that were pregnancy-related were infections, embolism, mental health condition, amniotic fluid embolism, cardiomyopathy, conditions unique to pregnancy, and hemorrhage (Table 2).

Table 2: Cause of Death Among Pregnancy-Related Maternal Mortalities, 2021

Cause of Death	2021
Infection	2
Embolism (Excluding AFE)	1
Mental Health Conditions	1
Amniotic Fluid Embolism	1
Cardiomyopathy	1
Conditions Unique to Pregnancy	1
Hemorrhage (Excludes Aneurysms or CVA)	1
Total	8

According to the CDC's Enhancing Reviews and Surveillance to Eliminate Maternal Mortality Program, a death is considered preventable if the committee determines that there was at least some chance of the death being averted by one or more reasonable changes to patient, family, provider, facility, system, and/or community factors. Therefore, after in-depth panel discussions,

it was determined that 15 (68.2%) of the 22 pregnancy-associated deaths in 2021 were preventable and seven (31.8%) of the deaths were not.

2022 Maternal Fatality Data Summary

In 2022, there were 15 pregnancy-associated maternal deaths, of which two (13.3%) were determined to be pregnancy-related, 12 (80%) that were pregnancy-associated but not related, and one (6.7%) that has not been reviewed at this time. Due to a delay in record access, this case is excluded from the Maternal Mortality Committee Reviews section but included in the rest of the maternal death 2022 sections.

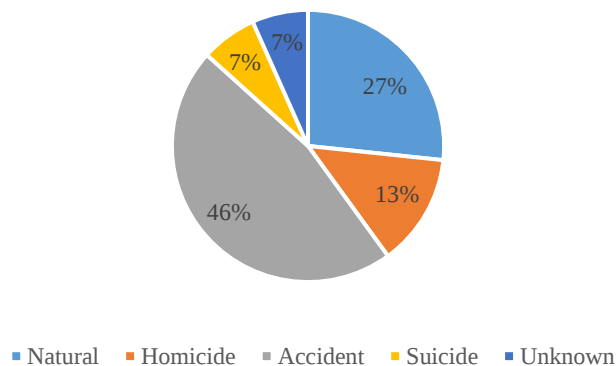
Maternal Fatalities by Race

Maternal race is collected on each maternal death as listed on the death certificate and maternal race is collected on the birth certificate of the infant. Of the 15 pregnancy-associated maternal deaths in 2022, 14 were White women and one was a Black woman. West Virginia's breakdown of population by race as reported in the 2020 Vital Statistics reports shows of the 17,327 annual births, 92.9% (16,061) were born to mothers reporting race as White, 3.7% (638) were born to mothers reporting race as Black or African American, 1.1% (183) were born to mothers reporting race as Asian, Hawaiian or Pacific Islander, 0.1% (24) were born to mothers reporting race as Native American or Aleutian and 2.2% (387) were born to mothers reporting race as two or more races.

Manner of Death

The manner of death was listed as: seven (46%) accidental, four (27%) natural, two homicide (13%) one (7%) suicide, and one unknown (7%). See Figure 28.

Figure 28: Pregnancy-Associated Deaths
by Manner of Death, 2022 (n=15)



Note: Unknown is listed for the number of cases in which the manner of death was not available to the nurse case abstractors.

Cause of Death

Accidental poisoning (overdose) was the cause of five (33.3%) pregnancy-associated deaths, three (20%) were from indirect obstetric causes, two (13.3%) were suicide, one (6.7%) was a motor vehicle accident, one (6.7%) was a homicide, one (6.7%) was an infection, one (6.7%) was caused by other ill-defined and unspecified cause of mortality, and one (6.7%) was caused by atherosclerotic cardiovascular disease.

Maternal Age

Of the 15 pregnancy-associated deaths illustrated in Figure 29, one (7%) decedent was less than 20 years old, one (7%) decedent was 20-25 years of age, five (33%) decedents were 26-30 years of age, six (40%) decedents were 31-35 years of age, and two (13%) decedents were older than 35 years of age.

Maternal Education

Of the pregnancy-associated deaths that occurred in 2022, three (20%) decedents had less than a high-school education, four (27%) decedents had at least a 12th grade education, three (20%) decedents had some college, and five (33%) decedents had a college degree. See Figure 30.

Maternal Employment

In 2022, four (27%) of the decedents worked full time, one (7%) worked part time, six (40%) were unemployed, and four (27%) of the cases were decedents whose employment status was other, or unknown at the time of death. See Figure 31.

Figure 29: Pregnancy-Associated Deaths by Age, 2022 (n=15)

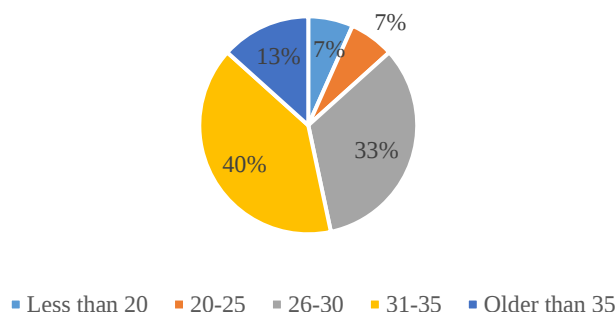


Figure 30: Pregnancy-Associated Deaths by Education, 2022 (n=15)

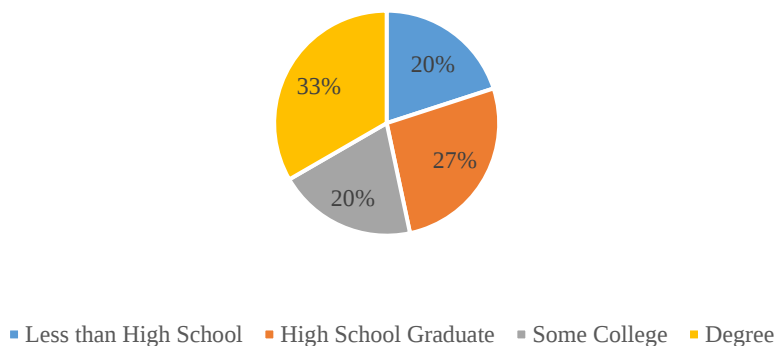
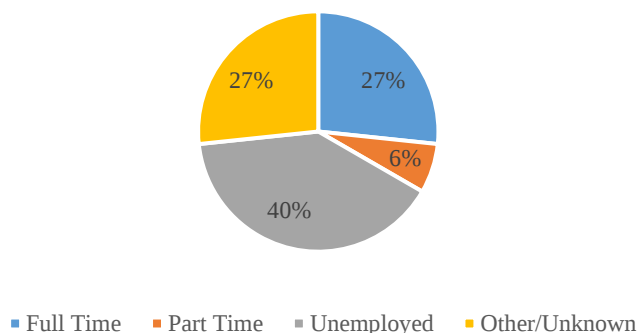


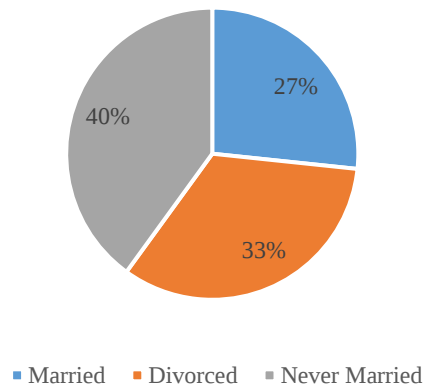
Figure 31: Pregnancy-Associated Deaths by Employment Status, 2022 (n=15)



Maternal Marital Status

In Figure 32, six (40%) of the maternal decedents had never been married, four (27%) were married, and five (33%) were divorced.

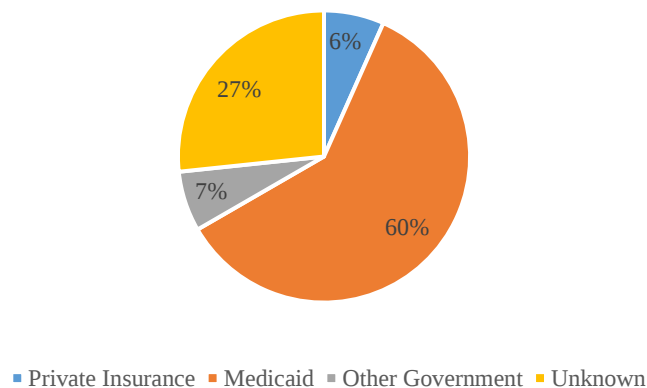
Figure 32: Pregnancy-Associated Deaths by Marital Status, 2022 (n=15)



Maternal Insurance Coverage

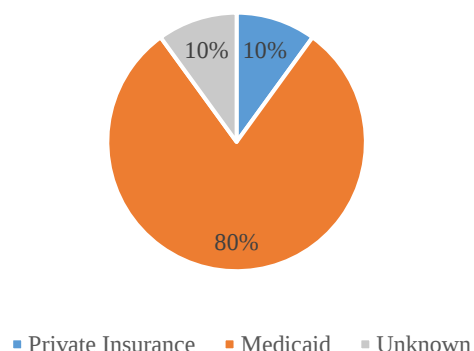
In 2022, Medicaid was the primary insurance coverage for nine (60%) of the decedents' prenatal care; private insurance was the primary insurance coverage for one (6.7%) for prenatal care; one (4.5%) maternal decedent had other government insurance, and the coverage was unknown for four (26.7%) of the pregnancy-associated decedents. See Figure 33.

Figure 33: Pregnancy-Associated Deaths by Prenatal Insurance, 2022 (n=15)



In 2022, five mothers were pregnant at the time of their death, so there were only ten decedents for the infant delivery insurance analysis. Medicaid was the primary insurance coverage for eight (80%) of the decedents infant's delivery; private insurance was the primary insurance coverage for one (10%) for delivery; and one (10%) was unknown. See Figure 34.

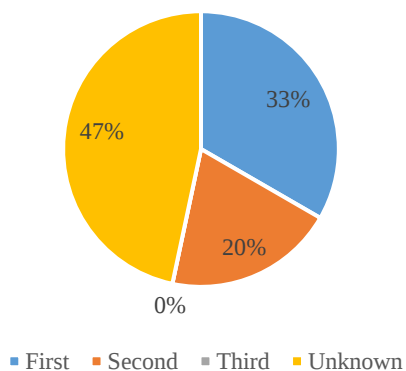
Figure 34: Maternal Death by Delivery Insurance Coverage, 2022 (n=10)



Maternal Prenatal Care

One third of the cases, or five decedents, began prenatal care in the first trimester, three (20%) began in the second trimester, none of the decedents began in the third trimester, and seven (47%) decedents had an unknown start of prenatal care.

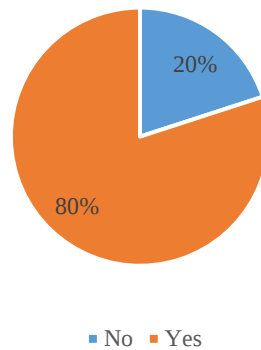
Figure 35: Pregnancy-Associated Deaths by Prenatal Care, 2022 (n=15)



Pre-existing Mental Health Conditions

In 2022, 12 (80%) of the decedents had documented pre-existing mental health conditions. Of those, five (41.7%) were diagnosed with substance use disorder, three (25%) were diagnosed with an anxiety disorder, and four (33.3%) were diagnosed with bipolar disorder.

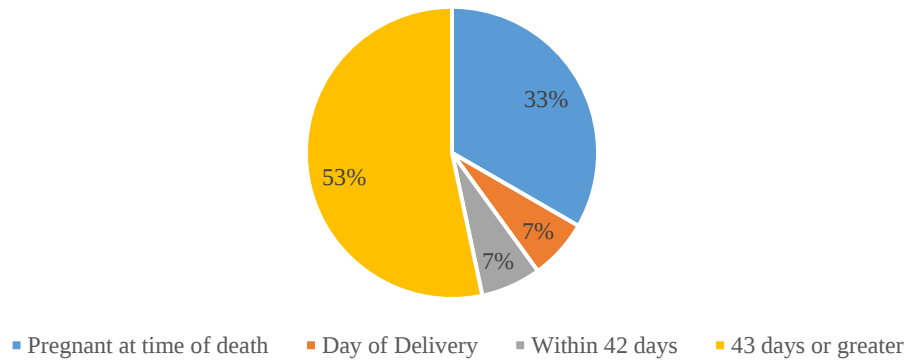
Figure 36: Pregnancy-Associated Deaths by Pre-existing Mental Health Condition, 2022 (n=12)



Time of Death

Five (33%) deaths occurred concurrently with fetal demise; one (7%) death occurred on the day of the infant's delivery, one (7%) death occurred less than 42 days postpartum; and eight (53%) deaths occurred greater than 42 days postpartum.

Figure 37: Pregnancy-Associated Deaths by Time of Death, 2022 (n=15)



Cause of Death Among Pregnancy-Related Maternal Mortality

The maternal mortality review panel members determined that two (14.3%) of the 14 deaths reviewed at this time were pregnancy-related. The leading causes of death for those two were embolism and mental health conditions (Table 3).

Table 3: Cause of Death Among Pregnancy-Related Mortalities

Cause of Death	2022
Embolism (Excluding AFE)	1
Mental Health Conditions	1
Total	2

2020 Infant Fatality Data Summary

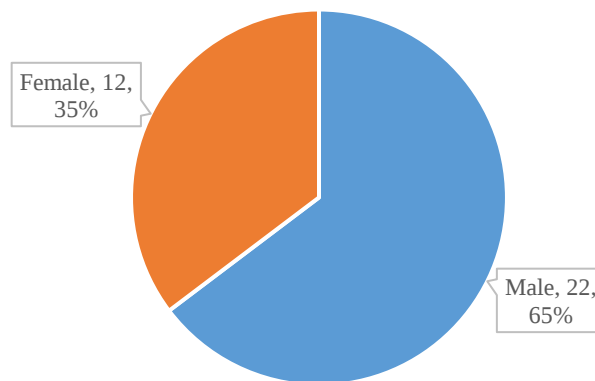
Infant deaths are reviewed by both the Child Fatality Review Panel as well as the Infant Mortality Review Panel. National guidelines exist for both types of reviews and are utilized by each case review panel. Child Fatality reviews are usually performed three years after the death has occurred, given that they are conducted once the case is closed by the OCME or any potentially involved court system. The 2020 Infant Fatality Data Summary is an excerpt from the Child Fatality Review Panel and is being presented in the section of this report that includes the Infant Mortality Review Panel's data for 2021 and 2022. The FMRT, with input from the case review panels, will work over the next year to integrate these two case review processes and analyses in future reports.

An infant death is the death of a child any time after their birth but prior to reaching their first birthday. In 2020, there were 34 preventable infant deaths reviewed by the Child Fatality Review Panel. Infant mortality is characteristically used as an indicator of the overall health of a society [3].

Demographics

Figure 38 depicts infant deaths in West Virginia divided into the category of sex. It shows that 22 male infants and 12 female infants died from a preventable cause in 2020.

Figure 38: Infant Deaths by Sex
2020 (n=34)



Infant deaths by race are shown in Figure 39. This figure demonstrates that most of the deaths (32) occurred in White infants. In 2019, there were two Black infant deaths. This has stayed the same for 2020.

The poverty status³ of infants who died of preventable causes in West Virginia in 2020 provides a figure that indicates a possible correlation. Figure 40 represents preventable deaths by poverty status of the parents at the time of the infant's death. Twenty-one of 34 infants were in poverty. This accounts for 62% of all preventable infant deaths, which has decreased from 76% in 2019. In West Virginia, infants in poverty were more likely than their non-poverty counterparts to die from

³ The poverty status is determined by family receiving Medicaid at time of infant's death.

a preventable cause. The high infant mortality rate in the United States has some association with disparities in socioeconomic status, which affects nutrition, food security, education, and health care⁴.

Figure 39: Infant Deaths by Race
2020 (n=32)

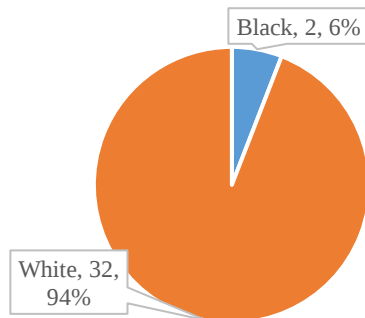
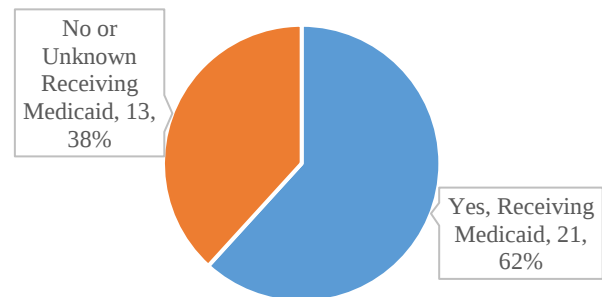
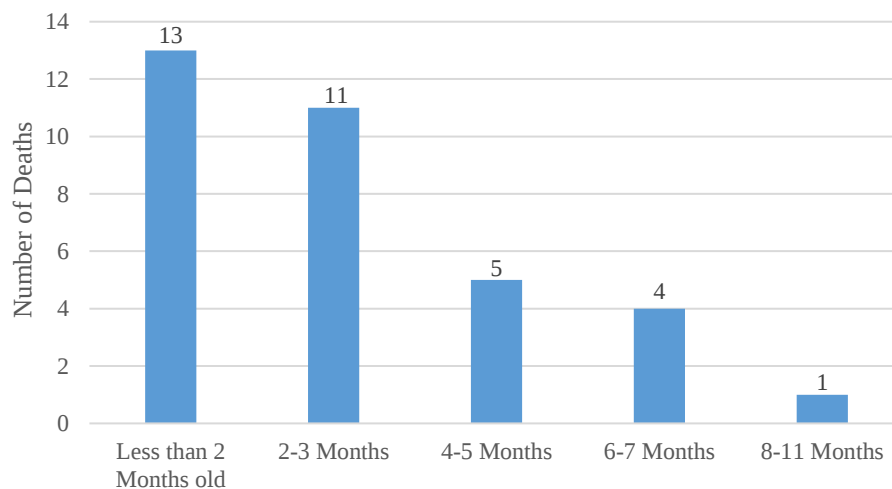


Figure 40: Preventable Infant Deaths
by Poverty Status
2020 (n=34)



Infant deaths are distributed across age categories in Figure 41. Most infant deaths occurred during the first three months of life. There was a significant decrease in deaths for the four-to-five-month age range, with a further reduction from six months onward.

Figure 41: Infant Deaths by Age in Months
2020 (n=34)

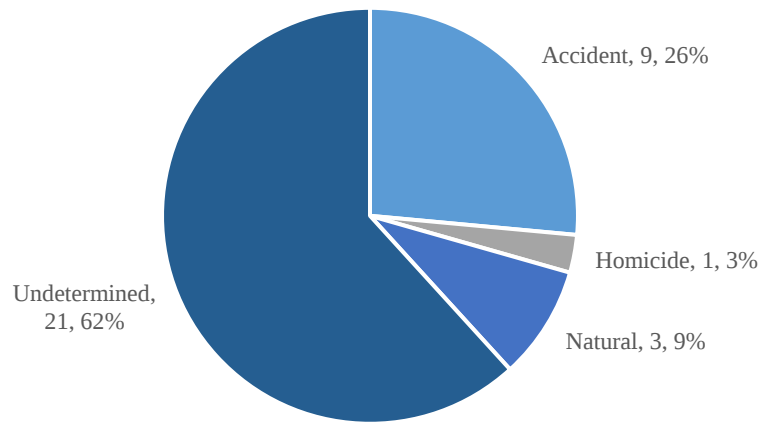


Manner of Death in Infants

The data on preventable death for infants is divided into four manner of death categories: accident, homicide, natural, and undetermined. Figure 42 depicts twenty-one deaths deemed undetermined, nine accidental deaths, one homicide, and three natural deaths.

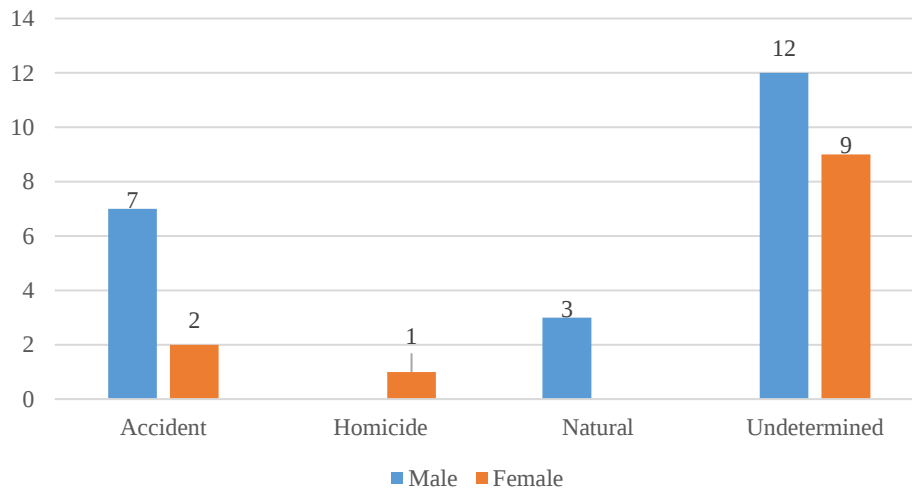
⁴ He, X., Akil, L., Aker, W. G., Hwang, H. -M., & Ahmad, H. A. (2015). Trends in Infant Mortality in United States: A Brief Study of the Southeastern States from 2005–2009. *International Journal of Environmental Research and Public Health*, 12(5), 4908–4920. <https://doi.org/10.3390/ijerph120504908>.

Figure 42: Manner of Death in Infants
2020 (n=34)



In Figure 43, the manners of death for infants are grouped by sex. Overall male infants died at higher numbers than female infants. Male infants accounted for the most undetermined and accidental deaths. Three male infants also died by natural causes.

Figure 43: Infant Manner of Death by Sex
2020 (n=34)



Causes of Death in Infants

The leading cause of death in West Virginia infants in 2020 was unknown (undetermined). Most of those deaths were attributed to an unsafe sleep environment. In the past, most deaths were labeled as sudden infant death syndrome (SIDS) even when there was evidence of unsafe sleep. Today, they can be labeled differently depending on findings during the investigation such as Sudden Unexplained Infant Death (SUID), undetermined/unknown cause, asphyxia, or suffocation. SUID is a general category under which all sudden unexpected deaths in infants fall, including SIDS. To further differentiate between the two terms, SUID is an infant death that does

not have a specific cause but has associated risk factors that may have contributed to the death. SIDS is the cause of death after the autopsy, death scene investigation, and medical history rules out all other possible causes and contributing risk factors.

There were 26 sleep-related deaths that occurred in 2020 in the state. It is important to look at the way these deaths were recorded to better understand the information within this report. The manner of death for 19 of 26 sleep-related deaths was undetermined. The remaining seven deaths were ruled as accidents.

The 26 unsafe sleep-related deaths were assessed for four common risk factors: co-sleeping, unsafe sleeping surface, unsafe sleeping position, and unsafe bedding. Figure 44 displays this information, which was found during unexpected infant death investigations. It is important to note that more than one category was a possible contributing factor to the infant death, so the total is more than the number of deaths. There were 21 cases in which the infant was put to sleep on an unsafe sleeping surface. This category includes anything not designed for infant sleeping such as an adult bed, couch, infant swing (unrestrained), or some type of pillow. Infants should be put to sleep on their backs. “Unsafe sleeping position” refers to any infant that was laid to sleep on either their stomach or side. Soft bedding/toys in a sleeping environment include crib bumpers, pillows, blankets, stuffed animals, or any other unnecessary materials in the sleeping area.

Figure 44: Unsafe Factors in Sleep-Related Deaths, 2020

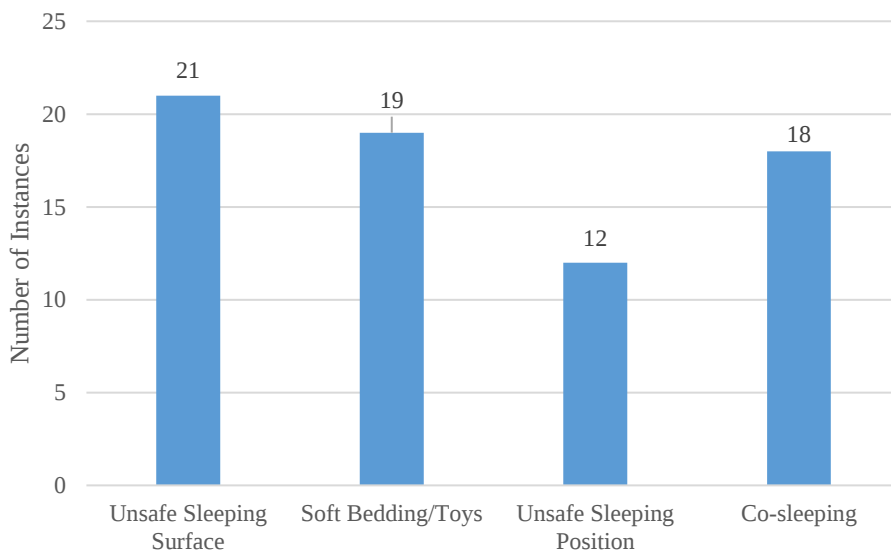


Figure 45 shows whether a crib or port-a-crib was in the home for infant use. The data states that 18 of 34 had a crib in the home for infant use. Five of 34 infants were known to not have a crib available. There were eleven infants for which it was unknown if a crib was available. In many instances a crib was available and regularly used; however, the infant death occurred on an unsafe sleeping surface. This is an important factor to consider since 18 of the 26 sleep-related deaths involved co-sleeping.

Figure 45: Availability of a Crib in Home
2020 (n=34)

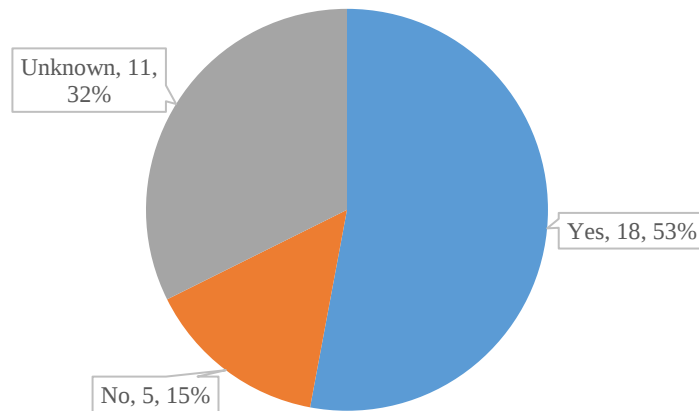
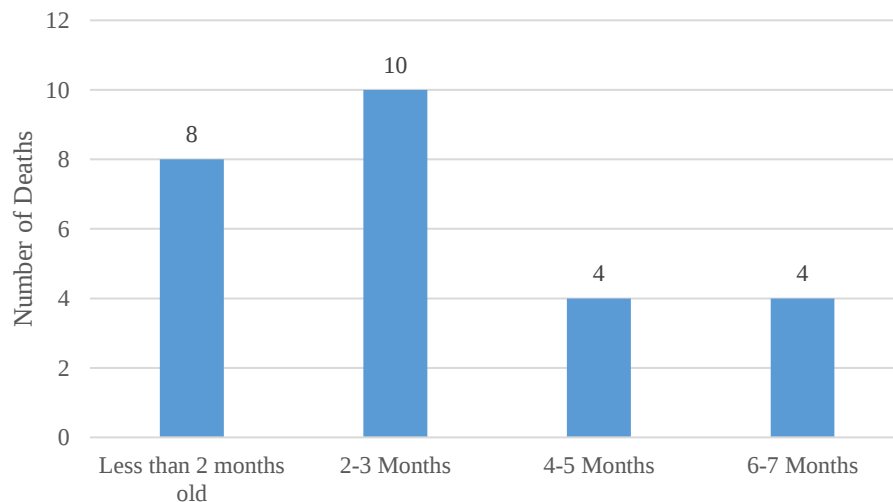


Figure 46 shows the unsafe sleeping deaths by age in months. In 2020, infants ranging in age from birth to three-months old were the most likely to die from unsafe sleeping practices with a peak during the two-to-three-months age period. This number reduced to four deaths in the next age category of four-to-five months old and continued through the six-to-seven months old range.

Figure 46: Sleep-Related Deaths by Age
2020 (n=26)

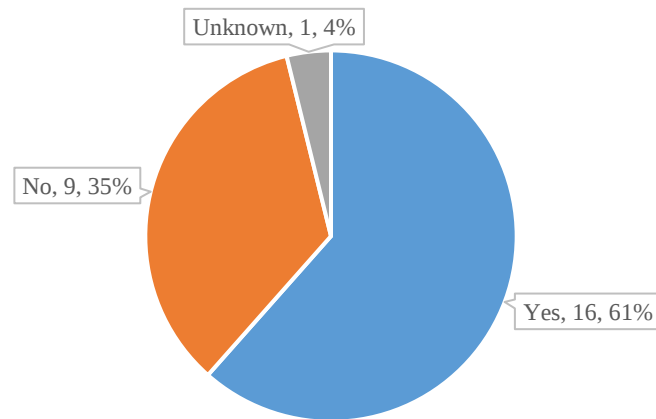


Smoking is a risk factor in SUID deaths. Figure 47 shows that at least 16 of the 26 infants with a sleep-related death were exposed to smoke in utero. There were nine infants that did not have smoke exposure during pregnancy, and one had an unknown status⁵. This is an important risk factor to consider; the CDC states infants who are exposed to smoke in utero are at risk of birth defects such as cleft lip or palate, have an increased risk of being born premature and/or at a low

⁵ Information as found by investigators during unexpected infant death investigation

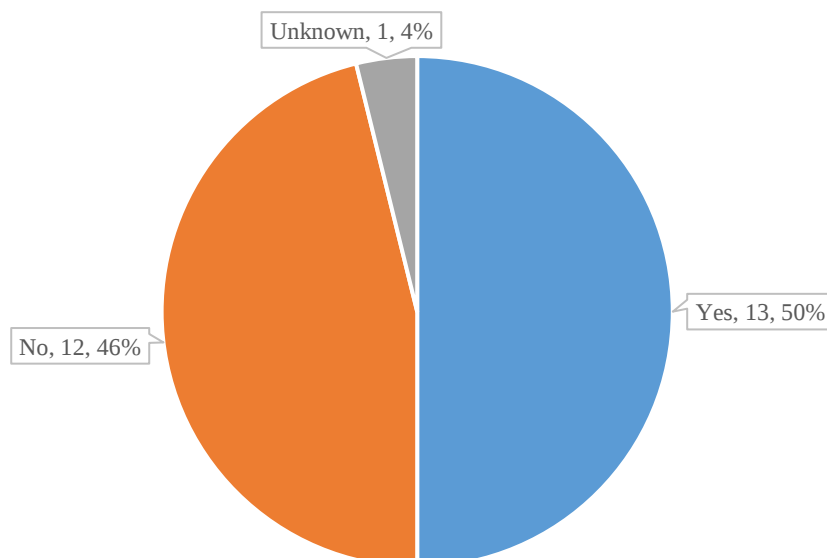
birth weight. Carbon monoxide from cigarettes can also prevent the baby from getting adequate oxygen. Babies born under these conditions are at an increased risk of poor health or death [5].

Figure 47: Smoke Exposure in Utero for Sleep-Related Deaths, 2020 (n=26)



Thirteen of the sleep-related infant deaths were reported to have second-hand smoke exposure. Second-hand smoke is another contributing factor to SUID⁶. According to the CDC, second-hand smoke exposure makes the baby three times as likely to die from SIDS. Additionally, infants exposed to tobacco smoke may develop respiratory-related illnesses, such as asthma [5].

Figure 48: Second-hand Smoke Exposure for Sleep-Related Deaths, 2020 (n=26)



⁶ Information as found by investigators during unexpected infant death investigation

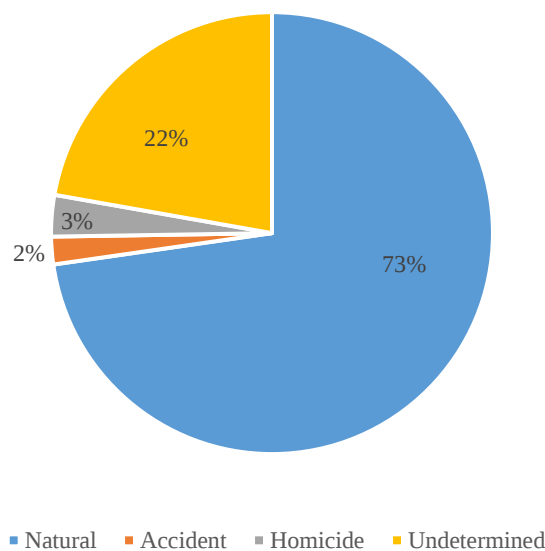
2021 Infant Fatality Data Summary

In 2021, the CDC reported the U.S. infant mortality rate as 5.4 infant deaths per 1,000 live births. West Virginia had the ninth-highest infant mortality rate in the nation (6.8 per 1,000 live births), reporting 117 infant deaths⁷ in this year.

Manner of Death

For calendar year 2021, 99 infant deaths were reviewed by the IMMRP. The manner of death was listed as: 72 (73%) natural; 22 (22%) undetermined; three (3%) homicides; and two (2%) accidents. Deaths not due to external causes (accident, homicide, suicide) are identified as “natural” and can be certified by any physician, whereas a manner of death other than natural requires a medical examiner to certify. These are typically deaths caused solely by disease or natural processes. Deaths in which the manner of death is classified as undetermined are deaths in which a single manner of death is not known, or a determination cannot be made between two or more competing manner types. See Figure 49.

Figure 49: Infant Deaths by Manner of Death, 2021 (n=99)



Cause of Death

Of the 99 infant deaths, unknown cause was the leading cause of death, with prematurity being the second leading cause of death and congenital anomalies as the third leading cause of death. The 27 unknown cause of death cases include five (18.5%) deaths from an external cause of injury and 22 (81.5%) deaths that were unable to be determined if they were a result of injury or natural cause. See Table 4.

⁷ Center for Disease Control and Prevention. n.d. Infant Mortality Rates by State. Retrieved from: https://www.cdc.gov/nchs/pressroom/sosmap/infant_mortality_rates/infant_mortality.htm

Table 4: Causes of Death for IMMRP-reviewed Infant Decedents, 2021 (n=99)

Cause of Death	Total
Unknown (external cause or unable to determine if injury or natural cause)	27 (27.3%)
Prematurity	18 (18.2%)
Congenital Anomaly	17 (17.2%)
Perinatal condition	11 (11.1%)
Other medical condition	11 (11.1%)
Cardiovascular	5 (5%)
Other infection	5 (5%)
Asthma/Respiratory	4 (4%)
Neurological/Seizure disorder	1 (1%)

Sudden unexpected infant death is a sudden and unexpected death of a baby aged younger than one year. For these deaths, there is no obvious cause before investigation. These deaths can include sudden infant death syndrome, accidental suffocation in a sleeping environment and other deaths from unknown causes. In West Virginia, when reviewing contributing factors in 2021, almost a quarter or 24 of 99 infant deaths could be attributed to SUIDs.

Sleep Related Deaths

Data from the death certificate and the IMMRP case review process revealed that 25 (25.2%) of the deaths reviewed in 2021 were related to sleeping or the sleep environment. Of these 25, more than half (13) took place in an adult bed; five (20%) took place in a bassinet or crib; and the remainder occurred on a couch, a chair, a swing and other locations. While the majority were put to sleep on their back (80%), more than half were found in a different or unknown sleeping position. Usual sleep location indicated more than half do not usually sleep in a crib or bassinet, but the majority (80%) are placed on their back to sleep. Not even half of these infants had a crib, portable crib, or bassinet in their home. See Table 5 below for further details.

Table 5: Infant Deaths related to Sleep/Sleeping Environment, 2021 (n=25)

Sleep environment	Number of infants (%)
Incident sleep place	25/99 (25.2%)
Crib	3 (12%)
Bassinet	2 (8%)
Adult Bed	13 (52%)
Couch	1 (4%)
Chair	1 (4%)
Other	3 (12%)
Swing	1 (4%)
Unknown	1 (4%)
Child put to sleep position	
On back	20 (80%)
On stomach	2 (8%)
On side	1 (4%)
Unknown	2 (8%)

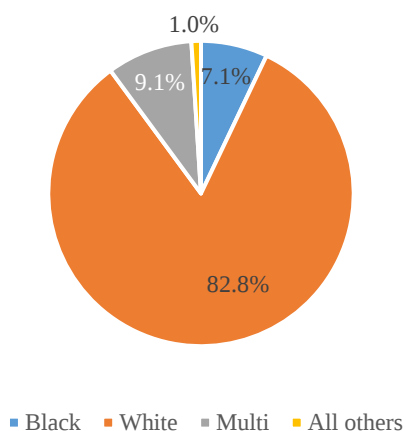
Child found sleep position	
On back	12 (48%)
On stomach	9 (36%)
On side	2 (8%)
Unknown	2 (8%)
Usual sleep place	
Crib	5 (20%)
Bassinet	5 (20%)
Adult Bed	6 (24%)
Other	3 (12%)
Bouncy chair	1 (4%)
Unknown	5 (20%)
Usual sleep position	
On back	20 (80%)
On side	1 (4%)
Unknown	4 (16%)
There was a crib, portable crib, or bassinet in the home.	12 (48%)

Infant Race

Nationally, the mortality rate for Black infants is more than twice the rate of White infants (10.5 per 1,000 live births vs 4.4 per 1,000 live births). During 2019 through 2021, the infant mortality rate among Black infants was much higher than that of White infants in West Virginia (10.3 per 1,000 live births vs 6.5 per 1,000 live births)⁸.

In 2021, 82 (82.8%) of the 99 infant decedents were White, seven (7.1%) were Black, nine (9.1%) were multi-racial, and one (1%) was of unknown race. Seven of the multi-racial infants were Black and White, one was Asian and White, and one was Pacific Islander and White. See Figure 50.

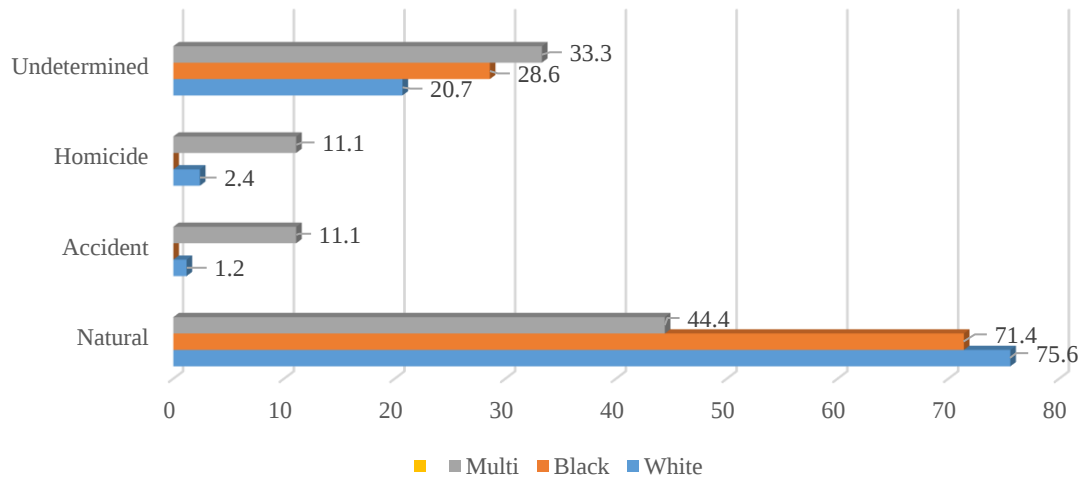
Figure 50: Infant Deaths by Race, 2021 (n=99)



⁸ March of Dimes. Infant Mortality Rates by Race: West Virginia, 2019-2021 Average. Retrieved from: <https://www.marchofdimes.org/peristats/data?reg=99&top=6&stop=94&lev=1&slev=4&obj=1&sreg=54>

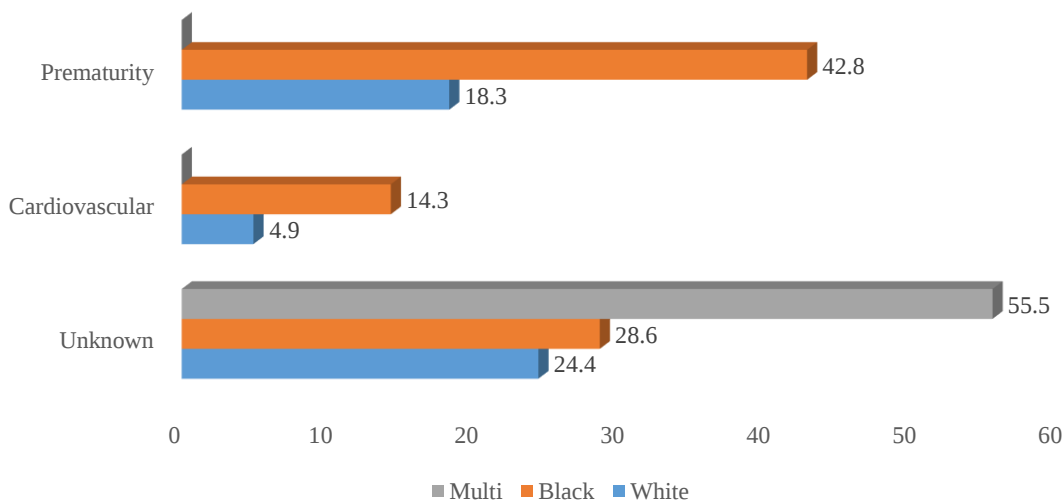
Natural was the leading manner of death in both Black and White infants in 2021. Undetermined was the second leading manner, with homicide and accident tied as the third leading manner of death for both races. See Figure 51.

Figure 51: Percentage of Manner of Death Among Races, 2021



The three leading causes of death for both Black and White infants were prematurity, cardiovascular, and unknown causes. However, for White infants, the leading cause of death behind unknown causes was congenital anomalies (20.7%). Congenital anomalies were not the cause of death for any Black or Multi-racial infants in 2021. Also, neurological/seizure disorder tied as the third leading cause of death among Black infants but was not a cause for any White nor Multi-racial infant deaths. See Figure 52.

Figure 52: Percentage of Leading Causes of Death Among Races, 2021

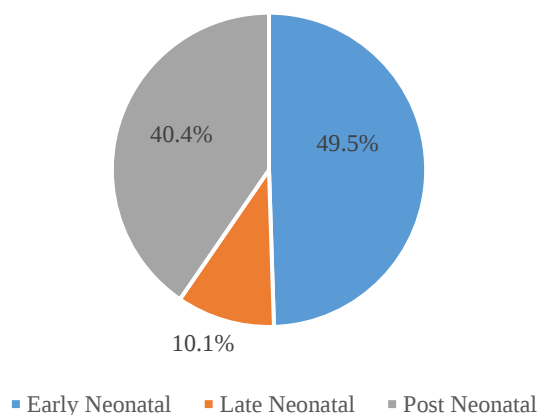


Infant Age at Time of Death

In the first four weeks of an infant's life, they are considered a neonate, and the risk of death is higher during that period time⁹. This is a time where feeding patterns are established, bonding between parents and infant begins, risk of infections are higher, and many birth and congenital defects are first noted¹⁰. Therefore, it is important to review neonatal deaths separately from all infant deaths to identify different risks among the neonatal groups (early neonate - six days or less, late neonate - seven to 27 days, and post neonate - 28 days to one year).

In 2021, the national neonatal mortality rate was 3.5 per 1,000 live births. West Virginia's neonatal mortality rate was 3.4 per 1,000 deaths (calculated by dividing number of neonate deaths- (59) by number of live births- (17,189). Of the 99 infant deaths reviewed by the IMMRP, 49 (49.5%) were early neonates (less than seven days old), ten (10.1%) were late neonates (7-27 days old), and 40 (40.4%) were post neonates (greater than 28 days old). See Figure 53.

Figure 53: Infant Deaths by Neonatal Stage at Time of Death, 2021 (n=99)



Manner of Death by Infant Age at Time of Death

Natural was the only manner of death for neonates that lived less than seven days, was the leading manner of death for those that lived between seven and twenty-seven days (80%) and was the second leading manner of death for those 28 days or older (37.5%). The leading manner of death for the post neonatal infants (28 days or older) was undetermined (50%). See Table 6.

⁹ World Health Organization. 2024. Newborn Health. Retrieved from: <https://www.who.int/westernpacific/health-topics/newborn-health>

¹⁰ MedlinePlus. 2023. Neonate. Retrieved from: <https://medlineplus.gov/ency/article/002271.htm>

Table 6: Manner of Death for IMMRP-reviewed Infant Decedents by Age at Time of Death, 2021 (n=99)

	Early Neonatal	Late Neonatal	Post Neonatal	Total
Natural	49 (100%)	8 (80%)	15 (37.5)	72 (72.7%)
Accident	0	0	2 (5%)	2 (2%)
Homicide	0	0	3 (7.5%)	3 (3%)
Undetermined	0	2 (20%)	20 (50%)	22 (22.2%)

Cause of Death by Infant Age at Time of Death

For infants who lived less than seven days, prematurity was the leading cause of death followed by other medical conditions as the second leading cause, and congenital anomalies and perinatal conditions tying for the third leading cause. Post neonatal infants (28 days or older) died mostly from unknown causes, with congenital anomalies as the second leading cause and other infections being the third leading cause.

Table 7: Cause of Death for IMMRP-reviewed Infant Decedents by Age at Time of Death, 2021 (n=99)

	Early Neonatal	Late Neonatal	Post Neonatal	Total
Unknown	0	2 (10%)	25 (62.5%)	27 (27.3%)
Asthma/Respiratory	2 (4.1%)	1 (10%)	1 (2.5%)	4 (4%)
Cardiovascular	2 (4.1%)	1 (10%)	2 (5%)	5 (5%)
Congenital Anomaly	9 (18.4%)	2 (20%)	6 (15%)	17 (17.2%)
Neurological/Seizure disorder	0	0	1 (2.5%)	1 (1%)
Prematurity	17 (34.6%)	0	1 (2.5%)	18 (18.2%)
Other infection	0	2 (20%)	3 (7.5%)	5 (5%)
Perinatal condition	9 (18.4%)	1 (10%)	1 (2.5%)	11 (11.1%)
Other medical condition	10 (20.4%)	1 (10%)	0	11 (11.1%)

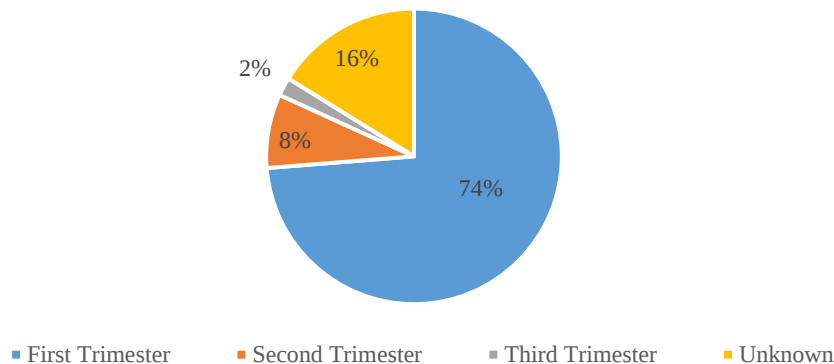
Of 24 SUID deaths reviewed in 2021, the majority (n=22) were post neonates (91.7%) and the other two deaths were among the late neonates (8.3%).

In reviewing 23 infant deaths due to unsafe environments among neonatal stages, unsafe sleeping conditions contributed to nine (18.4%) of the early neonate deaths and eight (20%) of the post neonate deaths. Unsafe sleeping conditions were present for two (4.1%) of the early neonate deaths and four (10%) of the post neonate deaths. Unsafe sleeping conditions were not present nor contributed to any late neonatal deaths in 2021.

Maternal Prenatal Care

Seventy-three (74%) of the 99 infant decedents began receiving prenatal care in the first trimester, eight (8%) began prenatal care during the second trimester, two (2%) began prenatal care in the third trimester, and 16 (16.2%) had none /unknown prenatal care. See Figure 54.

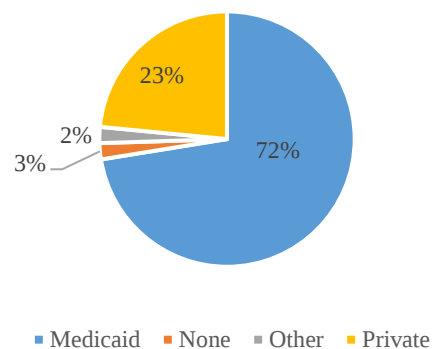
Figure 54: Infant Deaths by Prenatal Care, 2021 (n=99)



Insurance Coverage

In 2021, Medicaid was the primary medical coverage for the birth of 71 (71.7%) of the 99 infants that died, while 23 (23.2%) were covered by private insurance, two (2%) had other coverage and three (3%) had none/unknown coverage. See Figure 55.

Figure 55: Infant Deaths by Insurance Coverage, 2021



Preventability

According to the Center for Fatality Review and Prevention, a child's death is considered to have been preventable if an individual or the community could reasonably have done something that would have changed the circumstances that led to the child's death. After in-depth panel discussions, it was determined that 23 (23.2%) of the 99 infant deaths in 2021 were probably preventable, 54 (54.5%) were probably not preventable, and the preventability of 22 (22.2%)

deaths could not be determined. Of the 23 preventable infant deaths, the race of 19 (82.6%) were White, one (4.3%) was Black, and three (13%) were multiracial. There were two (9%) deaths where the panel could not determine if the death was preventable. Both had an open CPS case at the time of the death. See Table 8.

Table 8: Infant Mortality Review Determination of Preventability, 2021

Was death preventable?	White (N=82)	Black (N=7)	Multi (N=9)	Unknown (N=1)	Total
No, probably not	44 (53.6%)	5 (71.4%)	5 (55.5%)	0	54 (54.5%)
Yes, probably	19 (23.2%)	1 (14.3%)	3 (33.3%)	0	2 (23.2%)
Panel could not determine	19 (23.2%)	1 (14.3%)	1 (11.1%)	1 (100%)	22 (22.2%)

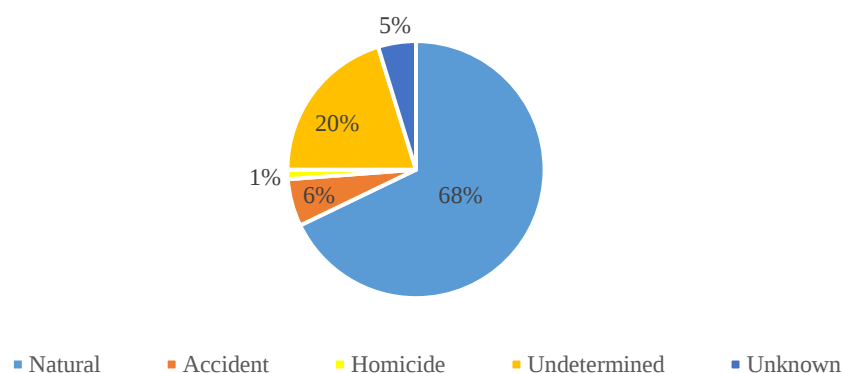
2022 Infant Fatality Data Summary (preliminary and partial year)

In 2022, the CDC reported the U.S. infant mortality rate as 5.6 infant deaths per 1,000 live births. West Virginia had the eighth highest infant mortality rates in the nation (7.3 per 1,000 live births), reporting 124 infant deaths¹¹. For the 2022 infant mortality review process, the review panel received 118 infant death records for review. At the time of this report, the panel reviewed 84 of those deaths which are summarized in this report. The remaining 34 deaths will be reviewed in March of 2025 and the final analysis for all 2022 deaths reported to the IMMRP will be included in next year's FMRT report.

Manner of Death

For calendar year 2022, 84 infant deaths were reviewed by the IMMRP. The manner of death was listed as: 57 (67.9%) natural, 17 (20.2%) undetermined, one (1.2%) homicide, five (5.9%) accidental, and four (4.8%) unknown manner. See Figure 56.

Figure 56: Infant Deaths by Manner of Death, 2022



Note: Unknown is listed for the number of cases in which the manner of death was not available to the nurse case abstractors.

¹¹ Center for Disease Control and Prevention. n.d. Infant Mortality Rates by State. Retrieved from: https://www.cdc.gov/nchs/pressroom/sosmap/infant_mortality_rates/infant_mortality.htm

Cause of Death

Of the 84 infant deaths, unknown cause was the leading cause of death, with prematurity being the second leading cause of death and congenital anomalies as the third leading cause of death. The 27 unknown causes of death include six (7.1%) deaths from an external cause of injury, 17 (20.2%) deaths that were unable to be determined if the cause was from an injury or natural cause, and four (4.8%) from unknown causes.

Table 9: Infant Deaths by Cause of Death, 2022

Cause of Death	Total
Unknown (external cause or unable to determine if injury or natural cause)	27 (32.1%)
Perinatal condition	15 (17.9%)
Congenital Anomaly	12 (14.3%)
Prematurity	10 (11.9%)
Other medical condition	9 (10.7%)
Other infection	8 (9.5%)
Cardiovascular	2 (2.4%)
Undetermined	1 (1.2%)

Sudden unexpected infant death is a sudden and unexpected death of a baby aged younger than one year. For these deaths, there is no obvious cause before investigation and include sudden infant death syndrome, accidental suffocation in a sleeping environment and other deaths from unknown causes. In West Virginia, when reviewing contributing factors in 2022, almost a third (32.1%) of the infant deaths could be attributed to SUIDs.

Sleep Related Deaths

Twenty-six (30.9%) of the deaths reviewed in 2022 were related to sleeping or the sleep environment. Of these 26, nine (34.6%) took place in an adult bed, six (23.1%) took place in a bassinet or crib, and the remainder occurred on a couch, a swing and other locations. While a little more than half were put to sleep on their back (57.7%), almost half were found in a different or unknown sleeping position. Usual sleep location indicated more than half do not usually sleep in a crib or bassinet, but the majority (80%) are placed on their back to sleep. More than half of these infants had a crib, portable crib, or bassinet in their home.

Table 10: Sleep Related Deaths by Sleep Environment, 2022

Sleep environment	Number of infants (%)
Incident sleep place	26/84 (30.9%)
Crib	4 (15.4%)
Bassinet	2 (7.7%)
Adult Bed	9 (34.6%)
Couch	4 (15.4%)
Other	2 (7.7%)
Swing	2 (7.7%)
Unknown	3 (11.5%)

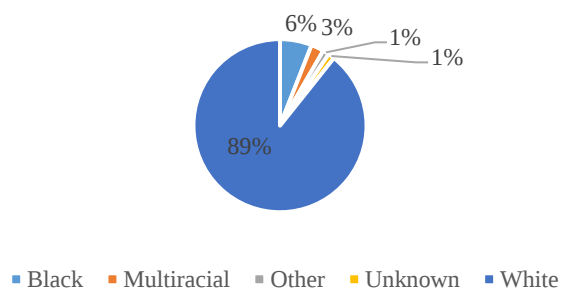
Child put to sleep position	
On back	15 (57.7%)
On stomach	6 (23.1%)
On side	2 (7.7%)
Unknown	3 (11.5%)
Child found sleep position	
On back	8 (30.8%)
On stomach	8 (30.8%)
On side	6 (23.1%)
Unknown	4 (15.3%)
Usual sleep place	
Crib	7 (26.9%)
Bassinet	6 (23.1%)
Adult Bed	6 (23.1%)
Other	2 (7.7%)
Swing	1 (3.8%)
Unknown	4 (15.3%)
Usual sleep position	
On back	13 (50%)
Stomach	3 (11.5%)
On side	1 (3.8%)
Unknown	9 (34.6%)
There was a crib, portable crib, or bassinet in the home.	17 (65.4%)

Infant Race

Nationally, the mortality rate for Black infants is more than twice the rate of White infants (10.9 per 1,000 live births vs 4.5 per 1,000 live births). During 2019 through 2021, the infant mortality rate among Black infants was much higher than that of White infants in West Virginia (10.3 per 1,000 live births vs 6.5 per 1,000 live births)¹².

In 2022, 75 (89%) of the 84 infant decedents were White, five (6%) were Black, two (3%) were multiracial, and two (2%) were unknown/other race. Both multi-racial infants were Black and White. See Figure 57.

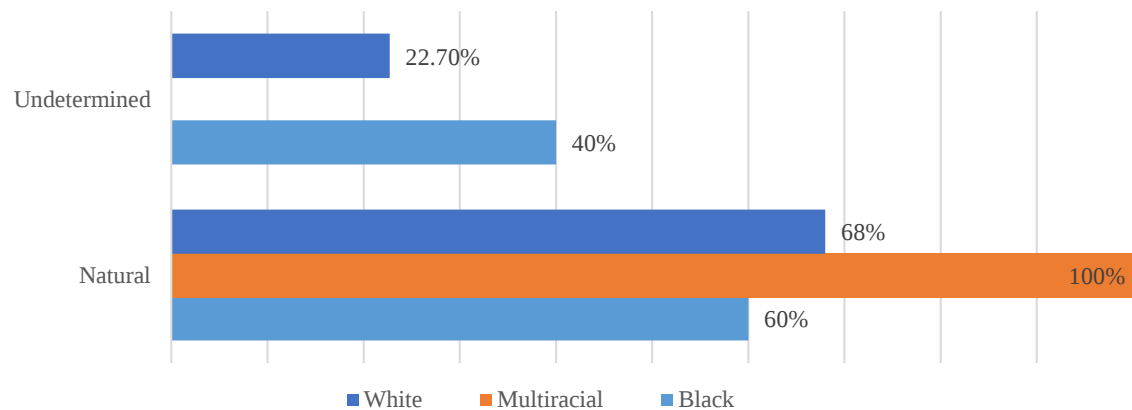
Figure 57: Infant Deaths by Race, 2022 (n=84)



¹² March of Dimes. Infant Mortality Rates by Race: West Virginia, 2019-2021 Average. Retrieved from: <https://www.marchofdimes.org/peristats/data?reg=99&top=6&stop=94&lev=1&slev=4&obj=1&sreg=54>

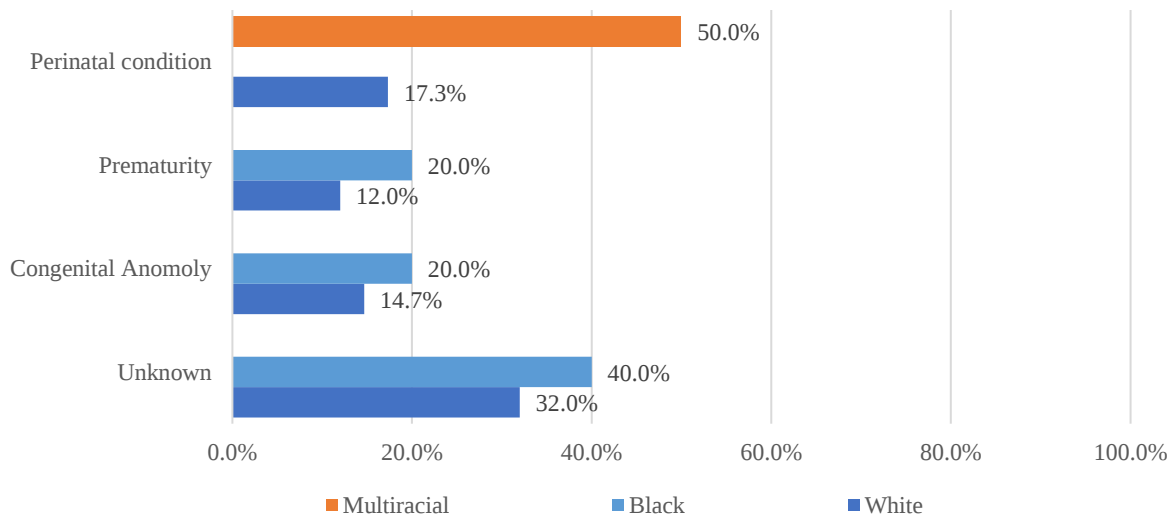
Natural was the leading manner of death in Black, White, Multiracial, and other raced infants in 2022. Undetermined was the second leading manner for both Blacks and Whites, and Whites were the only race with other manners of death (Accident and Homicide). See Figure 58.

Figure 58: Percentage of Manner of Death Among Races, 2022



The three leading causes of death for both Black and White infants were prematurity, congenital anomaly, and unknown causes. The causes of death for Black infants were two (40%) unknown, one (20%) congenital anomaly, one (20%) prematurity, and one (20%) other infection. White infants’ second leading cause of death behind unknown causes was 13 (17.3%) perinatal conditions. Other causes for White infants included nine (12%) other medical conditions, six (8%) other infections, two (2.7%) cardiovascular, and one (1.3%) undetermined. The two multiracial infants had other infection and perinatal conditions as causes of their deaths.

Figure 59: Percentage of Leading Causes of Death Among Race, 2022

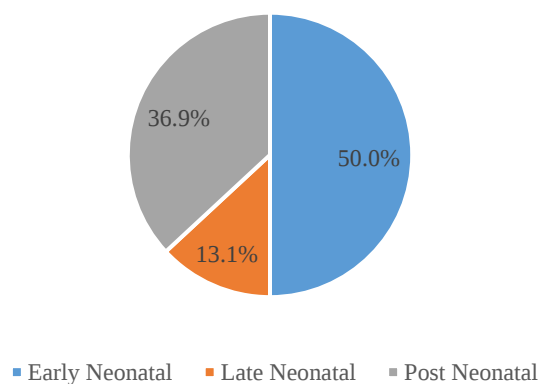


Infant Age at Time of Death

In the first four weeks of an infant's life, they are considered a neonate, and the risk of death is highest for them¹³. This is a time where feeding patterns are established, bonding between parents and infant begins, risk of infections are higher, and many birth and congenital defects are first noted¹⁴. Therefore, it is important to review neonatal deaths separately from all infant deaths to identify different risks among the neonatal groups (early neonate - six days or less, late neonate - seven to 27 days, and post neonate - 28 days to one year).

In 2022, the national neonatal mortality rate was 3.6 per 1,000 live births. West Virginia's neonatal mortality rate was 3.2 per 1,000 deaths (calculated by dividing number of neonate deaths - (53) by number of live births - (16,593). For the deaths that the IMMRP reviewed, 42 (50%) of the 84 decedents were early neonates (less than seven days old), 11 (13.1%) were late neonates (seven -27 days old), and 31 (36.9%) were post neonates (greater than 28 days old). See Figure 60.

Figure 60: Infant Deaths by Neonatal Stage at Time of Death, 2022 (n=84)



Manner of Death by Infant Age at Time of Birth

Natural was the leading manner of death for 38 (90.5%) of the neonates that lived less than seven days, the leading manner of death for eight (72.7%) of infants that lived between seven and 27 days and was the second leading manner of death for 11 (35.5%) of those that lived 28 days or longer. The leading manner of death for 15 (48.4%) of the post neonatal infants (greater than 28 days old) was undetermined. See Table 11.

¹³ World Health Organization. 2024. Newborn Health. Retrieved from: <https://www.who.int/westernpacific/health-topics/newborn-health>

¹⁴ MedlinePlus. 2023. Neonate. Retrieved from: <https://medlineplus.gov/ency/article/002271.htm>

Table 11: Manner of Death by Infant Age at Time of Birth

	Early Neonatal	Late Neonatal	Post Neonatal	Total
Natural	38 (90.5%)	8 (72.7%)	11 (35.5)	57 (67.9%)
Accident	0	2 (18.2%)	3 (9.7%)	5 (5.9%)
Homicide	0	0	1 (3.2%)	1 (1.2%)
Undetermined	1 (2.4%)	1 (9.1%)	15 (48.4%)	17 (20.2%)
Unknown	3 (7.1%)	0	1 (3.2%)	4 (4.8%)

Note: Unknown is listed for the number of cases in which the manner of death was not available to the nurse case abstractors.

Cause of Death by Infant Age at Time of Death

For infants who lived less than seven days, perinatal conditions were the leading cause of death followed by prematurity as the second leading cause, and congenital anomalies and other medical conditions tying for the third leading cause. Post neonatal infants (greater than 28 days old) died mostly from unknown causes, with congenital anomaly and other infections being the next two leading causes. See Table 12.

Table 12: Cause of Death by Infant Age at Time of Death

	Early Neonatal	Late Neonatal	Post Neonatal	Total
Unknown	4 (9.5%)	3 (27.3%)	20 (64.5%)	27 (32.1%)
Cardiovascular	1 (2.4%)	0	1 (3.2%)	2 (2.4%)
Congenital Anomaly	7 (16.7%)	2 (18.2%)	3 (9.7%)	12 (14.3%)
Prematurity	9 (21.4%)	1 (9.1%)	0	10 (11.9%)
Other infection	2 (4.8%)	3 (27.3%)	3 (9.7%)	8 (9.5%)
Perinatal condition	12 (28.6%)	1 (9.1%)	2 (6.4%)	15 (17.8%)
Other medical condition	7 (16.7%)	1 (9.1%)	1 (3.2%)	9 (10.7%)
Unknown	0	0	1 (3.2%)	1 (1.2%)

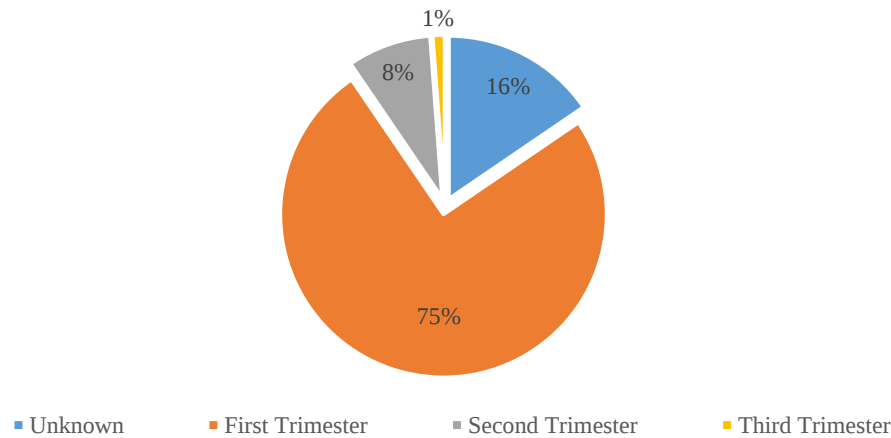
Note: Unknown is listed for the number of cases in which the manner of death was not available to the nurse case abstractors.

Of the 27 SUID deaths in 2022, the majority or 20 (74.1%) were post neonates (greater than 28 days old), three (11.1%) were late neonates (seven to 27 days), and four (14.8%) were early neonates (less than seven days).

Maternal Prenatal Care

Sixty-three (75%) of the 84 infant decedents began receiving prenatal care in the first trimester, seven (8%) began prenatal care during the second trimester, one (1%) began prenatal care in the third trimester, and 13 (16%) had none /unknown prenatal care.

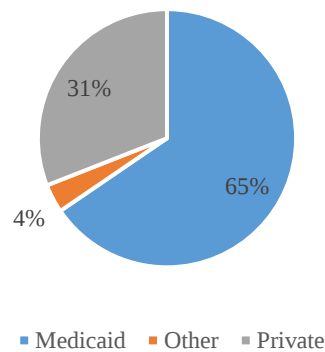
Figure 61: Infant Deaths by Prenatal Care, 2022 (n=84)



Insurance Coverage

In 2022, Medicaid was the primary medical coverage for the birth of 55 (65%) of the 84 infants that died, while 26 (31%) were covered by private insurance, and three (4%) had other coverage. See Figure 62.

Figure 62: Infant Deaths by Insurance Coverage, 2022 (n=84)



Preventability

According to the Center for Fatality Review and Prevention, a child's death is considered to have been preventable if an individual or the community could reasonably have done something that would have changed the circumstances that led to the child's death. After in-depth panel discussions, it was determined that 22 (26.2%) of the 84 infant deaths in 2022 were probably preventable, 43 (51.2%) were probably not preventable, and the preventability of 19 (22.6%) deaths could not be determined. Of the 22 preventable infant deaths, the race of 18 (81.8%) were White, three (13.6%) were Black, and one (4.5%) was unknown race. Seven infant deaths had open

CPS cases, four (57.1%) were not preventable, two (28.6%) were probably preventable, and one (14.3%) where the preventability could not be determined. See Table 13.

Table 13: Infant Mortality Review Panel Determination of Preventability

Was death preventable?	White (N=75)	Black (N=5)	Multi (N=2)	Unknown (N=2)	Total
No, probably not	37 (49.3%)	1 (20%)	2 (100%)	1 (50%)	43 (51.2%)
Yes, probably	18 (24%)	3 (60%)	0	1 (50%)	22 (26.2%)
Panel could not determine	20 (26.7%)	1 (20%)	0	0	19 (22.6%)

Definitions

Cause of Death

A medical opinion of the disease or injury that resulted in a person's death (what the person died of). Documentation of "cause of death" varies among data systems and may include terms such as "undetermined" and "unknown" separately.

Domestic Violence

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. Additionally, domestic violence is defined in W. Va. Code §48-27-202 as the occurrence of one or more of the following acts between family or household members 1) attempting to cause or intentionally, knowingly or recklessly causing physical harm to another with or without dangerous or deadly weapons; 2) placing another in reasonable apprehension of physical harm; 3) creating fear of physical harm by harassment, stalking, psychological abuse or threatening acts; 4) committing either sexual assault or sexual abuse and/or 5) holding, confining, detaining or abducting another person against that person's will.

Early Neonatal Death

Death of a newborn occurring from the first day to the seventh day of life.

Infant Case Review

The process by which all facts and circumstances about a deceased infant who has died in the first year of life.

Infant Death

Death of a live born infant in the first year of life.

Infant Mortality Rate

Number of infant deaths divided by the number of live births (rate reported per 1,000).

Late Neonatal Death

Death of a newborn occurring after the seventh day but before 28 completed days of life.

Live Birth

The complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy, which, after such expulsion or extraction, breathes or shows any evidence of life such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles, whether the umbilical cord has been cut or the placenta is attached.

Manner of Death

Classification system developed for public health statistics based on the circumstances under which death occurred (How the person died). There are five classifications including: 1) Accident: An unexpected or unforeseen death due to injury 2) Homicide: Death as a result of a volitional act committed by another person (e.g. injury, poisoning) 3) Natural: Death due solely to nature disease 4) Suicide: Death resulting from an intentional self-inflicted act 5) Undetermined: Manner of death used when the information pointing to one manner of death is no more compelling than another. 6) Unknown: Unknown is not a formal classification for manner of death but may be present when the manner of death is not available to the abstractor.

Maternal Death

Death of a woman during pregnancy, at the time of birth, or within one year of the birth of a child from any cause related to or aggravated by pregnancy or its management, but not from accidental or incidental causes.

Maternal Mortality Review Information Application (MMRIA)

Standardized data collection system that allows Maternal Mortality Review Committees to abstract relevant data from a variety of sources, document committee decisions and analyze data to better understand contributing factors and preventability of pregnancy related deaths.

Post Neonatal Death

Death of a newborn occurring between the ages of 28 days and 364 days.

Pregnancy-Associated Death (ACOG/CDC)

The death of a woman while pregnant or within one year of termination of pregnancy, irrespective of cause.

Pregnancy-Related Death (ACOG/CDC)

The death of a woman while pregnant or within one year of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by her pregnancy or its management, but not from accidental or incidental causes. Pregnancy-related deaths are caused by complications of the pregnancy itself, chain of events initiated by the pregnancy, or aggravation of an unrelated condition or event by the physiologic effects of pregnancy.

Pregnancy-Related Maternal Mortality Rate

Number of maternal deaths related to or aggravated by pregnancy divided by the number of live births (rate reported per 100,000).

Sleep Related Infant Death

A sudden, unexpected infant death that occurs during an observed or unobserved sleep period, or in a sleep environment.

Sudden Unexpected Infant Death (SUID)

Cause of death classified using methodology developed by the National Center for Fatality Review and Prevention for Sleep-Related Sudden Unexpected Infant Deaths analysis¹⁵.

Unexpected Death

The death of an infant who has died in the first year of life; or, a woman who has died during pregnancy, at the time of birth or within one year of the birth of a child, whose immediate death is not anticipated.

¹⁵ National Center for Fatality Review and Prevention. 2024. Quick Looks. Retrieved from: <https://ncfrp.org/center-resources/quick-looks/>