West Virginia
Infant and Maternal Mortality Review

Infant Deaths
Calendar Year 2015

Maternal Deaths
Calendar Year 2017
**Legislative History**
The West Virginia Legislature passed Senate Bill 234 on March 6, 2008. In effect 90 days from passage, a new article, designated §48-25A-1, §48-25A-2 and §48-25A-3, all relating to the creation of a Maternal Mortality Review Team, established its members and responsibilities and gave the West Virginia Department of Health and Human Resources, Bureau for Public Health rule-making authority for the team.

The passage of West Virginia House Bill 3028 in March 2011 expanded responsibilities of the Maternal Mortality Review Team to include infant mortality reviews and renamed the team the Infant and Maternal Mortality Review Team (IMMRT).

During the 2013 Legislative Session, Senate Bill 108 was passed creating the Fatality and Mortality Review Team and establishing four advisory panels: Unintentional Pharmaceutical Drug Overdose Fatality Review Panel (UPDODRP); Child Fatality Review Panel (CFRP); Domestic Violence Fatality Review Panel (DVFRP); and Infant and Maternal Mortality Review Panel (IMMRP), West Virginia Code §61-12A-2.

The Legislature found that there was a need for a process to study the causes of infant and maternal deaths. Comprehensive studies indicate that these mortalities are more extensive than they initially appear on death certificates. The Legislature believed that more extensive studies would enable development of a plan to reduce these deaths in the future.

The Infant and Maternal Mortality Review process is a method of understanding the diverse factors and issues that contribute to preventable deaths and identifying and implementing interventions to address these problems. The knowledge gained from the reviews will be used to enhance services, influence public health policy and direct planning efforts intended to lower mortality rates.

**Responsibilities of the Infant and Maternal Mortality Review Panel**
The IMMRT shall: (1) identify infant and maternal death cases; (2) review medical records and other relevant data; (3) determine preventability of deaths; (4) establish trends, patterns and risk factors and develop recommendations for the prevention of infant and maternal deaths; (5) provide statistical analysis regarding the causes of infant and maternal fatalities; (6) disseminate findings and make recommendations to policymakers, healthcare providers and facilities; and (7) promote public awareness of the incidence and causes of infant and maternal fatalities, including recommendations for their reduction.

The IMMRT shall submit an annual report to the Governor and to the Legislature concerning its activities and the incidence of infant and maternal fatalities within the State. The report is to include statistics setting forth the number of infant and maternal fatalities, identifiable trends in infant and maternal fatalities in the State, including possible causes, if any, and recommendations to reduce the number of preventable infant and maternal fatalities in the State.

**Definitions**
Maternal Mortality: 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.

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).
Infant Mortality: 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).

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.

Unexplained Death: The cause and manner of 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, that cannot be determined after an autopsy and thorough investigation of the circumstances surrounding the death.

Review: The process by which all facts and circumstances about a deceased 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 giving birth, are known and discussed among members of the Panel.

In 1986, the Centers for Disease Control and Prevention (CDC) and the American College of Obstetricians and Gynecologists (ACOG) collaborated to issue a statement recommending the use of two enhanced surveillance definitions as an approach to more accurately identify deaths among women in which pregnancy was a contributing factor.

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
- Aggravation of an unrelated condition or event by the physiologic effects of pregnancy

Case Identification of Maternal Deaths
Maternal deaths are identified from linking death certificates for women aged 10-50 years with birth certificates and fetal death certificates. Additional maternal deaths are identified by ICD 10 diagnostic codes O00–O99 – pregnancy, childbirth and the puerperium. All maternal deaths occurring 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. West Virginia residents who died in other jurisdictions are counted in the official Vital Statistics reports, but they are only included in the case reviews when additional information is available because of the difficulty in obtaining records across jurisdictions.

A Nurse Reviewer reviews death and birth certificates for all pregnancy-associated deaths. Once cases are identified as potentially pregnancy-related, medical records are obtained from all
healthcare facilities providing care before, during and after the pregnancy conclusion. Hospital records at the time of death and autopsy reports are included when applicable. Medical records are de-identified and a summary of events is developed. These documents are sent to all members prior to the meeting.

The IMMRP reviews the potential pregnancy-related cases to determine whether the maternal death was preventable or potentially preventable. Pregnancy-relatedness and opportunities for prevention are determined through Panel discussion.

The IMMRP reviews pregnancy-associated deaths caused from medical complications. The Panel determines whether the maternal death was preventable, not preventable and/or pregnancy-related. Opportunities for prevention are determined through Panel discussion.

Case Identification of Infant Deaths
Infant deaths are identified from linking birth and death certificates for infants in the first year of life. Due to perinatal influences of the mother’s health and maternal risk factors, maternal medical information obtained during pregnancy is also reviewed.

Case reviews are limited to infants who were residents of West Virginia at the time of their death. Infants who died in other jurisdictions are counted in official Vital Statistics reports, but are only included in the case reviews when additional information is available because of the difficulty in obtaining records across jurisdictions.

Maternal Deaths 2017

Manner of Death
In 2017, there were 16 pregnancy-associated maternal deaths of which four were determined to be pregnancy-related, one was tabled for discussion until next meeting pending additional information and one cannot determine whether pregnancy related or associated. The manner of death was listed as: eight (50%) accidental, five (31%) natural, one (6%) suicide, one (6%) undetermined and one (6%) pending death.

The pregnancy-related maternal mortality in 2017 was 21.4 per 100,000 (calculated as four maternal deaths by 18,675 residence births – preliminary 2017 Vital Statistics data).
Cause
In 2017, drug abuse was the cause of seven maternal deaths but drug use was noted in twelve of the sixteen deaths. Five deaths were natural with one cause of obesity and one cause of bilateral necrotizing pneumonia. One death was self-inflicted gunshot wound, one death was ill-defined causes, one death was complications of c-section wound and one death is pending cause.

Maternal Age
In 2017, five mothers were 20-25 years of age, five mothers were 26-30 years of age, five mothers were 31-35 years of age and one mother was older than 35 years of age.

Education
In 2017, two mothers had less than a high-school education, seven mothers had at least a 12th grade education, five mothers had some college and two mothers had a college degree.
Prenatal Care
In 2017, ten mothers began prenatal care in the first trimester, three mothers began in the second trimester, two mothers began in the third trimester and one mother had unknown prenatal care.

Time of Death
In 2017, one maternal death occurred with baby in utero; five maternal deaths, of which two were pregnancy-related, occurred less than 42 days postpartum; and ten deaths occurred greater than 42 days postpartum.
Insurance Coverage
In 2017, Medicaid was the primary insurance coverage in eleven of the sixteen cases; two deaths were covered by other insurance; and three cases had unknown insurance coverage.

Marital Status
In 2017, eight of the sixteen maternal deaths were women who had never been married, five of the deaths were women who had married and three of the deaths were divorced women.
Maternal Deaths 2007- 2017

The pregnancy-related maternal mortality rate for 2007-2017 was 11.5 per 100,000 (calculated as 26 maternal deaths by 225,429 residence births – Vital Statistics data). The 2015 estimated U.S. pregnancy-related maternal mortality rate was 14 maternal deaths per 100,000 births.

<table>
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<th>Year</th>
<th>All Deaths</th>
<th>Resident Births</th>
<th>Pregnancy-related Deaths</th>
<th>Pregnancy-related Rate</th>
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<td>2017*</td>
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*preliminary Vital Statistics data

Recommendations: Maternal Deaths

During review of the 2007-2017 cases, medical personnel, especially emergency room (ER) medical personnel, were not recognizing possible causes and were not always performing correct diagnostic procedures to rule out conditions that may or may not be related to the pregnancy when women were presenting with symptoms of:

- Nausea, vomiting and other vague abdominal symptoms.
- Hypertension, whether chronic or pregnancy-induced.
- Post-partum symptoms that may be related to cardiomyopathy.

Women were misdiagnosed resulting in complications that caused or contributed to their deaths. These problems were addressed through creation of subcommittees for development of educational materials for medical professionals and patients. The IMMRP developed practitioner educational posters for Hypertension/Preeclampsia and Peripartum Cardiomyopathy. These posters were distributed to all West Virginia hospital ERs, rural/community clinics and medical school curriculum across West Virginia. Once the educational materials were in place, available teaching moments such as Grand Rounds, medical journal articles, etc. were used to ensure the ER protocols were being practiced. The Panel recommended that the woman’s prenatal care medical practitioner should be notified immediately after she arrives to the healthcare facility. It was recommended in 2018 these educational posters be redistributed to facilities since it has been several years since they were initially distributed.
With the increase in maternal deaths relating to drug abuse, the Panel has recommended maintaining collaborations with the WV Perinatal Partnership and other stakeholders in continued education to providers and women of reproductive age of the negative outcomes associated with drug use before and during pregnancy.

An additional recommendation suggesting Quality Assurance measures be reviewed at specific facilities where possibly preventable maternal deaths have occurred.

**Infant Deaths 2015**

**Manner of Death**
For calendar year 2015, there were 139 infant deaths reviewed by the IMMRP. The manner of death was listed as 103 (74%) natural, 23 (17%) undetermined, two (1%) homicide and eleven (8%) accidental.

The infant mortality rate for West Virginia in 2015 was 7.02 infant deaths per 1,000 live births (calculated as 139 infant deaths by 19,778 residence births - 2015 Vital Statistics data). In 2015, the CDC reported the U.S. infant mortality rate as 5.9 infant deaths per 1,000 live births.

![2015 WV Infant Deaths by Manner of Death](image)

**Cause**
In 2015, of the 139 infant deaths, 36 deaths were due to prematurity, 42 deaths were due to birth defects, 23 deaths were Sudden Unexplained Infant Deaths (SUID), 25 deaths were medical related, 11 were accidental and two were homicide.
Infant Age at Time of Death
In 2015, 50 of the 139 deaths were less than one day old, 42 deaths were 1-28 days old and 62 deaths were greater than 28 days old.

![2015 WV Infant Deaths by Age](image)

Prenatal Care
In 2015, 82 of the 139 infant deaths began prenatal care in the first trimester. Twenty-nine deaths began prenatal care during the second trimester and six began prenatal care in the third trimester. Thirteen deaths had no prenatal care. The remaining nine deaths had unknown prenatal care.

![2015 WV Infant Deaths by Prenatal Care](image)
Insurance Coverage
In 2015, Medicaid was the primary medical coverage in 85 of the 139 infant deaths, while 38 were covered by other insurance and 16 had no/unknown insurance coverage.

Recommendations: Infant Deaths
The Panel recommends continued participation of collaborative efforts to address smoking among pregnant women. The Panel also recommends continued exploration of initiatives that will reduce sudden unexplained infant deaths, as these are deaths with modifiable risks factors that have an impact on preventable deaths. Additionally, the Panel recommends maintaining partnerships with the West Virginia Department of Health and Human Resources, Bureau for Children and Families and the Office of the Chief Medical Examiner in identifying infants that may be exposed to these risk factors before death and other infants in the household after an infant death has occurred as a preventative measure.

Additional recommendations include making educational material on safe sleep available at homeless shelters and women’s shelters across the State. Recommendations were also made regarding CPS follow-up procedures after an infant death has occurred in a home and measures taken to reduce the risk of another infant death in the future.