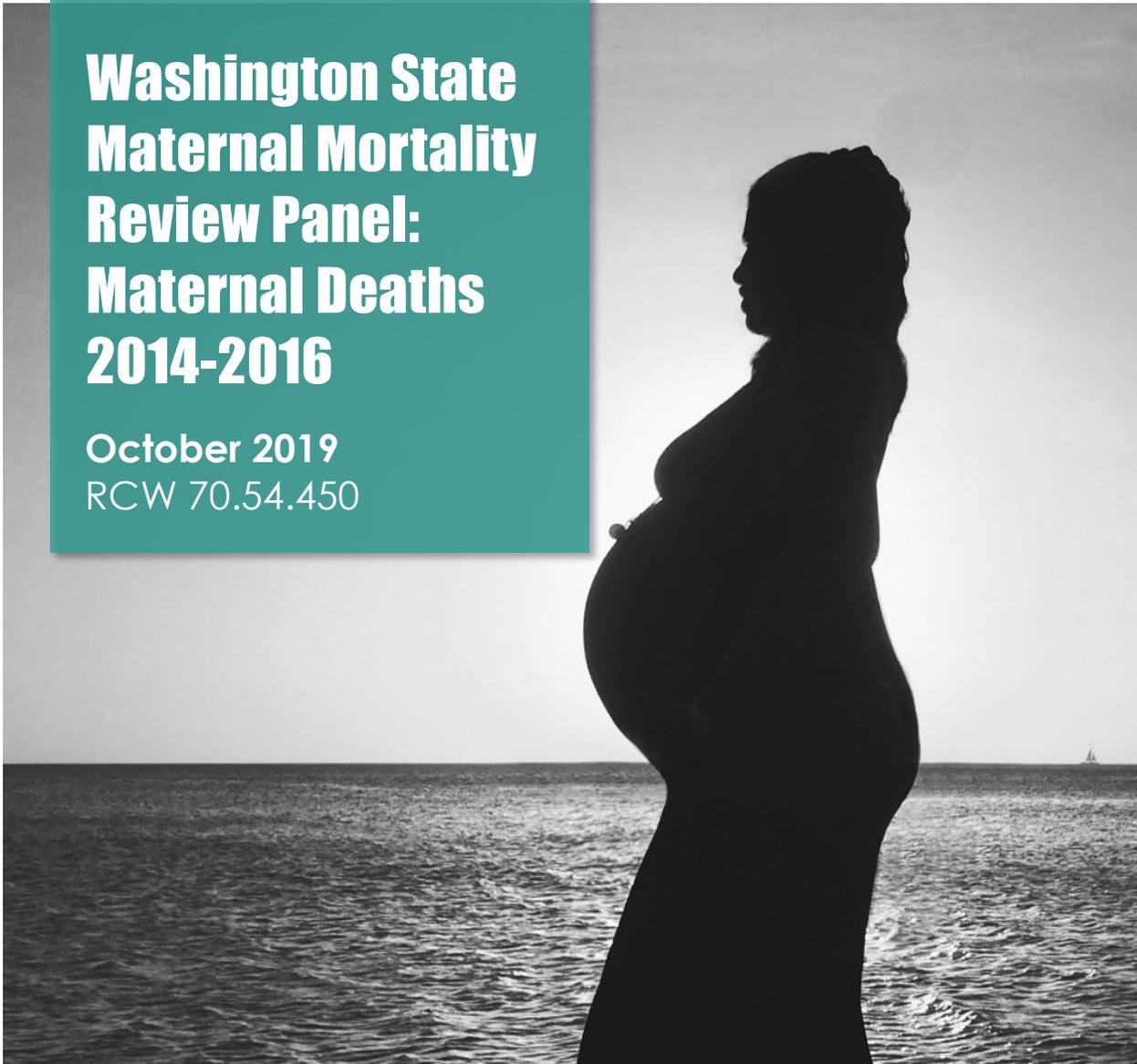


Report to the Legislature

**Washington State
Maternal Mortality
Review Panel:
Maternal Deaths
2014-2016**

October 2019
RCW 70.54.450



Prepared by the
**Prevention and Community
Health Division**



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Contents

- Acknowledgments..... 5
- Executive Summary..... 8
- Background 10
 - What does Maternal Mortality look like in the United States?..... 10
 - Have there been any changes to maternal mortality surveillance, nationally?..... 10
 - What is Washington doing to reduce maternal deaths?..... 11
 - Who is on the Maternal Mortality Review Panel?..... 11
 - What definitions does Washington use in the maternal mortality review?..... 12
 - How does the Panel conduct a maternal mortality review? 13
 - Why does this report include suicide and overdose deaths when they weren’t included in the last report? 14
- Findings 14
 - Maternal Mortality 2014-2016 16
 - Pregnancy-Associated Deaths, 2014-2016 17
 - Pregnancy-Related Deaths, 2014-2016 21
 - Pregnancy-Associated Deaths Due to Behavioral Health Conditions..... 27
 - Pregnancy-Associated Deaths from Accidental Substance Overdose..... 28
 - Pregnancy-Associated Deaths from Suicide 29
- Summary of Findings..... 30
 - What factors contributed to *preventable pregnancy-related deaths*? 31
- Recommendations 36
 - Priority Recommendation 1: Address racism, social determinants of health, and social inequities to reduce maternal mortality in priority populations..... 37
 - Priority Recommendation 2: Support active engagement by birthing hospitals, licensed birth centers, and perinatal providers in quality improvement efforts that reduce the leading causes of maternal mortality and morbidity. 40
 - Priority Recommendation 3: Ensure funding and access to postpartum care and support through the first year after the end of pregnancy..... 42
 - Priority Recommendation 4: Increase access and reduce barriers to behavioral health and community support structures from preconception through pregnancy and the first year postpartum. 44

Priority Recommendation 5: Increase and improve reimbursement for behavioral health care from preconception through all phases of pregnancy and the first year postpartum, including screening, treatment, monitoring, and support services.	46
Priority Recommendation 6: Increase knowledge and skill of providers, patients, and families about behavioral health disorders during and after pregnancy, and the treatment and the resources that are available for support.	47
What is the Department of Health doing to implement Recommendations?	49
Conclusion.....	51
Appendix 1: Review Process	56
Appendix 2: Additional Data & Findings	59
Pregnancy-related Deaths, Additional Data (N=30)	61
Pregnancy-related Deaths Due to Other Medical Causes (n=19).....	63
Pregnancy-associated, not related deaths from other medical causes	65
Pregnancy-associated deaths due to other injuries	66
Appendix 3: Maternal Mortality Review Panel Committee Decisions Form	68
Appendix 4: RCW 70.54.450	72
Appendix 5: Quality Improvement Updates.....	75
Appendix 6: An Early Look at 2017 Maternal Deaths.....	77
.....	77
Appendix 7: Review of 2014-2016 Maternal Deaths Fact Sheet	79



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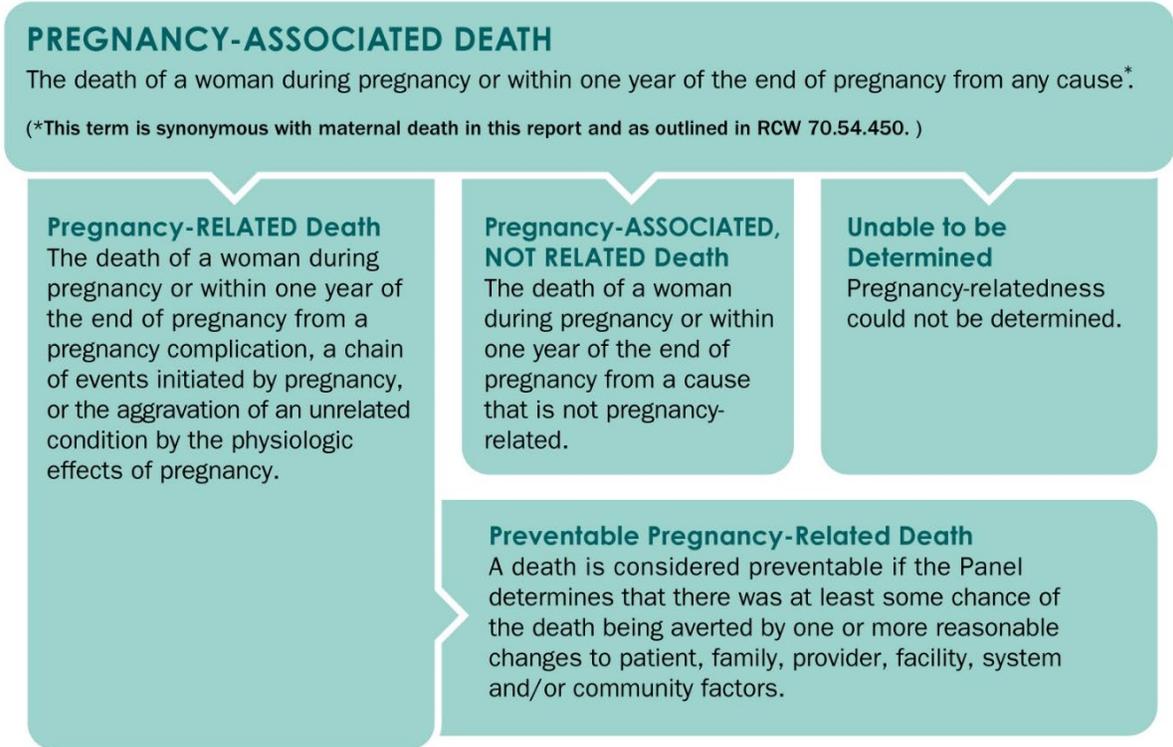
Executive Summary

The Washington State Legislature established a Maternal Mortality Review Panel (the Panel) within the Department of Health (the Department) in 2016. The Panel was tasked with reviewing maternal deaths within the state and producing a biennial report with findings and recommendations to prevent future maternal deaths. The Panel’s first report, released in 2017, covered maternal deaths between 2014 and 2015.

This report examines maternal deaths between 2014 and 2016 and includes data from the previously published report. The growing understanding of the complex role that behavioral health issues play in pregnancy led the Panel to examine maternal deaths from suicide and substance overdose for this report.

Findings from the 2014-2016 maternal mortality reviews identified 100 *pregnancy-associated deaths* in 2014-2016, which are deaths that occur during pregnancy or the first year after pregnancy. As shown in Figure 1a, these data include deaths related to pregnancy, not related to pregnancy, and those that can’t be determined if they are related to pregnancy (Figure 1a). Thirty of these deaths were determined by the Panel to be *pregnancy-related*, which means the Panel determined that the death occurred during pregnancy or within the first year after pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

Figure 1a: Key Definitions - Washington State Maternal Mortality Review Panel



Key findings include:

- Maternal mortality rates in Washington are not increasing like they are nationally.
- The leading underlying cause of death among *pregnancy-related* deaths (N=30) were behavioral health conditions, including suicide and overdose (30%), hemorrhage (20%) and hypertensive disorders in pregnancy (10%).
- The *pregnancy-related death* ratio was 11.2 deaths per 100,000 live births
- The majority of *pregnancy-related* deaths occurred during pregnancy or delivery (30%), or within 42 days after the end of pregnancy (35%).
- The Panel concluded that 60% of the *pregnancy-related deaths* were preventable.

Interpretations of the data presented in this report should be made with caution. While each death is a tragedy, the cohort of maternal deaths for 2014-2016 is relatively small, and slight changes could have resulted in very different percentages. Findings in this report are a snapshot of this three-year interval.

The Panel identified the factors that contributed to each preventable *pregnancy-related death*. These are the events or issues that, if altered, the Panel believes might have prevented the death. Factors identified included access to health care services, gaps in continuity of care (especially postpartum), gaps in clinical skill and quality of care (including delays in diagnoses, treatment, referral, and transfer), and lack of care coordination at the provider, facility, and systems levels. The Panel used this information to make recommendations to prevent maternal deaths. Recommendations are:

1. Address social determinants of health, structural racism, provider biases, and other social inequities to reduce maternal mortality in priority populations.
2. Support active engagement by birthing hospitals, licensed birth centers, and perinatal providers in quality improvement efforts that reduce the leading causes of maternal mortality and morbidity.
3. Ensure funding and access to postpartum care and support through the first year after pregnancy for all pregnancy outcomes.
4. Increase access and reduce barriers to behavioral health and community support structures from preconception through pregnancy and the first year postpartum.
5. Increase and improve reimbursement for behavioral health care from preconception through all phases of pregnancy and the first year postpartum, including screening, treatment, monitoring, and support services.
6. Increase knowledge and skill of providers, patients, and families about behavioral health conditions during and after pregnancy, and the treatment and resources that are available for support.

Background

What does Maternal Mortality look like in the United States?

Maternal mortality in the United States affects hundreds of families each year. The Pregnancy Mortality Surveillance System (PMSS) at the Centers for Disease Control and Prevention (CDC) reports that rates of maternal mortality have been on the rise since the 1980s. Nationally, approximately 700 women die each year from complications related to pregnancy and childbirth.ⁱ CDC estimates that 60% of these deaths are preventable.ⁱⁱ

Rates of maternal mortality in the United States are higher than those in most other developed nations.ⁱⁱⁱ A patient's race, income, and place of residence influence the quality of care she receives.^{iv} In addition to the women who die, as many as 60,000 more women suffer severe complications related to pregnancy and childbirth. These women are often burdened with significant medical, economic, and social setbacks that are costly to families, communities, and social and health resources.^v

Have there been any changes to maternal mortality surveillance, nationally?

The national picture of maternal mortality is difficult to understand because of variations in how state and federal agencies monitor maternal mortality. The most notable variations are the terms used to define types of maternal deaths, the sources of records and data used to draw conclusions and outline trends in maternal mortality, and the scope of work in which maternal mortality reviews are conducted. St. Pierre, et al identify three main systems of maternal mortality surveillance in the United States.^{vi} These systems are composed of the National Vital Statistics System and the Pregnancy Mortality Surveillance System at the federal level, and state or local maternal mortality review committees or panels.^{vii} Each system reports on different information and data for varied purposes, and states may select any one of these systems to report on maternal mortality. Because of this, comparability between states is limited, and state data cannot necessarily be compared to federal maternal mortality surveillance systems.

Findings from maternal mortality reviews result in the most accurate and comprehensive data and insight into the issues affecting maternal mortality. In the last year, a number of states have passed maternal mortality review legislation, and interest in establishing maternal mortality review panels continues to grow.^{viii}

A partnership between the CDC, the Association of Maternal and Child Health Programs (AMCHP), and the CDC Foundation, has focused efforts to improve and standardize maternal mortality surveillance in the United States. The partnership between these entities has led to the [*Building U.S. Capacity to Review and Prevent Maternal Deaths*](#) initiative. The goal of the initiative

is to increase the use of maternal mortality review panels or committees by individual states to develop a more comprehensive understanding of maternal mortality across the country.^{ix} The initiative is giving participating states tools and technical assistance on the use of those tools. Ideally, this initiative will result in increased use of maternal mortality reviews for surveillance by individual states and make comparisons between states easier and more accurate. This will help stakeholders and advocates save lives by focusing prevention activities to improve maternal care for women across the country.

What is Washington doing to reduce maternal deaths?

The Department has studied maternal mortality since 1990, and for more than 25 years data collected from birth and death certificates have been analyzed to understand Washington trends. Rates of maternal mortality in the state are relatively stable, and seem to be lower than the national average cited by the Pregnancy Mortality Surveillance System in 2018. However, before 2016 the maternal mortality reviews in Washington State had limited staffing, funding, and access to pertinent records, which made it difficult for experts to determine which deaths were preventable and what factors were contributing to the deaths.

In 2016, the Washington State Legislature passed Engrossed Second Substitute Senate Bill 6534 to establish an official Maternal Mortality Review Panel.^x The law directs the Panel to:

- Review maternal deaths in the state and determine if deaths are related to pregnancy;
- Identify factors contributing to those deaths;
- Make recommendations for systems changes to improve health care services for women;
- Submit a report of findings to the health care committees of the House of Representatives and Senate every two years.

The law gives the Department the authority to obtain pertinent vital records, medical records, and autopsy reports related to maternal deaths. The law also provides protections for those records and for the panel members who participate in the review. This authority and protection allowed the Department and the Panel to determine which deaths were preventable and identify the issues that lead to preventable deaths. The law was amended in 2019 to permanently establish the Panel and the maternal mortality review in Washington.

Who is on the Maternal Mortality Review Panel?

The Washington State Maternal Mortality Review Panel (the Panel) is made up of more than 60 health and service professionals from diverse backgrounds who live and work throughout the state. Panel members are appointed by the Secretary of Health and voluntarily serve on the panel for three to five years. Panel members must adhere to strict confidentiality rules and have no access to any identifiable information. They are presented with de-identified summaries of each

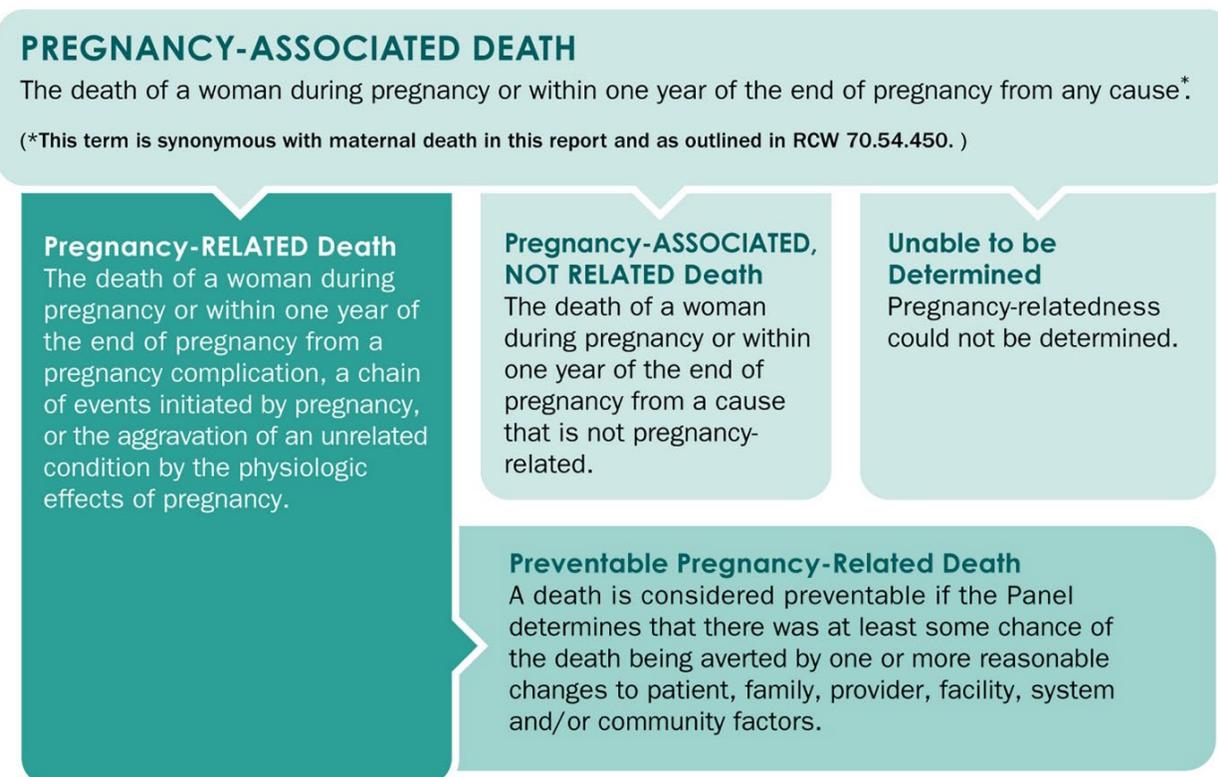
reviewed death, de-identified data, and aggregated data to conduct the review. They use this information to make key decisions to meet the goals and objectives of the review. Panel members are listed in the *Acknowledgements*.

What definitions does Washington use in the maternal mortality review?

In Washington, the four key definitions used in the maternal mortality review are those published by the CDC Foundation.^{xi}

A **pregnancy-associated death** is the death of a woman during pregnancy or within the first year after the end of her pregnancy from any cause (see Figure 1b). **This term encompasses deaths that are pregnancy-related, deaths that are pregnancy-associated but not related, and deaths that cannot be determined if they are related to pregnancy.** The term “pregnancy-associated death” is synonymous with maternal death in this report.

Figure 1b: Key Definitions - Washington State Maternal Mortality Review Panel



After the review process is complete, each pregnancy-associated death is categorized into one of three sub-categories, including (see Figure 1b):

- Pregnancy-related death
- Pregnancy-associated not related death, or
- Unable to determine pregnancy-relatedness

As part of the review process, the Panel works to determine which pregnancy-related deaths were preventable using the definition outlined in RCW (see Appendix 4).

How does the Panel conduct a maternal mortality review?

The Department and the Panel conduct the maternal mortality reviews through a multi-level process that is grounded in a maternal mortality review framework developed by the *Building U.S. Capacity to Review and Prevent Maternal Deaths* initiative^{xii}. This framework provides best practices and guidelines for reviewing pregnancy-associated deaths to determine pregnancy-relatedness, preventability, contributing factors to deaths, and opportunities for interventions. Additionally, the process is easily applied to all type of deaths, including deaths related to behavioral health conditions.

The process begins with the Department’s Center for Health Statistics working to identify maternal deaths in the state within a given time period and ends with the development of Panel findings and recommendations for legislators, including prevention activities (see Figure 2). With the exception of deaths related to homicide, each pregnancy-associated death is reviewed to determine whether it is pregnancy-related. If a death is pregnancy-related, the Panel determines if it was preventable, identifies contributing factors in the death, and makes recommendations on prevention. This process is outlined by the CDC Foundation (see Appendix 3). After qualitative and quantitative analyses of the review findings are completed, the Panel and the Department develop systems-level recommendations to improve maternal care based on the findings of the maternal mortality review. These are submitted to state legislators in a report due every three years in accordance with legislation revisions in 2019. For more details, see Appendix 1.

Figure 2: Multi-level Review Process, Washington State



Why does this report include suicide and overdose deaths when they weren't included in the last report?

Feedback from members of the Panel and key partners indicated a strong desire for Washington's maternal mortality review to acknowledge the magnitude of suicide and overdose deaths on maternal mortality. This is in large part due to a national paradigm shift in how mood disorders, suicide, and substance use are understood in relation to pregnancy. Contributing to this shift is the growing body of knowledge around behavioral health issues, particularly depression and substance use, and how they interact with pregnancy. Maternal deaths related to suicide and overdose were not reviewed or addressed by the Panel in the 2017 report because of resource and time constraints related to implementing new legislation.

Since the publication of the report in 2017, the CDC Foundation's initiative *Building U.S. Capacity to Review and Prevent Maternal Deaths* has encouraged maternal mortality review panels to include deaths related to suicide and overdose in maternal mortality reviews.^{viii} The recently published *Report from Nine Maternal Mortality Review Committees* indicates several maternal mortality review panels have begun including suicide and substance-related deaths in their maternal mortality review. These reviews are shedding light on the impact these illnesses have on women and families throughout the country.^{xiii}

Why doesn't this report include a review of deaths related to homicide?

Deaths related to homicide are not reviewed for pregnancy-relatedness and preventability in Washington's maternal mortality review. This is due in part to resource and staffing limitations, and also due to the nature of homicide deaths. Discussions on how and when to include these types of deaths in the maternal mortality review are ongoing.

Findings

A note about interpreting small numbers:

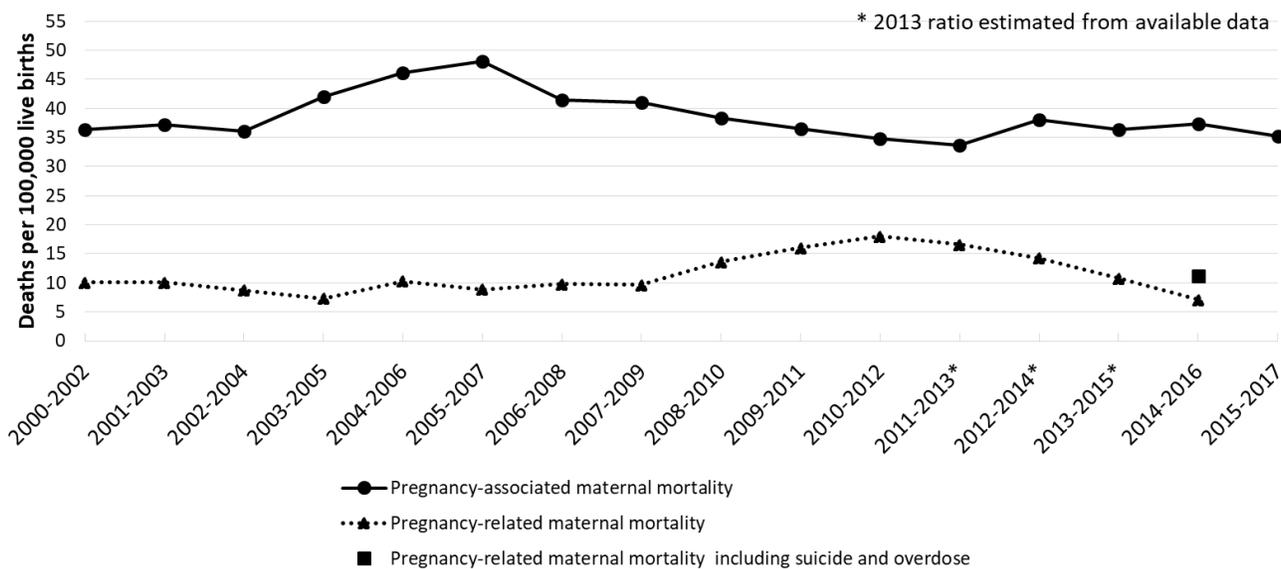
Data presented in this report is descriptive in nature and meant to illustrate the characteristics of the cohort of pregnancy-associated and pregnancy-related deaths for 2014-2016. Because of the relatively low number of deaths, slight changes could have resulted in very different percentages. The findings presented offer a snapshot of this three-year period. More data collected over the next five to ten years will clarify whether these associations regarding maternal mortality persist over time and can be generalized.

Trends of Maternal Mortality in Washington

Historical maternal mortality data collected between 2000 and 2016 show maternal mortality ratios over time in Washington State are relatively stable. Figure 3 shows trends of pregnancy-

associated and pregnancy-related maternal mortality ratios over time using a three-year rolling average. Additionally, two definitions of pregnancy-related death are presented: the rate based on the total number of pregnancy-related deaths that includes suicide and overdose; and the rate based on the historic definition of pregnancy-related death, without suicide and overdose. The latter is the most comparable to earlier maternal mortality ratios. Data analyses and findings covering pregnancy-related deaths using the historic definition of pregnancy-related death are included for informational purposes in Appendix 3.

Figure 3: Trends of Total Maternal Mortality and Pregnancy-Related Mortality Ratios (deaths per 100,000 live births), Washington State, 1990-2016.



Please note: Data collected and analyzed at the Department to understand trends of maternal mortality in Washington have become more robust over time. The review of maternal deaths before 2008 was restricted to birth, death, and hospitalization records; the review of deaths between 2009 and 2012 was limited to birth and death records. Maternal deaths in 2013 have not been reviewed due to resource constraints. An estimate for 2013 was used in Figure 3. The most comprehensive review to date was conducted for deaths that occurred in 2014 through 2016. The review was based on birth, hospitalization, and medical records, autopsies, and other available records. Different data sources limits comparability of data.

Total pregnancy-associated maternal mortality ratios were highest in 2005-2007 at 48 deaths per 100,000 live births. The rate from the most recent review period were lower at 37.3 deaths per 100,000 live births from 2014-2016. Preliminary data for 2017 indicate there are 32 potentially pregnancy-associated deaths to be reviewed resulting in an estimated ratio of 36.5 deaths per 100,000 live births from 2015-2017.

The highest *pregnancy-related* maternal mortality ratios occurred in 2010-2012, with 18 deaths per 100,000 live births. The most recent review period covering the years 2014-2016 were among the lowest measured in Washington, with seven deaths per 100,000 live births (Figure 3). The pregnancy-related maternal mortality ratio of 11.2 deaths per 100,000 live births reflects an expanded definition that included deaths due to suicide and overdose in addition to deaths caused by other diseases and conditions. (Figure 3; Table 1).

Maternal Mortality 2014-2016

There were 268,050 live births in Washington during 2014-2016. The Department identified 100 maternal deaths, resulting in a pregnancy-associated maternal mortality ratio of 37.3 deaths per 100,000 live births. Thirty of these deaths were determined by the Panel to be pregnancy-related resulting in a pregnancy-related maternal mortality ratio of 11.2 deaths per 100,000 live births (see Table 1).

Table 1: Maternal Mortality Ratios (deaths per 100,000 live births) and 95% Exact Confidence Limits, Washington State, 2014-2016

	2014	2015	2016	2014-2016	Ratio (deaths per 100,000 live births) and 95% Confidence Limits*
Total Pregnancy-Associated Deaths	38	31	31	100	37.3 (30.3, 45.4)
Pregnancy-Related Deaths	13	8	9	30	11.2 (7.6, 16.0)
Pregnancy-associated, not related	25	19	19	63	23.5 (18.1, 30.1)
Pregnancy-Associated but Unable to Determine if Related	0	4	3	7	

*95% Exact Poisson confidence limits

The pregnancy-related maternal mortality ratio of 11.2 deaths per 100,000 live births reflects an expanded maternal mortality definition that included deaths due to suicide and accidental overdose (see Table 1). Using the historic definition of pregnancy-related death, which excludes deaths due to suicide and overdose, the pregnancy-related maternal mortality ratio drops to 7.1 deaths per 100,000 live births. The ratio is 4.1 deaths per 100,000 live births for pregnancy-related deaths caused by suicide or overdose (see Table 2).

Table 2: Subgroups of Pregnancy-Related Deaths, Maternal Mortality Ratios and 95% Exact Confidence Limits, Washington State, 2014-2016

	2014	2015	2016	2014-2016	Ratio (deaths per 100,000 live births) and 95% Confidence Limits*
Total Pregnancy-Related Deaths	13	8	9	30	11.2 (7.6, 16.0)
Pregnancy-Related Deaths from Other Medical Causes	9	7	3	19	7.1 (4.3, 11.1)
Pregnancy-Related Deaths from Suicide and Overdose	4	1	6	11	4.1 (2.0, 7.3)

*95% Exact Poisson confidence limits

Pregnancy-Associated Deaths, 2014-2016

Pregnancy-associated deaths are deaths from any cause that occur during pregnancy or within one year of the end of pregnancy. This group includes deaths that are pregnancy-related, deaths that are pregnancy-associated but not related, and deaths that cannot be determined if they are related to pregnancy.

Demographics: Pregnancy-Associated Deaths

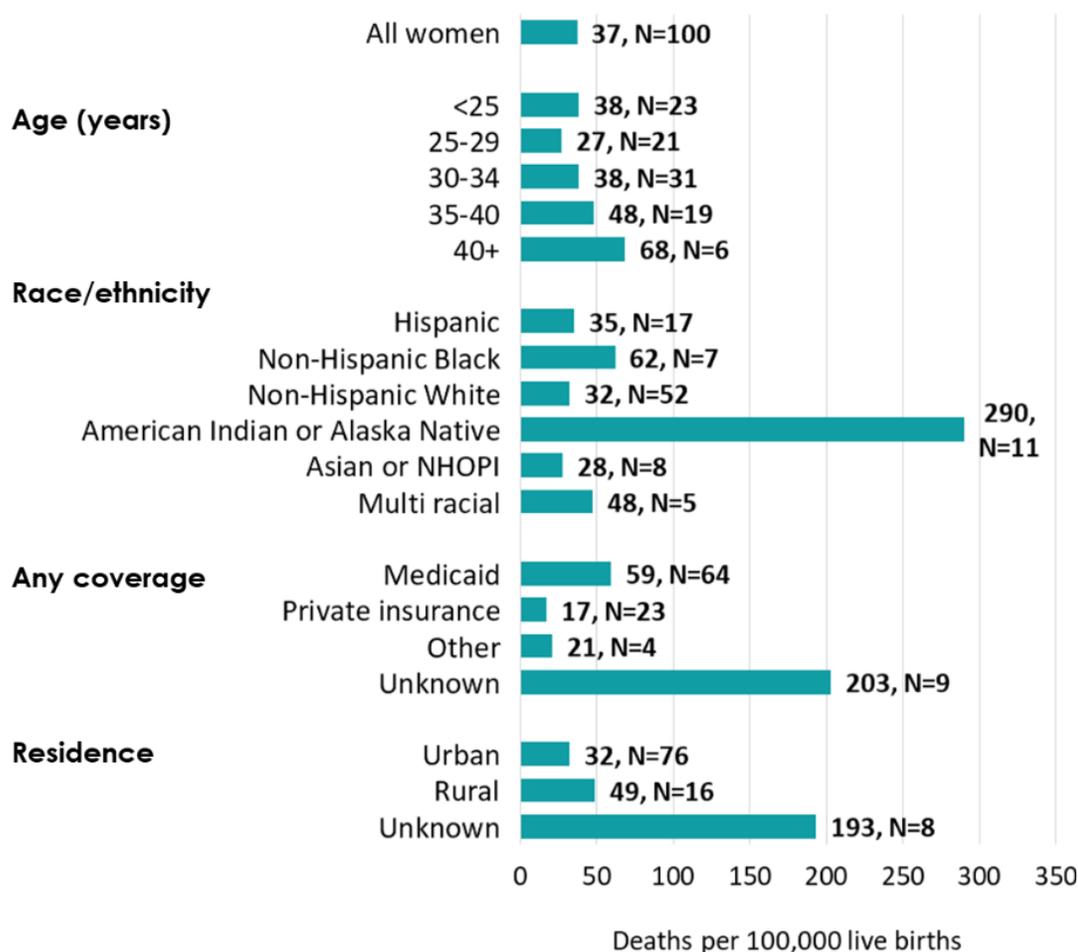
Figure 4 (and all demographic graphs) shows demographic characteristics of maternal deaths at time of death using the maternal mortality ratio (number of deaths per 100,000 live births) and the count (total number of deaths for each subgroup). Demographics include age at time of death, race/ethnic groups, insurance coverage type, and residence. Additional data on demographics that includes exact confidence limits are included in Table 1A. This information is helpful when interpreting data based on small numbers and few years, and should be considered when drawing conclusions and interpreting the information presented in this report.

The race/ethnic groups included Hispanic, Non-Hispanic Black, Non-Hispanic White, American Indian or Alaska Native, Asian or Native Hawaiian or other Pacific Islander (NHOPI), and multi-racial. Due to small counts, Asian and NHOPI were combined into one group for all the analyses presented in this report. Health insurance was assessed as health insurance coverage at delivery or postpartum up to a year; The *Other* group contains other type of governmental insurance programs such as Tricare and Indian Health Care. Residence was classified as rural or urban using the residential ZIP code designation from the Rural-Urban Commuting Area (RUCA) system developed by the Federal Office of Rural Health and Policy.

Maternal mortality ratios for pregnancy-associated deaths varied across subgroups of women. The highest ratios were observed in women 35 years or older. American Indian and Alaska Native women had higher maternal mortality ratios than any other race/ethnic group.

Women with private health insurance during pregnancy, at delivery or up to a year postpartum had the lowest maternal mortality ratios. The highest maternal mortality ratio was observed for women for which no health insurance records could be located. Most of these women died from homicides or other injuries that were not included in the Panel’s review, so limited information was available. Among this same group, many had no known residential address, which was the highest maternal mortality ratio of the residence category.

Figure 4: Demographics, Maternal Mortality Ratios (deaths per 100,000 live births) and Counts for Pregnancy-Associated Deaths (N=100), Washington State, 2014-2016



Cause and Manner of Death: Pregnancy-Associated Deaths

Findings of maternal mortality reviews include terminology used in death investigations, including the underlying cause and manner of death. This information is used in data analyses and to understand the circumstances surrounding deaths.

- Underlying Cause of Death: The World Health Organization defines the underlying cause of death as the “disease or injury which initiated the chain of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury.”^{xiv} The underlying cause of death reflects the medical opinion of the coroner, medical examiner, or physician certifying the death.^{xv}
- Manner of Death: The manner of death indicates how a death occurred and is either: natural, in which death is caused by disease only; or unnatural, in which injury of any type caused or contributed to death. Any death which may be unnatural in manner is to be reported to the applicable medicolegal system, either the coroner or medical examiner. Only the coroner or medical examiner can certify a death as unnatural in manner.^{xvi}

There are five main classifications of manner of death:

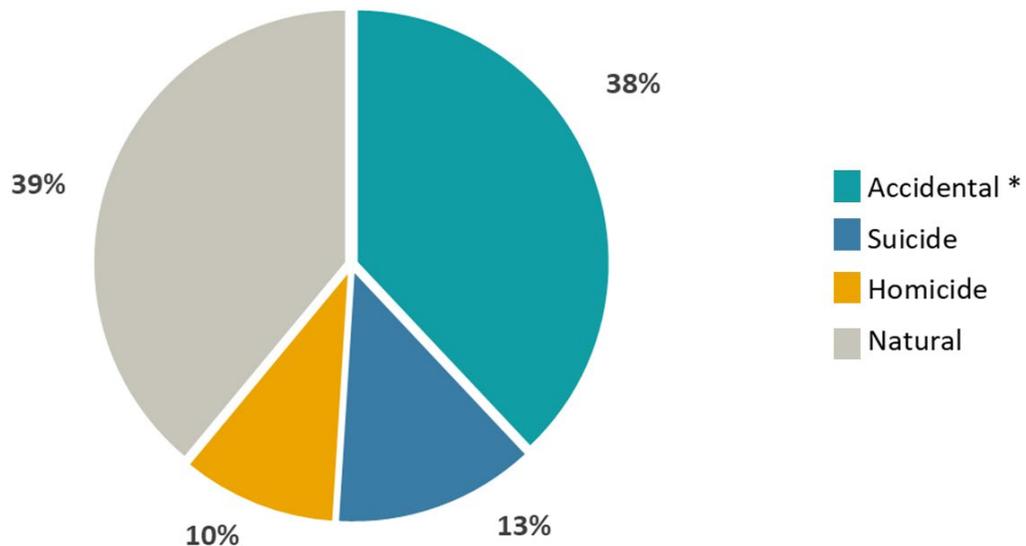
- Natural: Death caused entirely by natural disease process(es). If injury of any type caused or contributed to death, the death is considered unnatural.
- There are four categories of unnatural death.
 - Accident: The injury which caused or contributed to death was unintentional (or inadvertent).
 - Suicide: The injury which caused or contributed to death was intentionally self-inflicted.
 - Homicide: The injury which caused or contributed to death resulted from another person’s actions.
 - Undetermined or unable to determine: It is not possible to determine how the death occurred, based on all available information. This classification may also be used in circumstances where the condition of the body or other findings prevent determination of a likely cause of death.

Figure 5 shows the categorization of the maternal death cohort by the coroner/medical examiner-determined manner of death. Other injuries subgroup consists mostly of motor vehicle accidents, and injuries from falls and drownings.

In 2014-2016, natural manner of deaths made up the largest proportion for the total maternal deaths (39%), and included deaths from hemorrhage, hypertensive disorders, infection, pulmonary conditions, embolism, cardiomyopathy, gastrointestinal disorders, and cancer. Deaths from injuries such as motor vehicle accidents accounted for nearly a quarter of deaths (23%), followed by accidental substance overdose (prescription and illicit drugs, and alcohol)

(15%). Suicide manner of death represented 13%, and homicide manner of death represented 10% of the total deaths. (Figure 5).

Figure 5: Manner of Death for Pregnancy-Associated Deaths (N=100), Washington State, 2014-2016



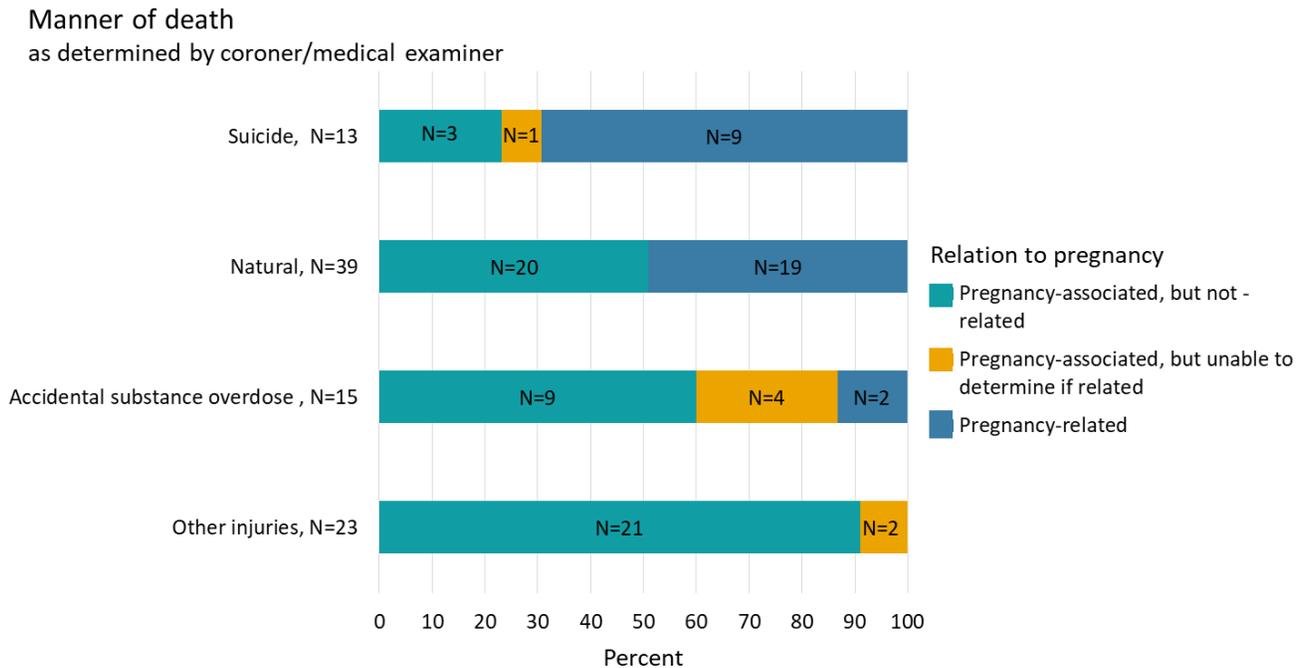
*One death of undetermined manner was included here to ensure confidentiality of data.

Pregnancy-relatedness and Manner of Death

Figure 6 presents pregnancy-associated deaths by manner of death and the relationship to the pregnancy as determined by the Panel's review. The percentage of pregnancy-related deaths varied by manner of death.

- The highest percentage of pregnancy-related deaths was among deaths due to suicide. Sixty-nine percent of deaths from suicide were found by the Panel to be pregnancy-related.
- About half of the natural deaths were pregnancy-related.
- Thirteen percent of deaths due to accidental substance overdose were pregnancy-related.
- None of the deaths due to other injuries were pregnancy-related.

Figure 6: Pregnancy-Associated Deaths and Relation to Pregnancy by Manner of Death (N=90), Washington State, 2014-2016*



*Deaths due to homicide (N=10) not included in the graph as they were not reviewed by the Panel.

Pregnancy-Related Deaths, 2014-2016

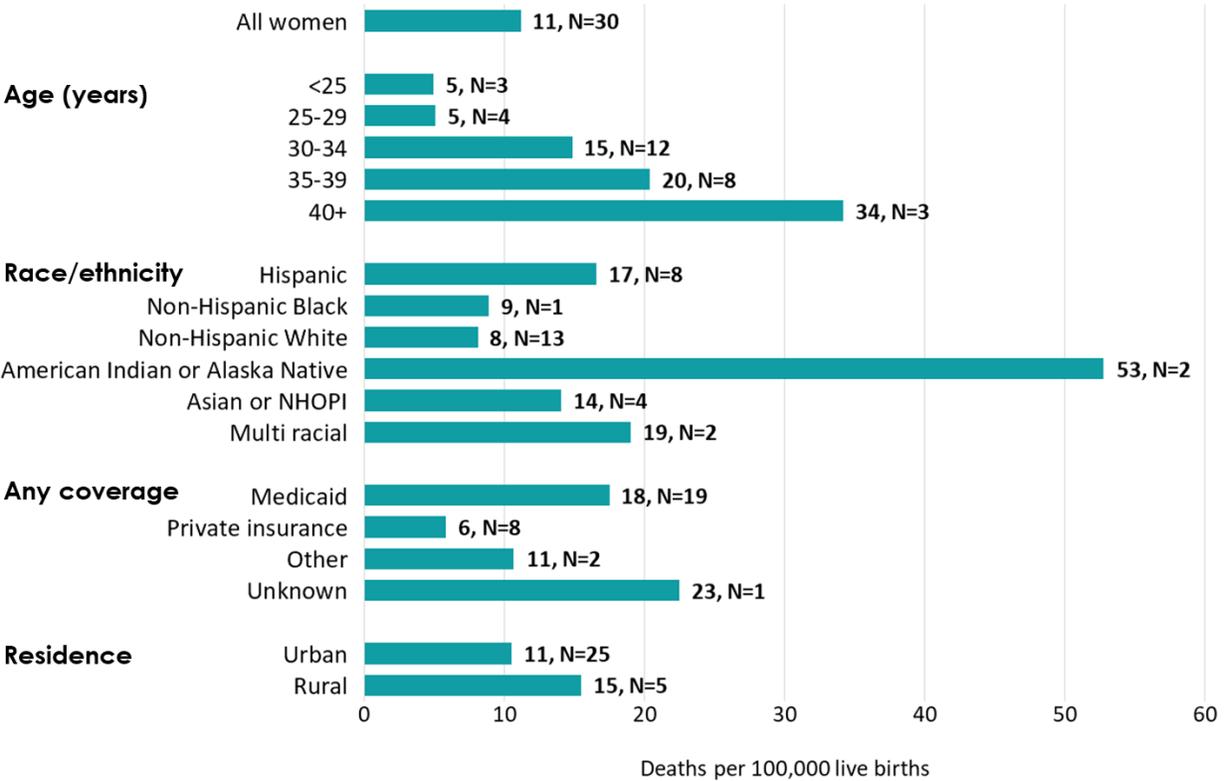
As part of the review process, the Panel determines which pregnancy-associated deaths are **pregnancy-related deaths**. These are deaths that occur during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by a pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. This subgroup includes pregnancy-related deaths from behavioral health conditions.

Demographics: Pregnancy-Related Deaths

Similar to the data presented in the pregnancy-associated deaths section of the report, the demographics include age at time of death, race/ethnic groups, insurance coverage type, and residence. The subgroups for each characteristics were defined in the same manner as before.

Women 30 years or older had the highest pregnancy-related maternal mortality ratios of all age groups. American Indian and Alaska Native women experienced higher maternal mortality ratios than any other race/ethnic group. Women with private health insurance during or up to one year after pregnancy experienced the lowest pregnancy-related maternal mortality ratios among all groups of insurance type (see Figure 7.)

Figure 7: Demographics, Maternal Mortality Ratios (deaths per 100,000 live births) and Counts for Pregnancy-Related Deaths (N=30), Washington State, 2014-2016



Underlying Cause of Death: Pregnancy-Related Deaths

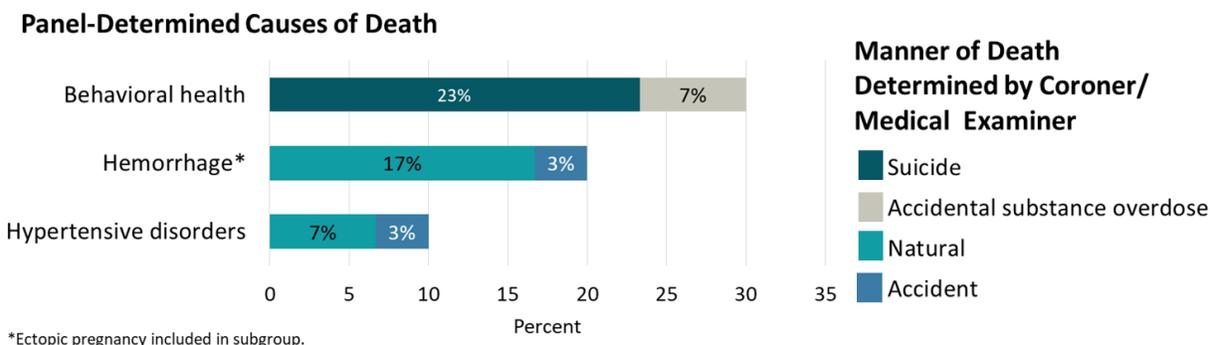
For all pregnancy-related deaths, the Panel determined the sequence of events that led to death and may revise the underlying cause of death from what the medical examiner or coroner identified. This portion of the findings presents the underlying cause of death as determined by the Panel during the maternal mortality review. Figure 8 illustrates the underlying cause of death for pregnancy-related deaths as determined by the Panel and the proportion of the type of manner of death for the three leading underlying causes of death. For the remaining pregnancy-related deaths, other causes of death had 2 or fewer deaths and were not included in Figure 8.

Overall, the Panel found the leading underlying cause of pregnancy-related deaths ($n=30$) was behavioral health conditions (30%) related to suicide and accidental substance overdose. This was followed by hemorrhage or bleeding too much (20%), and hypertensive disorders in pregnancy (10%).

The causes of the nine pregnancy-related deaths from behavioral health conditions consisted of suicide and accidental substance overdose from diagnoses of substance use disorder, and depression or other mental health conditions. Hemorrhage and hypertensive disorders consisted

of natural and accidental deaths. Hemorrhage deaths were caused by cervical laceration, ectopic pregnancy, uterine rupture or other hemorrhage (not otherwise specified). Among the deaths due to hypertensive disorders in pregnancy the Panel identified preeclampsia, eclampsia, and HELLP syndrome (a life-threatening pregnancy complication usually considered to be a variation of preeclampsia that can lead to liver rupture or stroke.)^{xvii}

Figure 8: Manner of Death and Three Leading Panel-determined Underlying Causes of Death and for Pregnancy-Related Deaths (N=18), Washington State, 2014-2016



Time of Death Related to Pregnancy: Pregnancy-Related Deaths

Maternal deaths described in this report occurred during pregnancy or up to a year after the end of pregnancy. The circumstances surrounding these deaths and the opportunities for reducing the risk for such deaths may vary whether a woman is pregnant, has just delivered or is postpartum at time of death, as well as the length of time since the end of pregnancy or delivery.

Figure 9: Timing from End of Pregnancy to Death, Pregnancy-Related Deaths (N=30), Washington State, 2014-2016

Of all women who died from pregnancy-related deaths...

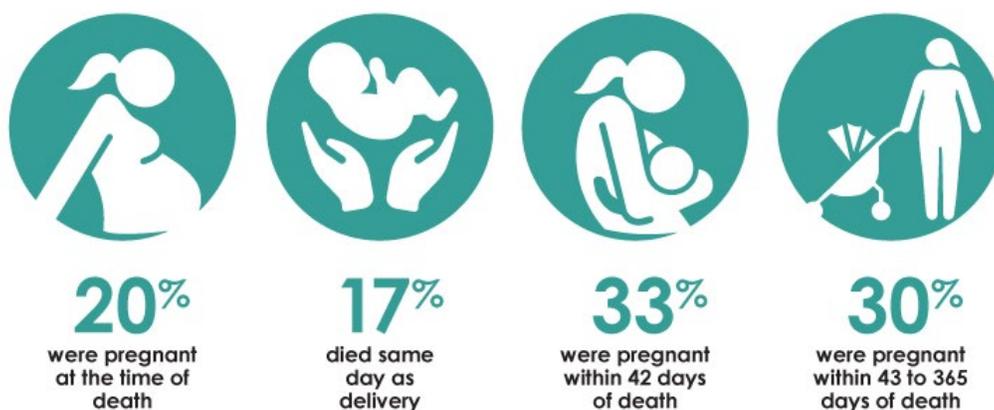
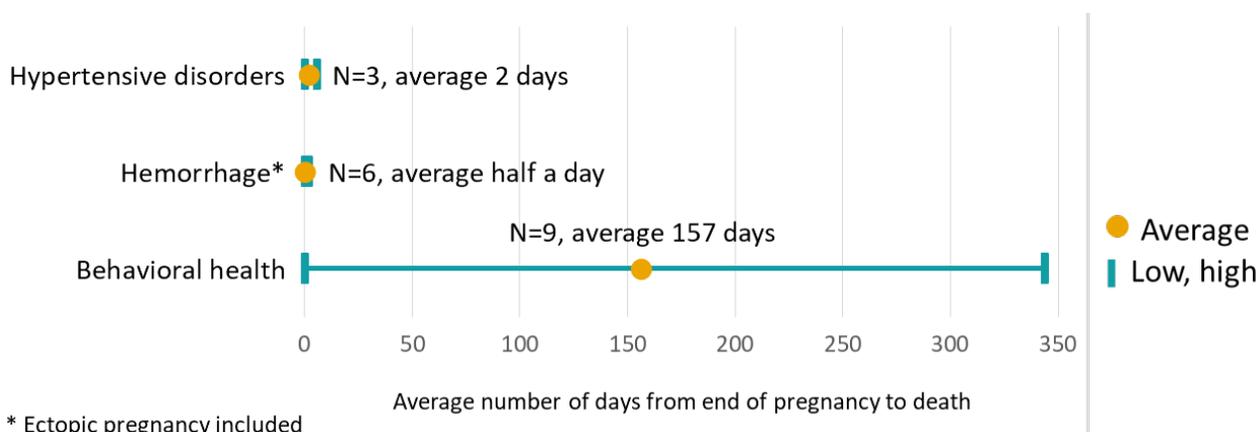


Figure 9 illustrates the timing of death relative to the pregnancy and presents groups of women who were pregnant at time of death (no birth or fetal death), and women who were no longer pregnant when they died which includes women who delivered and died shortly (within 24 hours) after delivery, women who died within 42 days of the end of pregnancy, and women who died 43 days to a year after the end of pregnancy. More than one third of the pregnancy-related deaths occurred during pregnancy (20%) or within 24 hours of a delivery (17%). One third of the pregnancy related deaths (33%) occurred within 42 days after the end of pregnancy, and 30 percent occurred beyond 43 days after the end of pregnancy (Figure 9.)

Figure 10 shows how the number of days from the end of pregnancy to death varies by the Panel-determined cause of death for top three leading causes of death. The graph presents for each group the number of deaths, the range of days (low and high) and the average number of days.

Deaths related to behavioral health conditions occurred on average 157 days after the end of pregnancy, with a range from zero to 344 days. Deaths due to hemorrhage and hypertensive disorders of pregnancy occurred on average within one and three days from the end of pregnancy, respectively.

Figure 10: Average Time from Pregnancy to Death for Top Three Leading Causes of Death, Pregnancy-Related Deaths (N=18), Washington State, 2014-2016

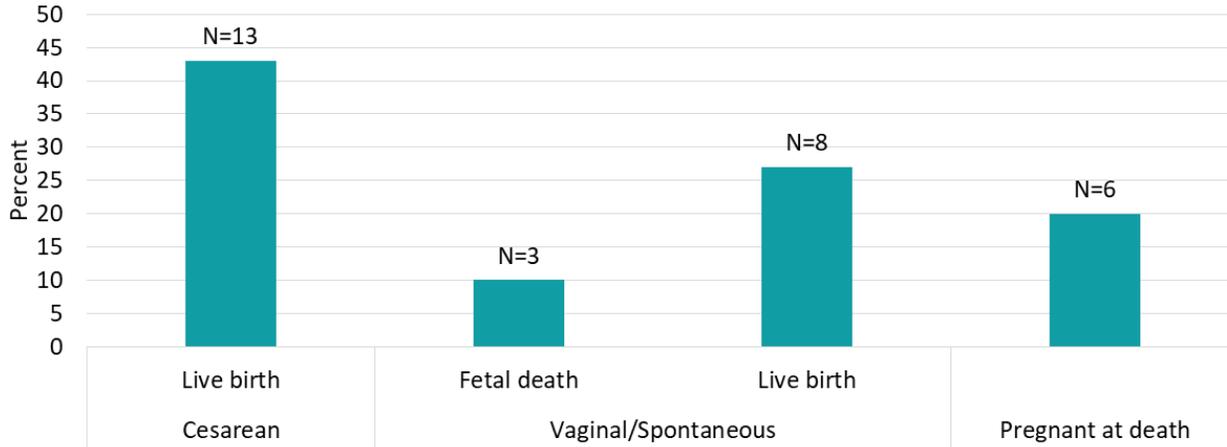


* Ectopic pregnancy included

Pregnancy Outcome: Pregnancy-Related Deaths

Figure 11 describes the pregnancy outcome and method of delivery for pregnancy-related deaths. Twenty four of the 30 pregnancy-related deaths experienced a delivery (80%); six of the women whose death was pregnancy-related died while they were pregnant and did not have a delivery (20%).

Figure 11: Method of Delivery and Outcome of Pregnancy for Pregnancy-Related Deaths (N=30), Washington State, 2014-2016



Among pregnancy-related deaths with deliveries (n=24), 54% were delivered by cesarean section and 46% were vaginal deliveries. The majority of pregnancies resulted in live births (88%); and three pregnancies resulted in fetal deaths (12%).

Health Insurance Coverage: Pregnancy-Related Deaths

All women who died from pregnancy-related causes had health insurance coverage during pregnancy and through the first year postpartum. The majority of health insurance coverage was through Medicaid. Among the six women who died while pregnant, five were covered by Medicaid and one had unknown health insurance coverage. Among women with a delivery (n=24), health insurance at delivery was through Medicaid (58%), private insurance (33%) and other programs, such as Tricare (8%).

Figure 12: Health Insurance Coverage at Time of Death by Time since Delivery, Pregnancy-Related Deaths (N=24), Washington State, 2014-2016

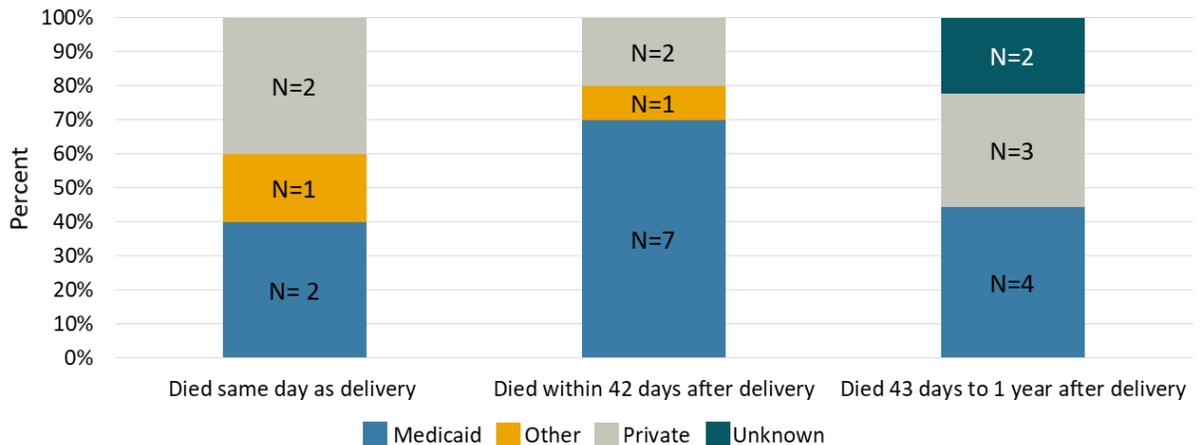


Figure 12 illustrates types of health insurance coverage, and how coverage varied among pregnancy-related deaths at the time of death after the end of pregnancy. Medicaid and private insurance were noted as coverage throughout one year postpartum. Coverage from other government programs was only noted for pregnancy-related deaths that occurred at delivery or within 42 days postpartum. Percentage pregnancy-related deaths with Medicaid coverage almost doubled from delivery to 42 days postpartum (from 40% at delivery to 70% 42 days postpartum). Beyond 42 days postpartum, there is a small percentage of pregnancy-related deaths without any insurance information.

Preventability of Pregnancy-Related Deaths

To determine whether a death was preventable, the Panel followed the definition outlined by the CDC Foundation’s *Building U.S. Capacity to Review and Prevent Maternal Deaths* initiative, which states “a death is considered preventable if the [Panel] 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.” (See Appendix 3.)

Table 3 shows the Panel determined 60% of pregnancy-related deaths were preventable. The Panel discussions on preventable events and contributing factors are presented later in this report.

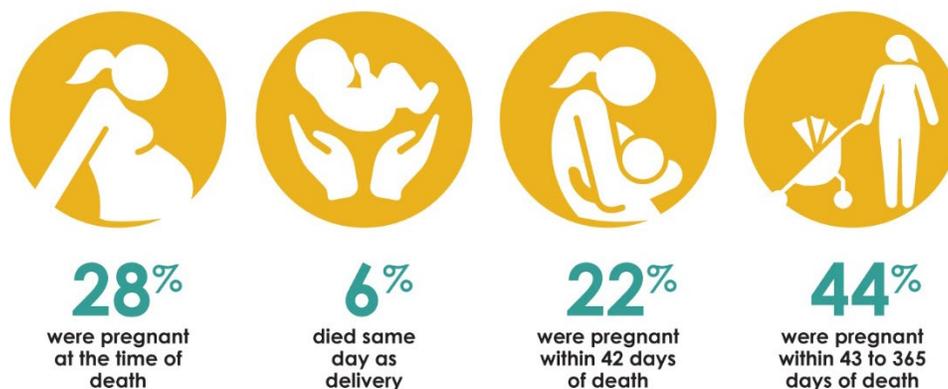
Table 3: Preventability of Pregnancy-Related Deaths as Determined by the Maternal Mortality Review Panel, Washington State, 2014-2016

Preventability of Pregnancy Related Deaths	Count	%
Yes - Preventable	18	60
No - Not Preventable	10	33
Unable to determine preventability	2	7

Figure 13 illustrates the timing of preventable pregnancy-related deaths relative to pregnancy. None of the preventable deaths occurred during pregnancy. Preventable deaths occurred to 6 women (28% of preventable deaths) who died while still pregnant; six percent who delivered and died within 24 hours after delivery; twenty-two percent who died within 42 days of the end of pregnancy (22%); and 8 women who died 43 days to a year from the end of pregnancy (44%). The majority of deaths over 43 days since delivery (n=7) occurred 200 days or more after the end of pregnancy (Figure 13).

Figure 13: Timing of Death for Preventable Pregnancy-related Deaths (N=18), Washington State, 2014-2016

Of all women who died from preventable pregnancy-related deaths...



Pregnancy-Associated Deaths Due to Behavioral Health Conditions

This subgroup includes all *pregnancy-associated deaths from behavioral health conditions* and includes deaths that are pregnancy-related, deaths that are pregnancy-associated but not related, and deaths that cannot be determined if they are related to pregnancy.

There were 28 pregnancy-associated deaths from suicide and substance overdose, combined. They were reviewed through the same standard process that historically was only applied to pregnancy-associated deaths from other medical causes. Due to the unique clustering of deaths in these groups and the small number of records, the data presented for this subgroup includes all pregnancy-associated deaths (pregnancy-related, unable to determine and pregnancy-associated, not related).

Figure 14: Pregnancy-Associated Deaths Due to Suicide (N=13) and Substance Use Overdose (N=15), Washington State, 2014-2016

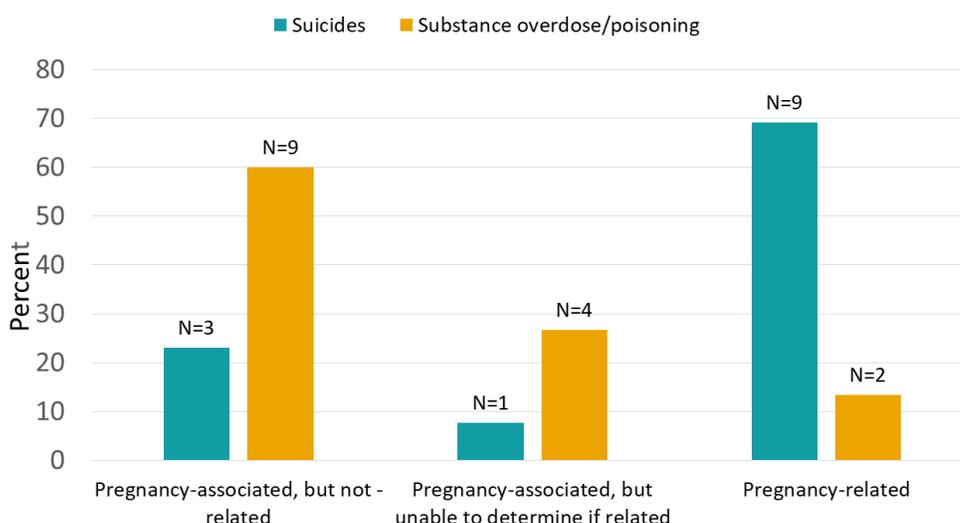


Figure 14 shows the percentage of pregnancy-associated deaths from suicide and accidental substance overdose that the Panel determined were pregnancy-related. The Panel determined that 69% of deaths by suicide were pregnancy-related; conversely, the Panel concluded that 60% of substance use overdose deaths were pregnancy-associated, but not related.

Pregnancy-Associated Deaths from Accidental Substance Overdose

This subgroup includes all *pregnancy-associated deaths from accidental substance overdose* and includes deaths that are pregnancy-related, deaths that are pregnancy-associated but not related, and deaths that cannot be determined if they are related to pregnancy.

Demographics: Pregnancy-Associated Deaths from Accidental Substance Overdose

There were a total of 15 pregnancy-associated deaths from accidental overdose in 2014-2016. Pregnancy-associated deaths due to accidental substance overdose primarily occurred to women age 25 and younger, and who were non-Hispanic white. A disproportionate number of these deaths were to American Indian and Alaska Native women. The majority of these deaths occurred to women who were insured through Medicaid and were living in urban areas.

Timing of Deaths: Pregnancy-Associated Deaths due to Accidental Substance Overdose

Figure 15 illustrates the timing of pregnancy-associated deaths from accidental substance overdose relative to the pregnancy. None of the deaths occurred during pregnancy. Twenty percent of the pregnancy-associated deaths from accidental overdose occurred on the same day as the delivery; 20% occurred within 42 days after the end of pregnancy; and 60% occurred between 43 days and one year after the end of pregnancy.

Figure 15: Timing from Pregnancy to Death - Pregnancy-Associated Deaths from Accidental Substance Overdose (N=15), Washington State, 2014-2016

Of all women who died of pregnancy-associated deaths from substance overdose/poisoning...



Substances Involved in Accidental Overdose

Substances involved in accidental overdose deaths included illicit and prescription drugs as well as alcohol. Opioids were the most frequent group of substances involved in overdose deaths. Other substances involved in deaths included methamphetamine, cocaine, alcohol, and combinations of two or more substances.

Pregnancy-Associated Deaths from Suicide

This subgroup includes all *pregnancy-associated deaths from suicide* and includes deaths that are pregnancy-related, deaths that are pregnancy-associated but not related, and deaths that cannot be determined if they are related to pregnancy.

Demographics: Pregnancy-Associated Death from Suicide

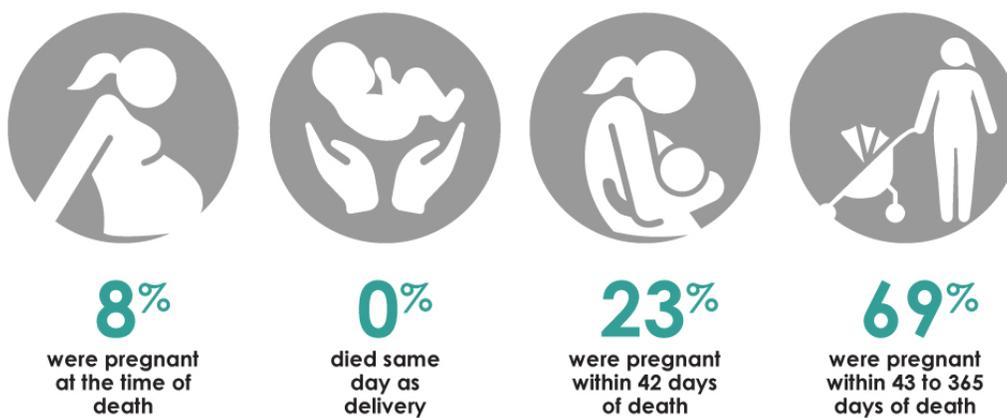
There were a total of 13 pregnancy-associated deaths from suicide in 2014-2016. Pregnancy-associated deaths due to suicide occurred primarily to women 30 and older, residing almost exclusively in urban areas, and who had health insurance through Medicaid. Suicide deaths were due to intentional substance overdose, hanging, and firearm discharge.

Timing of Death: Pregnancy-Associated Death from Suicide

Figure 16 illustrates the timing of pregnancy-associated deaths from suicide relative to the pregnancy. The majority of pregnancy-associated deaths from suicide occurred after the end of pregnancy. Eight percent of pregnancy-associated deaths from suicide occurred during pregnancy; there were no deaths within 24 hours of delivery; twenty-three percent occurred within 42 days of the end of pregnancy; and 69 percent occurred 43 days or more after the end of pregnancy. Six of the thirteen suicide deaths occurred between six and twelve months after the end of pregnancy.

Figure 16: Time from Pregnancy to Death - Pregnancy-Associated Deaths due to Suicide (N=13), Washington State, 2014-2016

Of all women who died from pregnancy-associated deaths from suicide...



Summary of Findings

Pregnancy-associated deaths

- Pregnancy-associated mortality rates in Washington State have remained stable in recent years and are not increasing.
- In 2014-2016, 100 pregnancy-associated deaths were identified.
- Maternal mortality ratios were highest for women 35 years or older.
- American Indian/Alaska Native mothers had statistically higher maternal mortality ratios than any other racial/ethnic group.
- Women with private health insurance during pregnancy or up to one year after had statistically lower maternal mortality ratios than women covered through Medicaid.

Pregnancy-related deaths

- In 2014-2016, the Panel identified 30 pregnancy-related deaths and determined that 60% were preventable.
- Women 30 years or older had the highest maternal mortality ratio.
- The leading causes of pregnancy-related deaths were behavioral health conditions (30%, n=11), hemorrhage (20%, n=6), and hypertensive disorders in pregnancy (10%, n=3).
 - Pregnancy-related deaths due to behavioral health conditions included 9 suicide deaths and 2 overdose deaths.
- The timing of deaths varied widely, ranging from during pregnancy to one year postpartum among leading causes of death.
 - Deaths from behavioral health conditions occurred, on average, 157 days after pregnancy.
 - Deaths due to hemorrhage and hypertensive disorders occurred, within one to three days, respectively, from the end of pregnancy.

All pregnancy-associated deaths from accidental substance overdose

- In 2014-2016, there were 15 pregnancy-associated deaths from overdose.
- The Panel determined that 2 of pregnancy-associated deaths from substance overdose were pregnancy-related.
- Sixty percent of the pregnancy-associated deaths from accidental overdose occurred 43 days or more after the end of pregnancy.
- Women with private insurance had significantly lower maternal mortality ratios than women whose care was covered by Medicaid.
- Opioids were involved in the majority of these deaths.

All pregnancy associated deaths from suicide

- In 2014-2016, there were 13 pregnancy-associated deaths from suicide.
- The Panel determined 9 of the pregnancy-associated deaths from suicide were pregnancy-related.
- Sixty-nine percent of pregnancy-associated deaths from suicide occurred 43 days or more after pregnancy; including 46% that occurred between six and 12 months after the end of pregnancy.
- The majority of the women who died by suicide received insurance coverage from Medicaid.

What factors contributed to preventable pregnancy-related deaths?

One of the key decisions the Panel makes is determining the *contributing factors* leading to each preventable pregnancy-related death. These factors are the events or issues that, if altered, the Panel believes might have prevented the pregnancy-related death. The Panel used information about the contributing factors to identify opportunities for intervention and make recommendations on prevention.^{xii}

It should be noted that this is a critical part of the maternal mortality review process. Because maternal mortality is the extreme end of maternal morbidity, it is likely the same contributing factors that impacted preventable pregnancy-related deaths also impacted other maternal deaths, as well as severe maternal morbidity. As such, identifying and addressing these issues has the potential to impact all types of maternal deaths and severe maternal morbidity, and improve maternal and perinatal health care, overall.

Once identified and detailed, each contributing factor was designated a level and a class as outlined by the *Building U.S. Capacity to Reduce and Prevent Maternal Deaths* framework found at *reviewtoaction.org*.^{xii}

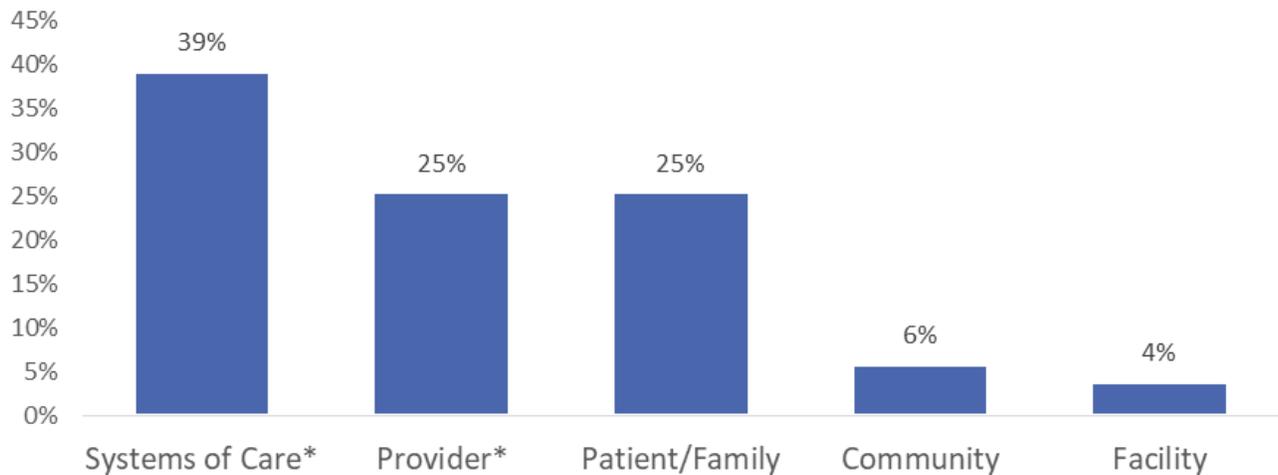
- The “level” describes the source of the contributing factor in society: patient/family, provider, facility, systems of care, and/or community. A contributing factor’s level was assigned by the Panel at the time of the review.
- The “class” is the category assigned to the contributing factor based on the subject of the issue and helps to identify common themes. (See summary of classes of factors and examples on page 36.) To determine a contributing factor’s class, three coders categorized each contributing factor into one of 23 class categories defined by the framework. For a description of each class see Appendix 3.

A summary of the contributing factors is presented in this report, organized by level, and by classes within each level. Examples of more specific contributing factors in each class are provided, however factors associated with specific causes of death are not listed due to small numbers and the potential for identification. Additionally, because of the growing threat of behavioral health conditions in maternal mortality, factors identified specifically for preventable pregnancy-related deaths from suicide and substance overdose are grouped separately to illustrate the specific issues contributing to those deaths.

Contributing Factors to Preventable Pregnancy-Related Deaths

Figure 17 shows the distribution of contributing factors by level. The Panel identified more than 100 contributing factors for the 18 preventable pregnancy-related deaths from 2014-2016. Most contributing factors were found to occur at the systems of care level, followed by provider and patient/family level issues. Systems- and provider-level issues impacted all of the deaths.

Figure 17: Distribution of Contributing Factors (N=112) by Systems Level for Preventable Pregnancy- Related Deaths, Washington State, 2014-2016



Categories with * include global factors that impacted all deaths; due to updated data collection methods, this table does not include counts of factors from deaths from other medical causes from 2014 and 2015.

Issues that impacted the majority of pregnancy-related deaths from 2014-2016 include:

- Access to health care services,
- Gaps in continuity of care, especially postpartum care,
- Gaps in clinical skill and quality of care, especially delays in diagnoses, treatment, referral and transfer), and
- Lack of care coordination at the provider, facility, and systems-levels (see Figure 20).

Below is a summary of the classes of factors and examples that contributed to all preventable pregnancy-related deaths from 2014-2016.

Patient and Family Level

- **Access to health care:** Ability to make it to appointments and adhere to medical advice.
- **Social support or social isolation:** Lack of family or social support, especially during the early postpartum period.
- **Cultural/religious factors:** Cultural and or religious reasons that guide decisions about medical treatment which can affect health outcomes.
- **Chronic disease and comorbidities:** High body mass index, history of pregnancy complications, behavioral health issues, and other chronic diseases.

Provider and Facility Levels

- **Clinical skill/quality of care:** Delays, gaps, or failures in maternal care, including diagnoses, treatment, and medication management. Facility and provider capacity to

deliver appropriate maternal care to meet specific patient needs and attend to obstetric emergencies.

- **Continuity of Care:** Gaps in postpartum follow-up care and support, especially during the first one to two weeks after pregnancy, and the nine to 12 months after pregnancy.
- **Referral or consultation:** Failure or delays in referrals and transfers to higher levels of care and/or specialists.
- **Failure to screen:** Inadequate assessment of risk for pregnancy complications, behavioral health conditions and needs.
- **Standardized policies and procedures:** Lack of standard policies and procedures for maternal care and obstetric emergencies, and for women with very high body mass indices.
- **Care coordination/case management:** Lack of care coordination or case management, especially for women at high medical or socioeconomic risk.
- **Stigma and bias:** Stigma and bias among health care providers that resulted in variability in the quality of care and treatment received by patients.

Systems of Care Levels

- **Care coordination/case management:** Lack of care coordination or case management, especially for women at high risk, medically, or socioeconomically.
- **Continuity of care:** Lack of information sharing between hospitals/facilities and providers about available maternal resources.
- **Stigma and bias:** Stigma and bias in healthcare systems that resulted in variability in the quality of care and treatment received by patients.
- **Community resources and outreach:** Lack of universal postpartum support structures, such as nurse home visiting services.
- **Standardized policies and procedures:** Inconsistent reporting of pregnancy-related deaths in facilities to local coroners and medical examiners and variation in autopsy protocols and procedures

Contributing Factors to Preventable Pregnancy-Related Deaths from Behavioral Health Conditions

Figure 18 illustrates the proportion of deaths impacted by specific types of contributing factors identified by the Panel. The Panel found that every preventable pregnancy-related deaths from behavioral health conditions was impacted by gaps in knowledge and clinical skill related to behavioral health conditions in pregnancy or postpartum. Additionally, lack of access to behavioral health care services and treatment, lack of case management and lack of continuity of care affected more than half of the deaths in this group.

Figure 18: Percent of Preventable Pregnancy-Related Deaths from Behavioral Health Conditions Impacted by Type of Contributing Factor (Top Ten), Washington State, 2014-2016



Below is a summary of contributing factors specific to preventable pregnancy-related deaths from behavioral health conditions. Because numbers are small, these include factors for both preventable suicide and accidental substance overdose deaths.

Patient/Family Level

- **Knowledge:** Gaps in knowledge among patients and families about warning signs for suicide and substance use disorder, suicide safety planning, and coping with grief, in cases of fetal or infant loss.
- **Access to behavioral health care:** Patient ability to seek behavioral health care.
- **Stigma and bias:** Stigma among patients and family about behavioral health disorders.
- **Mental health conditions:** Preexisting behavioral health conditions exacerbated by pregnancy.

Provider and Facility Levels

- **Knowledge:** Gaps in knowledge among providers on the care and treatment of behavioral health conditions in pregnancy, and gaps in knowledge among providers about behavioral health resources available in Washington.

- **Clinical skill/quality of care:** Gaps in clinical skill related to medical management for mental health conditions during pregnancy and postpartum, treatment for substance use disorders during and after pregnancy, and suicide safety planning.
- **Referral/consultation:** Need for obstetrics providers to refer patients to appropriate behavioral health services/providers.
- **Failure to screen/inadequate assessment of risk:** Lack of screening for substance use and mood or anxiety disorders, especially at antepartum and postpartum visits.
- **Community resources/outreach:** Gaps in behavioral health support services, especially during the first one to two weeks after the end of pregnancy, and the last nine to 12 months after the end of pregnancy.
- **Standardized policies and procedures:** Gaps in the suicide safety net, including a lack of policies/procedures for all types of perinatal medical, nursing, and support providers to assess and manage suicide risk, conduct suicide safety planning, and engage families and partners in suicide safety planning.
- **Communication:** Gaps in communication between providers about patients, and between providers and their patients.
- **Care coordination/case management:** Lack of case and care coordination, and continuity of care for behavioral health conditions.
- **Stigma and biases:** Differential treatment of women with behavioral health disorders as they attempt to access equitable health care, or who avoid care based on fears related to stigma or negative past experience with care delivery.

Systems of Care Level

- **Knowledge:** Lack of general knowledge about existing behavioral health care and support resources that are available for women during and after pregnancy.
- **Standardized policies and procedures:** Lack of standardized protocols to assess and manage suicide risk and substance use overdose risk.
- **Stigma and biases:** Biases and stigma that result in systemic prejudice and discrimination related to behavioral health conditions resulted in variability in the quality of care and treatment received by patients.
- **Support structures:** Lack of support services for women/families who experienced the loss of a pregnancy or infant due to death or legal proceedings.
- **Care coordination:** Lack of universal care coordination and continuity of care, especially for women who were medically and/or socioeconomically high risk.
- **Lack of access/barriers to care:** Lack of access to behavioral health services and support, including inpatient and outpatient treatment and residential treatment centers, especially those that allow mothers to stay with their babies and children.
- **Legislative:** Lack of policy limiting access to guns by people with extreme risk for suicide.

Recommendations

For most contributing factors, the Panel made recommendations to address the preventable events identified. Recommendations are made to not only reduce preventable pregnancy-related deaths, but to also reduce all types of pregnancy-associated deaths and severe maternal morbidities, and improve women’s and maternal care throughout the state.

Table 4: Percentage of Preventable Pregnancy-Related Deaths That Could Have Been Impacted By Each Type of Recommendation Made by the Maternal Mortality Review Panel Washington State, 2014-2016

Type of Recommendation	Percent of deaths potentially impacted	Examples
Increase support structure	50%	Create a system to increase services in immediate and very late postpartum period; universal home visiting.
Improve knowledge among patients, families, providers, and communities	44%	Community awareness and education for patients, families, and obstetric providers on mental health, substance use disorder during pregnancy, suicide safety planning.
Increase access to health care	44%	Integrated behavioral health care. Home visiting during the pregnancy and postpartum.
Improve continuity of care	33%	Coordinated care - primary and mental health care; providers should do a warm handoff.
Improve reimbursement for health care and behavioral health	33%	Extend postpartum care for one year and provide adequate funding and reimbursement, more funding for behavioral health resources for women during and after pregnancy.
Reduce stigma	22%	Launch a communication campaign from agencies to reduce stigma associated with mental illness.
Improve mental health screening	17%	Pregnancy and postpartum screening for mental health conditions - screen every patient (OB provider, prenatal care provider, pediatric care) early in pregnancy.
Increase access to family planning	17%	Increase access to contraception and preconception counseling.
Medication management	11%	Provide education to providers related to medication management of opioid use disorder.
Increase specialty training	11%	Increase addiction medicine specialists and perinatal psychiatry.
Legislative policy	11%	Address access to firearms.
Policy and procedures	1%	Establish process for providers to address post-pregnancy care when there is a pregnancy loss.

Table 4 shows the percentage of preventable pregnancy-related deaths that could have been impacted by each type of recommendation made by the Panel. The recommendation type made the most by the Panel was to increase the support structure for women during pregnancy and through the first full year postpartum. This recommendation would have impacted half of the preventable pregnancy-related deaths. Additionally, recommendations for improving knowledge about perinatal behavioral health conditions and recommendations to increase access to health care services would have impacted nearly half of the preventable pregnancy-related deaths.

Specific recommendations made by the Panel for each death were translated into systems-level recommendations with implementable activities through a multi-phase and collaborative process:

1. After recommendations were coded and analyzed, themes were identified, and overarching recommendations were developed.
2. The Department and the Panel researched evidence-based practices and other programs in Washington and the U.S. that are known to successfully address the issues identified.
3. The Panel, the Department, and partners identified activities to implement the overarching recommendations.
4. Internal and external experts, including members of the Panel and other state agency leads, were consulted to refine and articulate specific activities into actionable steps.
5. Recommendation groups were then prioritized by the Panel in order of importance. They are presented in this report in order of priority.

Priority Recommendation 1: Address social determinants of health, structural racism, provider biases, and other social inequities to reduce maternal mortality in priority populations.

Findings from the maternal mortality review indicate that women who were American Indian/Alaska Native and women who had Medicaid coverage were disproportionately represented among all pregnancy-associated deaths. Among some of the pregnancy-related deaths, basic needs like housing, were not being met. Additionally, during the review of specific deaths, Panel members identified instances where bias, stigma, and differential treatment based on race or substance use affected the quality and timeliness of maternal care delivery and contributed to preventable pregnancy-related deaths.

More efforts are needed to address racial and income disparities in maternal mortality and increase equity of maternal care, beginning with priority populations. This is supported by The

American College of Obstetrics and Gynecology (ACOG), in their 2018 Committee Opinion on Racial and Ethnic Disparities in Obstetrics and Gynecology.^{xviii}

Exposure to stigma, bias, and differential treatment based on race or income level leads to poor health outcomes and impacts overall wellbeing.^{xix} Additionally, chronic stress caused by racism and bias can compound socioeconomic issues that also lead to poor health outcomes.^{xx} Living in a society with a legacy of racial discrimination and historical trauma is an additional source of stress and an additional factor leading to poor health outcomes among communities of color.^{xxi} Even for those who have not directly experienced overt bias, the constant awareness that they or a loved one could be unfairly perceived or treated can be a source of chronic stress.^{xxii}

Health inequities affect everyone, including families and communities. When people of childbearing age experience poverty, trauma, homelessness, violence, maltreatment and other adverse experiences within community environments, the lifelong health and well-being of the entire family can be negatively impacted.^{xxiii} Health problems such as substance use and dependency, chronic obstructive pulmonary disease, depression, fetal death, decreased health-related quality of life, heart and liver disease, increased risk for HIV and other sexually transmitted infections, suicide, and unintended pregnancy are exacerbated by inequities.^{xxiv,xxv} Many of the practices that improve and strengthen maternal care and support structures also have a positive impact on disparities. For example, research indicates the home visiting, doula, and patient navigator programs improved postpartum outcomes, increased health equity and reduced disparities.^{xxiii, xxiv} Integrating these types of community-based practices into maternal care and medical care is a growing practice used to increase health equity among underserved populations.^{xxvi} Additionally, creating more opportunities to fund, train, hire and retain a more racially and culturally diverse obstetric and women's health care workforce is a practice that can increase health equity, address social determinants of health, and improve patient access to health care services and overall satisfaction.^{xxvii}

ACOG also notes that addressing social determinants of health is critical to addressing health disparities. These are issues that directly impact the health of all Washingtonians, particularly women and children. There is increasing evidence that social policies, such as housing and food vouchers, family strengthening programs, income supplementation, and employment programs can directly influence adult mental and physical health.^{xxxi} Similarly, addressing bias and stigma rooted in structural racism and oppression can help reduce disparities and increase health equity for women, children, and their families.^{xxviii} Addressing social determinants of health can begin important conversations that will save lives.

Implementing this Recommendation

Policy and Budget Actions:

- Prioritize funding for housing, education, employment, and transportation services for parents from priority populations, including low income backgrounds and for families who are American Indian and Alaska Native and women who have Medicaid.
- Address the housing crisis and ensure women and children have access to safe, affordable, and stable housing during and after pregnancy.
- Encourage agencies and organizations that receive funds for health care apprenticeships as a result of [Engrossed Substitute House Bill 1109 §219](#) consider creating opportunities in perinatal care and behavioral health care.
- Use a racial equity lens and tools to identify unconscious/implicit bias when creating health policies, programs, and resource decisions to help reduce and mitigate the harmful impacts of unjust and discriminatory practices.

Governmental, Academic, Community and Professional Agencies and Organizations:

- Academic institutions and other agencies/organizations should follow recommendations made by [ACOG \(2018\)](#) and increase visible diversity among obstetric and perinatal providers. Some potential examples might include:
 - Create or prioritize fellowships and internships to people from diverse racial/ethnic backgrounds;
 - Increase academic admissions to medical and nursing programs to women and to people from diverse racial/ethnic backgrounds;
 - Hire and retain more people from diverse racial/ethnic backgrounds in perinatal and behavioral health care, service and leadership positions in hospitals and birthing facilities.

Perinatal Systems of Care:

- Perinatal, obstetric, and women's health care facilities and professional groups/associations should provide evidence-based training for clinicians as recommended by [ACOG \(2018\)](#), including trainings on:
 - Social determinants of health;
 - Cultural humility;
 - Conscious and unconscious bias;
 - Societal racism;
 - Stigma; and
 - Cultural norms specific to the clients served.

- Perinatal, obstetric and women’s health care facilities and professional groups and associations should collect and review process and outcome measures by race/ethnicity to identify opportunities for improvement and targeted needs
- Prenatal care providers and birthing hospitals should screen women for safe housing and facilitate referrals to community support agencies when appropriate. Providers should consider training or hiring staff, such as social workers, community health workers, or patient navigators to help with screenings and referrals.
- Maternal care practices and facilities should implement evidence-based programs, such as the [EveryONE Project \(American Academy of Family Physicians\)](#), to address [social determinants of health](#) and increase health equity and cultural humility in their practices.

Priority Recommendation 2: Support active engagement by birthing hospitals, licensed birth centers, and perinatal providers in quality improvement efforts that reduce the leading causes of maternal mortality and morbidity.

The Panel found that nearly one-third of all pregnancy-associated deaths were directly related to pregnancy. The Panel determined that more than 60 percent of the pregnancy-related deaths were preventable, indicating that significant progress could be achieved in the area of prevention. In addition, for each of pregnancy-related death, there are hundreds and possibly thousands of women who suffered economic, medical, and psychosocial setbacks from the effects of severe maternal morbidities from the same diagnoses as those women who died.^v

The American College of Obstetricians and Gynecologists (ACOG) has partnered with HRSA’s Maternal and Child Health Bureau to develop quality improvement and patient safety guidelines, tools (also called bundles), and protocols and to offer support to states working to reduce maternal morbidity and mortality.^{xxix} Implementing hospital-wide evidence-based protocols reduces delays in diagnosis, treatment, referral and transfers. Training clinical staff helps clinicians to be prepared and effective in moments when quick action is required. Collecting and reporting data allows facilities to evaluate the effectiveness of their quality improvement strategies and provides the opportunity to recognize what is working and adjust when appropriate.

Implementing this Recommendation

Policy and Budget Actions:

- Require all birthing hospitals and licensed birth centers to implement and use hospital-wide protocols that address leading national causes of maternal morbidity and mortality, such as cardiovascular disease, hemorrhage, hypertension, sepsis, ectopic pregnancy, and thromboembolism.

Governmental, Academic, Community and Professional Agencies and Organizations:

- One of the state Health Care Authority's obstetric Medicaid Quality incentives should require birthing hospitals to participate in Washington's AIM program to implement maternal safety bundles and enter their hospital/birth center data.

Perinatal Systems of Care:

- Implement evidenced-based protocols and patient safety tools and guidelines (like patient safety or care bundles) that address leading national causes of maternal morbidity and mortality, including: cardiovascular disease, hemorrhage, hypertension, sepsis, ectopic pregnancy, thromboembolism, amniotic fluid embolism, and behavioral health. Collect and review process and outcome measures.
- Providers should identify the needs of women early by following standardized perinatal guidelines like those outlined by [American Family Physician](#), [American College of Obstetricians and Gynecology](#), [UpToDate](#) and others; clinics and hospitals should implement systems (like a policy and procedure or tool in electronic medical records) to initiate consultation and referrals to the appropriate services and facilities for patients when clinically indicated.
- Care plans for pregnancy, delivery, and postpartum care and recovery should ensure care by the appropriate professionals at the appropriate facilities that meet patient's individual needs.

The Department of Health:

- The Department of Health should continue to work with key partners, including WSHA's Safe Deliveries Roadmap, AIM, and collaborative quality improvement initiatives throughout the state.
- The Department of Health will engage partners to study severe maternal morbidity in Washington. Findings will be included in the next legislative report.

Priority Recommendation 3: Ensure funding and access to postpartum care and support through the first year after the end of pregnancy.

Findings from the maternal mortality review revealed gaps in care and services for women after pregnancy ended, especially during the first week postpartum until nine to 12 months postpartum. The Panel identified several contributing factors to deaths, including gaps in postpartum follow-up care and services, breaks in continuity of care and transfer of care to other providers, and lack of social support and support structures during the first year after pregnancy. These factors affected women who died from suicide and substance overdose, hypertension in pregnancy, and sepsis, as well as women who experienced fetal loss, and loss due to legal removal of an infant from its mother's care.

To address these gaps during the critical postpartum period, the Panel recommends strengthening support for women during the first week and through the first full year after the end of pregnancy, and ensuring clinical and non-clinical providers receive payment for additional postpartum services.

Evidence, research, and shifts in maternal care align with this recommendation. ACOG recently published new recommendations for postpartum care in *Optimizing Postpartum Care*.^{xxx} These new guidelines recommend seeing women earlier after the end of pregnancy and through at least the first three months after pregnancy. For women with risk factors, such as experiencing complications during childbirth or struggling with mental health needs, the guidelines recommend seeing women earlier and frequently.

Some examples of practices with demonstrated success include perinatal support services such as home visiting services, the use of community health workers, including doulas and peer lactation consultants, and the use of patient navigators. Nurse home visits geared to mothers and their infants beginning within the first six weeks and continued for nine months, have been demonstrated to decrease the incidence of postpartum depression and increase mother-infant bonding.^{xxxi} Similarly, care coordination/case management services through patient navigators during pregnancy and postpartum period resulted in more women accessing postpartum care, including attending follow up appointments with obstetric providers, obtaining vaccinations, and receiving screenings for postpartum depression.^{xxxi} Similarly, a randomized control trial found coordinated care between home visitors and doulas, a type of community health worker, during the postpartum period resulted in a number of positive outcomes in sleeping and feeding practices.^{xxxi}

Implementing this Recommendation

Policy and Budget Actions:

- Support and fund *universal* home visiting services that focus on women/birthing parents as well as their newborns/infants, and include at least one visit conducted by a nurse (or culturally responsive alternative) that occurs during the first 48-72 hours after the end of pregnancy or discharge from birthing facility or after delivery/end of pregnancy and which provide access to case management services as appropriate through the first year postpartum.
- Conduct a gap analysis to determine needs for funding and sustaining a universal perinatal outreach and support system for all women during pregnancy and through the first year postpartum. Gap analysis would include:
 - Collaboration with the Office of the Insurance Commissioner to conduct and analyze a survey of insurance plans on current payment for postpartum support services and allowable providers.
 - Funding for a survey of maternal care providers about current practices and personnel involved in providing postpartum support services.
 - Use the above information to identify steps needed to address, and any gaps in having, a universal system, including needed funding. The universal system elements would include:
 - Outreach to all women during their first trimester of pregnancy and again within 2-3 days after the end of pregnancy to screen for medical, psychosocial and economic needs, and overall well-being.
 - Connecting and facilitating access to needed care and services to address any needs identified during screening. Sustainably fund the expansion of the maternal labor and delivery bundled payments through the first 90 days postpartum, as recommended by [ACOG](#), and increase the total number of allowable postpartum visits. If mandated, increase funding to the Health Care Authority for this.
- Increase funding for Medicaid to sustain the expansion of the maternal labor and delivery bundled payments through the first 90 days postpartum and increase the total number of allowable postpartum visits.

Governmental, Academic, Community and Professional Agencies and Organizations:

- The Health Care Authority (HCA) should make Maternity Support Services (MSS) available to all women who have Medicaid during pregnancy and through the first year after pregnancy. Additionally, the HCA should provide more MSS blocks of time for each participant, and improve reimbursement for these services so slots can be expanded across the state. The HCA should consider extending this service to additional health care beneficiaries under its scope.

Perinatal Systems of Care:

- Follow ACOG recommendations in their 2018 Committee Opinion on Obstetric Practice and Optimizing Postpartum Care by seeing patients in the first three weeks after the end of pregnancy and provide care through first 90 days after the end of pregnancy. Additionally, develop and implement policies and procedures for an “after pregnancy” follow up phone call that occurs within 24-48 hours after the end of pregnancy or discharge from the hospital.
- Ensure continuity of care throughout pregnancy and postpartum by developing policies and procedures for a “[warm hand-off](#)” when transferring care after pregnancy.
- Develop practices to help women and parents address barriers to postpartum care and services when they need more support. Begin addressing postpartum care and support needs during the prenatal period.
- Consider integrating the [Best Practice Recommendations for Postpartum Care](#) published by the Washington State Hospital Association into health care practices.

Priority Recommendation 4: Increase access and reduce barriers to behavioral health and community support structures from preconception through pregnancy and the first year postpartum.

An uncomplicated pregnancy requires approximately 12-16 prenatal care visits, which can be challenging to coordinate with work and childcare schedules.^{xxxiv} The addition of increased visits for maternal complications or behavioral health services can be very challenging for women to coordinate and attend. For women who are faced with other barriers to care, such as lack of transportation, living in a rural area with few providers, or out of pocket cost of services, getting needed maternal care can be an impossible task. Reducing barriers to care and increasing access to services in the communities where women live decreases hardships on women trying to get good prenatal and behavioral health services.

Implementing this Recommendation

Policy and Budget Actions:

- Support and fund legislation that integrates community health workers, community health representatives, and community health aids, including doulas and peer lactation consultants, into perinatal care.
- Establish ongoing and sustainable funding to support community health workers, community health representatives, and community health aids, including doulas and peer lactation consultants.

- Address the perinatal behavioral health provider workforce shortage affecting mothers and children to increase the number of service providers for pregnant people or those who have been pregnant, and to decrease wait times for behavioral health care to two weeks or less.
- Support and increase funds to programs and agencies that integrate behavioral care or perinatal support services into obstetric care, especially evidence-based models such as collaborative care
- Require and fund the HCA to reimburse for outpatient intensive day treatment for maternal mental health disorders.

Governmental, Academic, Community and Professional Agencies and Organizations:

- The HCA should expand its initiative for people enrolled in Medicaid to integrate behavioral health into primary care to include integrating behavioral health into obstetric care.
- The HCA should collaborate with key partners to increase the use of collaborative care models by obstetric care providers.

Perinatal Systems of Care:

- In addition to screening for postpartum depression using a validated tool, providers should also screen for other postpartum mood disorders, including anxiety and bipolar disorder as indicated, and refer patients for care or provide treatment accordingly.
- Newborn/pediatric providers should follow guidelines by the [American Academy of Pediatrics](#) and screen parents for depression at all well-child checks, and consider extending screening through the infant's first year.
 - For people who have babies in the newborn intensive care unit and therefore cannot be screened at well-child visits with pediatric providers, screenings should be done by newborn intensive care unit clinicians or service providers.
- Obstetric providers should integrate behavioral health clinicians and perinatal support providers, such as community health workers, doulas or patient navigators, into their practices.

The Department of Health:

- The Department of Health should explore options to develop and offer perinatal training modules for perinatal support service providers like community health workers and community health representatives. An [example of this work is in North Carolina's Mamatoto Village.](#)

Priority Recommendation 5: Increase and improve reimbursement for behavioral health care from preconception through all phases of pregnancy and the first year postpartum, including screening, treatment, monitoring, and support services.

The Panel found that nearly 25% of pregnancy-associated deaths were related to suicide or substance overdose, and that there are a lot of gaps in behavioral health care services for women struggling with behavioral health conditions.

For example, state Medicaid does not currently reimburse providers for additional postpartum visits outside of the labor and delivery bundled payment structure. So if a woman requires additional postpartum follow-up visits, obstetric providers are not paid for these services. Another example: Washington currently has treatment programs for women who are pregnant and misusing substances, but if a woman doesn't receive treatment *before* delivery, there are no programs or payment structures for treatment at and after delivery that allow her to stay with her baby.

Offering stabilization services for mother and baby together at birthing hospitals would increase access to treatment services across the state. Evidence has shown that keeping mothers and babies together is beneficial for the dyad and leads to better health outcomes and decreased health care costs.^{xxxv, xxxvi} Treating mother and baby together at birthing hospitals and transitioning them to residential treatment centers together ensures the safety of the newborn and prevents the separation of the mother and baby.

Implementing this Recommendation

Policy and Budget Actions:

- Increase funding to the state Medicaid program so it can adequately reimburse hospitals and providers for inpatient perinatal substance use care at hospitals of birth at the time of delivery and for up to 14 days after delivery.

Governmental, Academic, Community and Professional Agencies and Organizations:

- The Health Care Authority should increase reimbursement for and create reimbursement mechanisms when necessary:
 - Reimburse for additional caregiver depression screenings by pediatric and family providers through the first year of an infant's life. Currently, these screenings are only reimbursed through the first six months of the infant's life.
 - Provide billing codes that allow enhanced reimbursement for group prenatal and postpartum care.

- Increase the use of integrated behavioral health models to address mental health and substance use in perinatal care, starting in prenatal care.
- With funding by state legislation, create reimbursement mechanisms that allow birthing hospitals to provide inpatient maternal substance use care for up to 14 days after delivery for women who need stabilization services so mothers can stay in the hospital with their infants. This should include:
 - Birthing hospitals should create quality metrics for services that include starting and titrating medication assisted treatment, breastfeeding support, and allowing mothers to stay in the same rooms as their babies.
 - Birthing hospitals should coordinate transfers to inpatient residential treatment facilities for substance use when indicated so mothers can stay together with their babies.

Priority Recommendation 6: Increase knowledge and skill of providers, patients, and families about behavioral health disorders during and after pregnancy, and the treatment and the resources that are available for support.

Gaps in knowledge and clinical skill accounted for nearly one quarter of the factors contributing to deaths from suicide and substance overdose. These gaps, which were related to behavioral health care and treatment during pregnancy, including screenings, medications, safety planning, and available services, were evident among obstetric medical and service providers. The Panel also identified gaps in knowledge related to behavioral health disorders, treatment, and specialized services for patients and their family members. Additionally, the Panel identified gaps in referral, screening, assessment, and management of substance use or mood disorders during and after pregnancy.

To address these gaps, the Panel recommends strengthening the knowledge base of obstetric, perinatal, and women’s health medical and service providers, as well as patients and family members about behavioral health and pregnancy. This includes ensuring people and providers know about the resources available for women who are or have been pregnant, how pregnancy can affect behavioral health conditions and treatment, and what can be done to help women in need.

Implementing this Recommendation

Policy and Budget Actions:

- Strengthen suicide prevention for people who are pregnant or have been pregnant in the last year.
 - Fund and implement recommendations in the Suicide Education report to be published by the Department, the [Washington State Suicide Prevention Plan](#) and the 2019 [multi-agency request decision package](#) to reduce suicide rates, and the [Governor's Executive Order 16-02 on Firearm Fatality Prevention](#).
 - Ensure all legislatively funded or supported suicide prevention activities include people who are pregnant or who have been pregnant in the last year.
- Sustainably fund programs that support obstetric/perinatal providers who are also delivering behavioral health care, such as the [Partnership Access Line for Moms](#) (a provider consultation) and the [Perinatal Support Washington](#) (support for patients and providers).
- Amend [RCW 43.70.442](#) to require health professional suicide trainings to include content on specific risk factors and resources for people who are pregnant or in the first year postpartum into the requirements.
- Fund the appropriate state agency to conduct an evidence-based awareness campaign for obstetric health medical and service providers, families and communities about behavioral health conditions and treatment during pregnancy and postpartum, and the resources available in our state.

Governmental, Academic, Community and Professional Agencies and Organizations:

- Professional organizations like the Washington State Hospital Association, the Washington State Medical Association, the Washington State Obstetrics Association and others should coordinate incentivized training and education for perinatal care providers on:
 - Medication management and screening behavioral health disorders during pregnancy and postpartum
 - Suicide risk assessment and management for people who are pregnant, or who have been pregnant in the last year
 - Behavioral health resources in Washington for pregnant and parenting people.

Perinatal Systems of Care:

- Perinatal, family, emergency and pediatric providers, practices, and facilities should address knowledge gaps related to suicide risk assessment and management. Addressing these gaps should include:
 - Read and consider implementing applicable recommendations, as appropriate, outlined in [Zero Suicide](#), the national report "[Recommended Standard of Care for](#)

[People with Suicide Risk: Making Health Care Suicide Safe,](#)” and the [Bree Collaborative Report on Suicide Care and Recommendations.](#)

- Additionally, develop evidence-based policies and procedures for suicide care, including screening, suicide risk assessment and management, and safety planning with supportive family members or third parties.
- Ensure [continuity of care](#) by developing policies and procedures for a “[warm hand off](#)” for transferring or sharing care between prenatal and postpartum provider, and primary care or behavioral health provider. This includes building relationships and connecting with the provider who will be participating in the patient’s care, helping the patient schedule appointments, addressing barriers like transportation or cost, and sending pertinent records to the participating provider before the patient’s appointment.
- Use consultative resources that support providers without a behavioral health specialty who are providing behavioral health care and treatment. For example, [Partnership Access Line for Moms](#) is a perinatal psychiatry line that offers free consultation for medical providers and in-person trainings. Similarly, [Perinatal Support Washington](#) is a nonprofit organization that also provides perinatal psychiatry training, resources, and consultation for medical providers.
- Providers should prioritize continuing education hours on courses and training that cover behavioral health conditions during pregnancy and postpartum.

The Department of Health:

- The Department is currently partnering with other agencies to expand provider trainings across the state for treatment options for substance use disorders during pregnancy. If mandated, the Department will work with key partners to develop suicide training content that covers specific risks and resources for people who are pregnant or who have been pregnant in the last year.

What is the Department of Health doing to implement Recommendations?

Since the last maternal mortality review and report published in 2017, the Department of Health and the Maternal Mortality Review Panel have been working with partners to implement recommendations made in the report and address key issues and gaps in maternal and perinatal care and services.

The Department of Health, with partners, prioritized several projects to begin the work to reduce preventable deaths. Work continues on these projects today:

- [Washington State joined AIM:](#) The Department of Health in partnership with the Washington State Hospital Association joined the Alliance for Innovation on Maternal Health (AIM), which uses maternal data [and quality improvement strategies](#) to reduce maternal mortality and morbidity at the population level. Birthing hospitals are currently

enrolling, data portal access is under way and the first AIM patient safety bundle we're focusing on is hemorrhage.

- The Department revised the maternal mortality review law: Partners from around the state made recommendations to amend the maternal mortality law (RCW 70.54.450) to strengthen the process, require reporting of some maternal deaths, and allow Washington to contribute to the national picture of maternal mortality. The proposed changes passed in [Second Substitute Senate Bill 5425](#) in the 2019 legislative session and went into effect in July 2019. The changes include:
 - Tribal representation is required for the Panel,
 - DOH can share data with the Centers for Disease Control and Prevention, local health jurisdictions, tribal health, and regional maternal mortality review efforts like the American College of Obstetricians and Gynecologists District VIII.
 - Hospitals and birthing centers are required to make good faith efforts to report deaths that occur during pregnancy or within 42 days of pregnancy to the local county coroner or medical examiner. Local coroners and/or medical examiners are required to conduct a death investigation, which may include an autopsy, on these reported deaths; autopsies will be reimbursed by the Forensic Investigation Council at 100 percent.
- Maternal Opioid Use - State Opioid Task force: As a result of the maternal mortality review of 2014-2015 deaths, a statewide workgroup was formed by the Department as part of the state's opioid response team to address the needs of parents and children. Many of the initiatives of this workgroup seek to improve access to maternal behavioral health care services to improve both maternal and infant outcomes.
- Guidelines for Maternal Care in Obesity: Members of the Panel and the Washington State Perinatal Collaborative developed guidelines for maternal care for women with a very high body mass index. These recommendations emphasize women with body mass index of equal or greater than 40 need early referral to specialties including an early anesthesia consult at 26-32 weeks and that plans of care should ensure delivery and care occur at appropriate facilities to meet their needs. The guidelines will be available on the DOH website soon, and will be distributed to providers and hospitals around the state.
- Postpartum Schedule of Follow Up for Women with Hypertension in Pregnancy: As a result of the last maternal mortality review and the high number of deaths that occurred during the first week after pregnancy, obstetric and newborn providers volunteered their time and developed a schedule and best practices for postpartum care for women with hypertension in pregnancy. These guidelines will be available soon on the Department's maternal mortality review webpage.

Conclusion

While resource intensive and extremely complicated, maternal mortality reviews offer the most comprehensive insight into how and why women die during and after pregnancy, and help us identify opportunities for intervention. This report shares the findings of the Panel and seeks to initiate change to prevent these tragic deaths. The Department and the Panel will continue to review maternal deaths, enhance and streamline the review process, and work with key partners and collaborators to begin quality improvement efforts to reduce preventable maternal deaths in our state and improve the health and wellbeing of women and their families in Washington.

Endnotes

ⁱ Centers for Disease Control and Prevention. Pregnancy Mortality Surveillance System. Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion. (2018). Found at <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-mortality-surveillance-system.htm>

ⁱⁱ Petersen, E.E. et al. *Vital Signs: Pregnancy-related Deaths, United States, 2011-2015 and Strategies for Prevention, 13 States, 2013-2017*. Morbidity and mortality weekly report. The Centers for Disease Control and Prevention. Vol. 68, May 2019.

ⁱⁱⁱ Central Intelligence Agency. The World Fact Book. Library: Publications. (2018). Found at <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2223rank.html>.

^{iv} Singh, GK. *Maternal Mortality in the United States, 1935-2007: Substantial Racial/ethnic, Socioeconomic, and Geographic Disparities Persist. A 75th Anniversary Publication*. (2010). Health Resources and Services Administration, Maternal and Child Health Bureau. U.S. Department of Health and Human Services.

^v Callaghan, W.M., Creanga, A.A., and Kuklina, E.V. "Severe maternal morbidity among delivery and postpartum hospitalizations in the United States." *Obstetrics & Gynecology*, 120(5), 1029-1036. (2012).

^{vi} St. Pierre et al. "Challenges and Opportunities in Identifying, Reviewing and Preventing Maternal Deaths." *Obstetrics and Gynecology*, 131/1. (2017). Found at <https://www.acog.org/-/media/Departments/Government-Relations-and-Outreach/2018CLCMMRCCDC.pdf?dmc=1>.

^{vii} Centers for Disease Control and Prevention. (2019). National Center for Health Statistics. National Vital Statistics System. Found at <https://www.cdc.gov/nchs/nvss/index.htm>.

^{viii} Building U.S. Capacity to Review and Prevent Maternal Deaths. (2018). "Maternal mortality review map". Found at <http://reviewtoaction.org/content/mmr-map>.

^{ix} Centers for Disease Control Foundation. "Building U.S. Capacity to Review and Prevent Maternal Deaths." (2019). Found at <https://www.cdcfoundation.org/building-us-capacity-review-and-prevent-maternal-deaths>.

^x Washington State Legislature. (2016). "An act relating to establishing a maternal mortality review panel." Senate Committee on Human Services, Mental Health and Housing. Found at <https://www.hrsa.gov/sites/default/files/ourstories/mchb75th/mchb75maternalmortality.pdf>

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- ^{xi} Building U.S. Capacity to Review and Prevent Maternal Deaths. “Definitions”. (2018) Retrieved at <http://reviewtoaction.org/learn/definitions>.
- ^{xii} Building U.S. Capacity to Review and Prevent Maternal Deaths. “Maternal mortality review committee facilitation guide”. (2019). Found at https://reviewtoaction.org/sites/default/files/national-portal-material/Maternal%20Mortality%20Review%20Committee%20Facilitation%20Guide_V10.pdf
- ^{xiv} World Health Organization. Historical trend series data on deaths from road traffic accidents, suicide and homicide. Violence and injury prevention. (2019). Found at https://www.cdc.gov/nchs/data/misc/hb_me.pdf.
https://www.who.int/violence_injury_prevention/surveillance/databases/mortality/en/.
- ^{xv} Centers for Disease Control and Prevention. “Medical Examiners’ and Coroners’ Handbook on Death Registration and Fetal Death Reporting.” (2003). Found at www.cdc.gov/nchs/data/misc/hb_me.pdf.
- ^{xvi} National Association of Medical Examiners. “A Guide for Manner of Death Certification.” (2002). Found at <https://name.memberclicks.net/assets/docs/4bd6187f-d329-4948-84dd-3d6fe6b48f4d.pdf>.
- ^{xvii} Preeclampsia Foundation. HELLP Syndrome. (2019). Retrieved from: <https://www.preeclampsia.org/health-information/hellp-syndrome>.
- ^{xviii} The American College of Obstetricians and Gynecologists. “Racial and Ethnic Disparities in Obstetrics and Gynecology.” Committee Opinion. Number 649, December. (2015). Retrieved from: <https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Health-Care-for-Underserved-Women/Racial-and-Ethnic-Disparities-in-Obstetrics-and-Gynecology>
- ^{xix} Smedley, B.D., Stith, A.Y., Nelson, A.R. (2003). Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. National Academy of Sciences. Retrieved from: https://www.ncbi.nlm.nih.gov/books/NBK220358/pdf/Bookshelf_NBK220358.pdf
- ^{xx} Kim, S., Im, E., Liu, Jianghong, & Ulrich, C. (2018). Factor Structure for Chronic Stress before and During Pregnancy by Racial/Ethnic Group. Western Journal of Nursing Research. Retrieved at: https://www.researchgate.net/profile/Sangmi_Kim5/publication/326463782_Factor_Structure_for_Chronic_Stress_Before_and_During_Pregnancy_by_RacialEthnic_Group/links/5b4f429aaca27217ff9f8562/Factor-Structure-for-Chronic-Stress-Before-and-During-Pregnancy-by-Racial-Ethnic-Group.pdf
- ^{xxi} Myers, H. F., Wyatt, G. E., Ullman, J. B., Loeb, T. B., Chin, D., Prause, N., ... & Liu, H. (2015). Cumulative burden of lifetime adversities: Trauma and mental health in low-SES African Americans and Latino/as. *Psychological Trauma: Theory, Research, Practice, and Policy*, 7(3), 243.

^{xxii} Osypuk, T.L., Joshi, P., Geronimo, K., Acevedo-Garcia, D. “Do social and economic policies influence health? A review.” *Current Epidemiology Reports*. September 1, 2014. 1(3): 149-164.

^{xxiii} Halfon, N., Forrest, C. B., Lerner, R. M., & Faustman, E. M. (Eds.). (2018). *Handbook of life course health development*. Pp 282. Springer.

^{xxiv} Felitti, V.J., Anda, R.F., Nordenberg, D., Williamson, D.F., Spitz, A.M., Edwards, V., ... and Marks, J.S. “Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults: The Adverse Childhood Experiences (ACE) Study.” *American Journal of Preventive Medicine*, 56(6), 774-786. (2019).

^{xxv} Hillis, S. D., Anda, R. F., Dube, S. R., Felitti, V. J., Marchbanks, P.A., and Marks, J.S. “The Association Between Adverse Childhood Experiences and Adolescent Pregnancy, Long-Term Psychosocial Consequences, and Fetal Death.” *Pediatrics*, 113(2), 320-327. (2004).

^{xxvi} Islam, N., Nadkarni, S. K., Zahn, D., Skillman, M., Kwon, S. C., & Trinh-Shevrin, C. “Integrating Community Health Workers Within Patient Protection and Affordable Care Act Implementation.” *Journal of Public Health Management and Practice*, 21(1), 42. (2015).

^{xxvii} Bristow, L.R., Butler, A.S., & Smedley, B.D. (Eds.) “In the Nation's Compelling Interest: Ensuring Diversity in the Health-care Workforce.” National Academies Press. (2004).

^{xxviii} Mays, V. M., Cochran, S.D., and Barnes, N.W. “Race, Race-based Discrimination, and Health Outcomes Among African Americans.” *Annu. Rev. Psychol.*, 58, 201-225. (2007).

^{xxix} The American College of Obstetricians and Gynecologists. “AIM Program Awarded Millions to Expand Efforts to Reduce Maternal Mortality and Morbidity.” (2018). Retrieved from: <https://www.acog.org/About-ACOG/News-Room/News-Releases/2018/AIM-Program-Maternal-Mortality-and-Morbidity>

^{xxx} McKinney, J., Keyser, L., Clinton, S., & Pagliano, C. ACOG Committee Opinion No. 736: “Optimizing Postpartum Care.” *Obstetrics & Gynecology*, 132(3), 784-785. (2018).

^{xxxi} Horowitz, J.A., Murphy, C.A., Gregory, K., Wojcik, J., Pulcini, J., and Solon, L. “Nurse Home Visits Improve Maternal/infant Interaction and Decrease Severity of Postpartum Depression.” *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 42(3), 287-300. (2013).

^{xxxii} Yee, L. M., Martinez, N. G., Nguyen, A. T., Hajjar, N., Chen, M. J., & Simon, M. A. Using a Patient Navigator to Improve Postpartum Care in an Urban Women's Health Clinic. *Obstetrics and Gynecology*, 129(5), 925. (2017).

^{xxxiii} Hans, S.L., et al. "Randomized Controlled Trial of Doula-Home-Visiting-Services: Impact on Maternal and Infant Health." *Maternal and Child Health Journal*. 22:s105-s113. (2018).

^{xxxiv} Lockwood, C.J., & Magriples, U. "Prenatal Care: Second and Third Trimesters." *UpToDate*. (2019).

^{xxxv} Holmes, A. V., Atwood, E. C., Whalen, B., Beliveau, J., Jarvis, J. D., Matulis, J.C., and Ralston, S.L. "Rooming-in to Treat Neonatal Abstinence Syndrome: Improved Family-centered Care at Lower Cost." *Pediatrics*, 137(6), e20152929. (2016).

^{xxxvi} Abrahams, R.R., Kelly, S.A., Payne, S., Thiessen, P.N., Mackintosh, J., and Janssen, P.A. "Rooming-in Compared with Standard Care for Newborns of Mothers Using Methadone or Heroin." *Canadian Family Physician*, 53(10), 1722-1730. (2007).

Appendix 1: Review Process

The maternal mortality review is conducted through a multi-level process (Figure 2) that begins with identification of maternal deaths in the state within a given time period and ends with the development of recommendations for legislators, including potential associated prevention activities. While all maternal deaths are reviewed, the Department prioritized the review to cover all *potentially* pregnancy-related deaths to determine underlying cause of death and preventability due to time and resource constraints. Deaths related to homicide are not included in the review due to resource constraints and due to the nature of homicide deaths. We will explore options to include these deaths in our reviews in the future.

Level 1 Review: Identification of Pregnancy-Associated Deaths

Potential deaths for review include all women who were Washington State residents at the time of death, who died in Washington during the time period reviewed and who were pregnant within a year of death. Washington residents who died in other states are not included in reviews due to the difficulty of obtaining records from other states. The Department identified maternal deaths that occurred within 365 days of delivery or end of pregnancy through multiple methods. The Center for Health Statistics (CHS) of the Department linked death certificates of all women to birth/fetal death certificates using probabilistic matching of a combination of identifiers, including Social Security number, infant name, date of birth, and parents' names. A probabilistic match allows the linkage of death certificates to birth/fetal death certificates when slight variations in records exist. Additional maternal deaths were identified from death certificates using either the underlying cause of death (ICD-10 codes (O00-O99) for maternal mortality or information from the pregnancy checkbox. Officials who certify a death use the pregnancy checkbox on death certificates to indicate if the decedent died while pregnant or within one year of a pregnancy, or if her pregnancy status was unknown.

Washington State Center for Vital Health Statistics does not collect death records of fetal deaths that occur within the first 20 weeks of gestation (RCW 70.58.150). In addition, the Department does not identify maternal deaths through linkage to abortion records within the year prior to death because abortion records do not have any identifiable information. A maternal death associated with a fetal death before 20 weeks (miscarriage) or an abortion would only be identified if a death certificate mentioned a previous abortion as a contributing cause of death or the pregnancy check box indicated pregnancy in the year prior to death and the medical record noted a miscarriage or abortion.

Level 2: Categorization/Abstraction of Pregnancy-Associated Deaths

The Department and a sub group of panel members evaluated the cause of each maternal death and categorized the death as either *potentially* pregnancy-related or pregnancy-associated not related.

The Department abstracted information from available records including birth/fetal death and death certificates, medical records for prenatal care visits, hospitalizations, office and emergency room visits, and autopsy and/or coroner reports for all *potentially* pregnancy-related deaths. Abstracted information was entered into CDC's Maternal Mortality Review Data System (MMRDS), and a summary of each death to be reviewed was created. To facilitate this process, perinatal nurse consultants at the Department reviewed and abstracted information from all available medical records and autopsy reports, and prepared a medical narrative for each of the *potentially* pregnancy-related death. A summary report with critical information — including maternal age, race/ethnicity, underlying cause of death, and pregnancy outcome — was generated from the database for each. The summary report and the medical narrative were prepared for the Panel to use in the review process during the next phase.

To ensure confidentiality, and in accordance with the law, the Department removed all personal identifying information from all data, records, and medical narratives prior to review by the Panel, including: patient, family, healthcare provider, healthcare facility, and healthcare staff names; all street addresses, city, and county; dates of birth, telephone numbers, social security numbers, medical and visit record numbers, insurance identification numbers, and any other item that had the potential to identify a death. Dates of service were maintained to help the Department and panel members determine a timeline of the events that led to death and whether a death was preventable.

Level 3 Review: Pregnancy-Related Death Review Preventability Discussion

A sub-group comprised of 20-25 panel members, including maternal-fetal medicine specialists, obstetrician/gynecologists, family practice providers, certified nurse midwives, social workers, forensic pathologists, tribal representatives, and individuals representing African American Health Board and health equity participated in the review of potentially pregnancy-related deaths. They were chosen strategically to ensure diversity in clinical, cultural, professional, and geographic experience.

For each *potentially* pregnancy-related death, panel members worked to answer key questions as outlined on the CDC's Maternal Mortality Review Committee Decision Form (Appendix 3), which guides the panel through the review process.

1. First, the Panel determines the underlying cause(s) of death, and whether that cause of death was in agreement with what was listed on the death certificate. Underlying cause of death is defined in the National Center for Health Statistics handbook on death

registration for coroners and medical examiners as the “disease or injury that initiated the events resulting in death”.^{xxxvii}

2. Next, panel members determine if a death was pregnancy-related using the definition discussed above.
3. Next, for all deaths found to be pregnancy-related, panel members determine the degree to which each death was preventable. The Department and the Panel used the *Building US Capacity to Review and Prevent Maternal Deaths* (Appendix 3) definition of preventability which states that a maternal death is considered preventable if there was at least some chance of a death being averted by one or more reasonable changes at the patient, family, community, provider, facility, and/or system levels.
4. If a death was preventable, the panel identified factors that may have contributed to the death and provided recommendations to avert the death, which, if implemented may have led to better outcome. Factors contributing to deaths were identified at the patient/family, community, provider, facility and systems levels as outlined on the CDC form/MMRIA.

Level 4 Review: Systems-Level Recommendations Development and Discussion

The Department aggregated the panel’s findings and decisions on each preventable pregnancy-related death and conducted qualitative analyses of all identified contributing factors and recommendations to prevent future deaths. First, contributing factors and associated recommendations were categorized at the patient/family, provider, and facility, systems, or community level as outlined in Appendix 3. Next, each contributing factor and recommendation was coded using a coding guide developed throughout this process. Codes were then summarized into themes of contributing factors and recommendations. Department staff and leadership prioritized the recommendation themes in accordance with the findings of the review and also in consideration of other maternal and infant birth outcome information, including maternal morbidity and infant outcomes.

The Department then worked with internal and external experts and partners to develop action points and activities under each prioritized recommendation and organized according to the audience – patients/families/communities, providers/facilities, legislators and state partners. In many cases, each activity outlines who, what, when, how. The recommendation themes and activities to implement those recommendations were presented to the Panel at the Level 4 Review meeting. During this meeting, Panel members provided feedback, assisted with refining activities, and prioritized recommendations for legislators through a vote. Those recommendations are presented in this report for consideration by the legislature, providers and facilities in the state, and patients and their families

Appendix 2: Additional Data & Findings

Data Analysis

The Department calculated maternal mortality ratios for all maternal deaths and pregnancy-related deaths. The maternal mortality ratio is the number of deaths per 100,000 live births during a specified time period and geography. It is used to describe maternal deaths in aggregate as well as for specific subgroups and to compare the experience of maternal mortality across states and the nation.

Results presented in this report are purely descriptive in nature. Information on maternal characteristics presented in the report was obtained from birth certificates. Additional information on health insurance coverage during one year postpartum was extracted from medical records collected for the review process. In cases where information is not available from the birth certificate, available information from the medical record or death certificate was used.

A three-year rolling average was used to present the trends of total and pregnancy-related maternal mortality in Washington State (Figure 3). For the purpose of presenting the trend the maternal mortality ratio for 2013 was estimated using an average of 2012 and 2014.

Exact Poisson confidence limits were developed for maternal mortality ratios to describe the uncertainty of these estimates. The confidence limits show the possible range of values for each estimate thus providing a good description of stability and errors associated with the maternal mortality ratios.

The maternal mortality review and the legislative report are focused on death determined by the Panel to be pregnancy-related. However, we recognize value in additional analyses related to other subgroups of deaths. As such, we have included information on several subgroups of pregnancy-associated deaths here.

Additional Definitions

As part of the review process, the Panel works to categorize pregnancy-associated deaths into three subgroups – 1) pregnancy-related deaths; 2) pregnancy-associated, but not related deaths; and 3) unable to determine pregnancy-relatedness. For analytic purposes, sometimes these groups are divided into smaller subgroups. Data on these smaller subgroups are included in this appendix. To orient the reader to the subgroups, we have included definitions for each.

Figure A1: Key Definitions, Maternal Mortality Review, Washington State, 2014-2016

Pregnancy-Associated Death: The death of a woman during pregnancy or within one year of the end of pregnancy from any cause. This includes all subgroups.

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

- Pregnancy-related death due to other medical causes: This subgroup does not include deaths related to suicide or substance overdose and is comparable to the "historic" pregnancy related death definition used at the Department and the definition published by the CDC's Pregnancy Mortality Surveillance System.

Pregnancy-Associated, Not Related Death: The death of a woman from any cause during pregnancy or within one year of the end of pregnancy that is not pregnancy-related.

- Pregnancy-associated, not related death due to other medical causes: This subgroup of deaths were reviewed by the Panel and determined not to be related to pregnancy and does not include deaths from suicide or overdose.
- Pregnancy-associated, not related deaths due to other injuries: This subgroup was reviewed by the Panel and determined not to be related to pregnancy and does not include deaths from suicide or substance overdose/poisoning.

Unable to be determined: Pregnancy-relatedness could not be determined

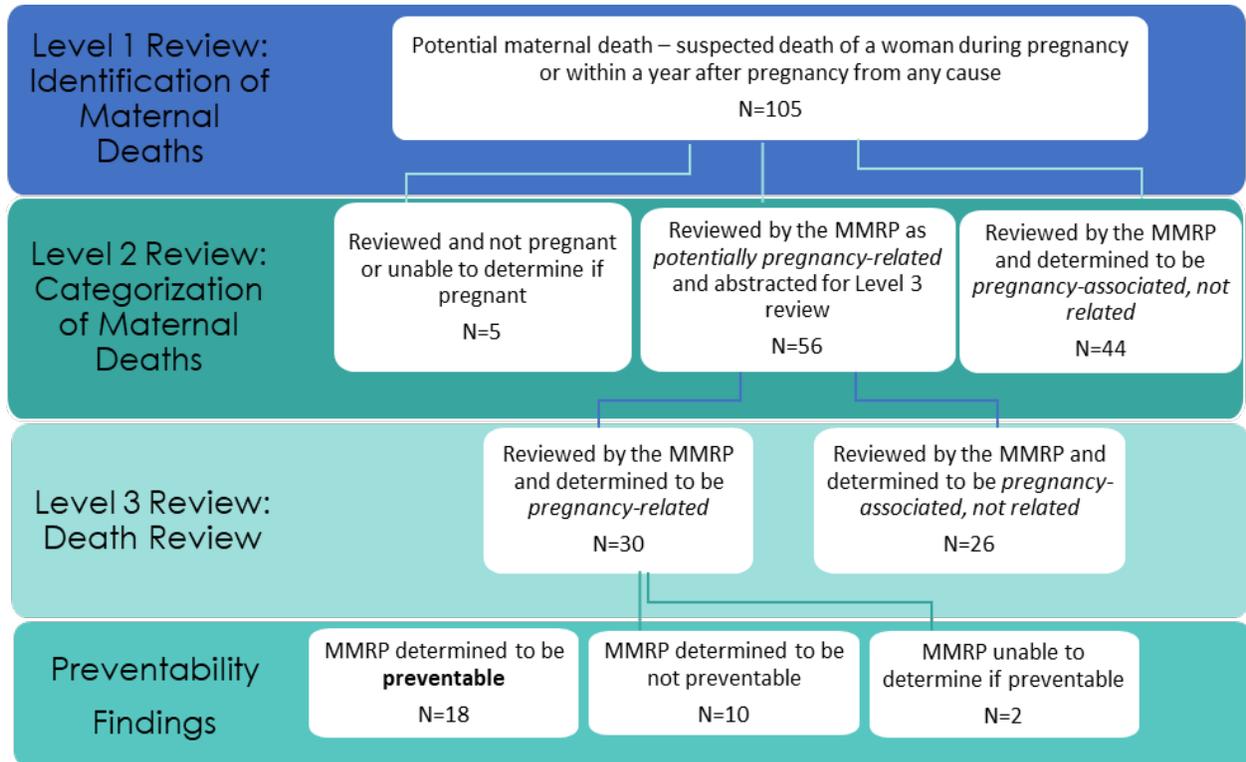
There were 268,050 live births in Washington during 2014-2016. The Department identified 105 maternal or pregnancy-associated deaths within this time period. Five of these deaths did not meet eligibility criteria and were excluded, resulting in 100 maternal deaths resulting in a pregnancy-associated maternal mortality ratio of 37.3 deaths per 100,000 live births.

At the Level 2 Review, all pregnancy-associated deaths were screened by a subgroup of Panel members, who determined that 56 deaths were *potentially* pregnancy related and required a full review by the Panel.

During the Level 3 Review, 30 deaths were determined by the Panel to be pregnancy-related resulting in a pregnancy-related maternal mortality ratio of 11.2 deaths per 100,000 live births and 63 pregnancy-associated, not related deaths resulting in a ratio of 26.1 deaths per 100,000 live births. There were seven pregnancy-associated deaths for which the reviews could not

establish whether there was a relationship to the pregnancy. (See Table 1, page 16.) Eighteen of the 30 pregnancy-related deaths were determined by the Panel to be preventable (see Figure 23).

Figure A2: Maternal Mortality Review Findings by Level of Review, Washington State, 2014-2016

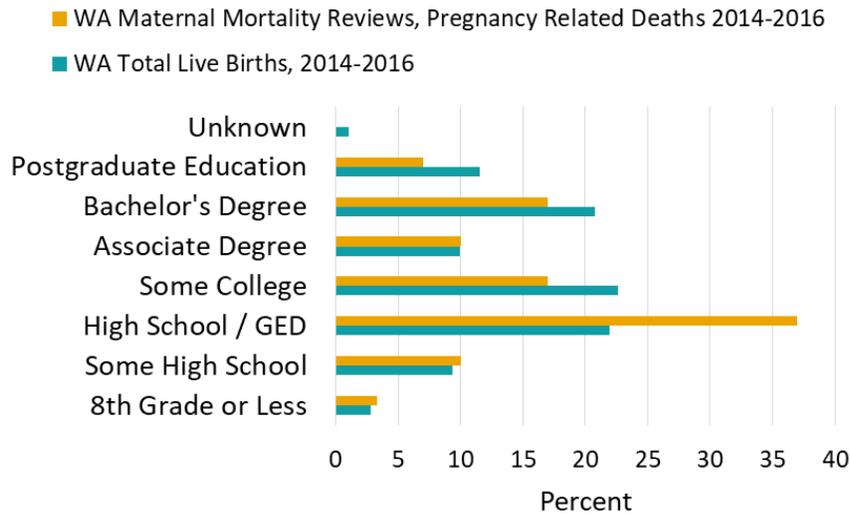


Pregnancy-related Deaths, Additional Data (N=30)

Education level at time of death

Maternal deaths affected women of all educational levels. Figure A3 illustrates the level of educational attainment among women who died from pregnancy-related causes and compares that to the total number of women who gave birth during the same time period. When compared with educational levels of women who had live births in 2014-2016, women with lower educational levels (high school or equivalent degree or less) were overrepresented in the maternal deaths group suggesting that maternal deaths disproportionately affected less educated women.

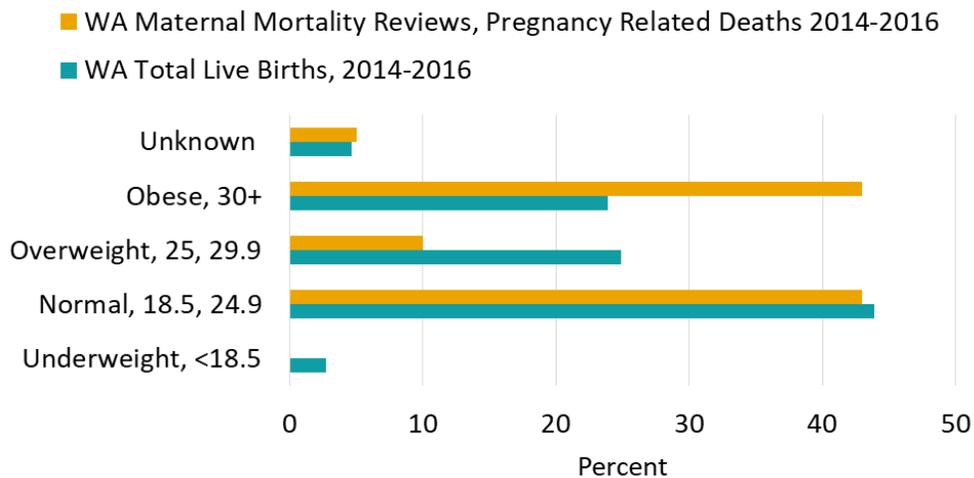
Figure A3: Education Attainment Level at Time of Death, Pregnancy-Related Deaths, (N=30), Washington State, 2014-2016



Pre-pregnancy body mass index (BMI)

Figure A4 illustrates the pre-pregnancy body mass index among women who died from pregnancy-related causes in 2014-2016 as compared to women who gave birth in Washington during the same time period. Pre-pregnancy body mass index was calculated using information from birth records. None of the maternal deaths were underweight before pregnancy. When compared with women who had live births during 2014-2016, women who were obese (BMI 30 or more) were overrepresented in the maternal deaths group.

Figure A4: Pre-pregnancy Body Mass Index, Pregnancy-Related Deaths, (N=21), Washington State, 2014-2016



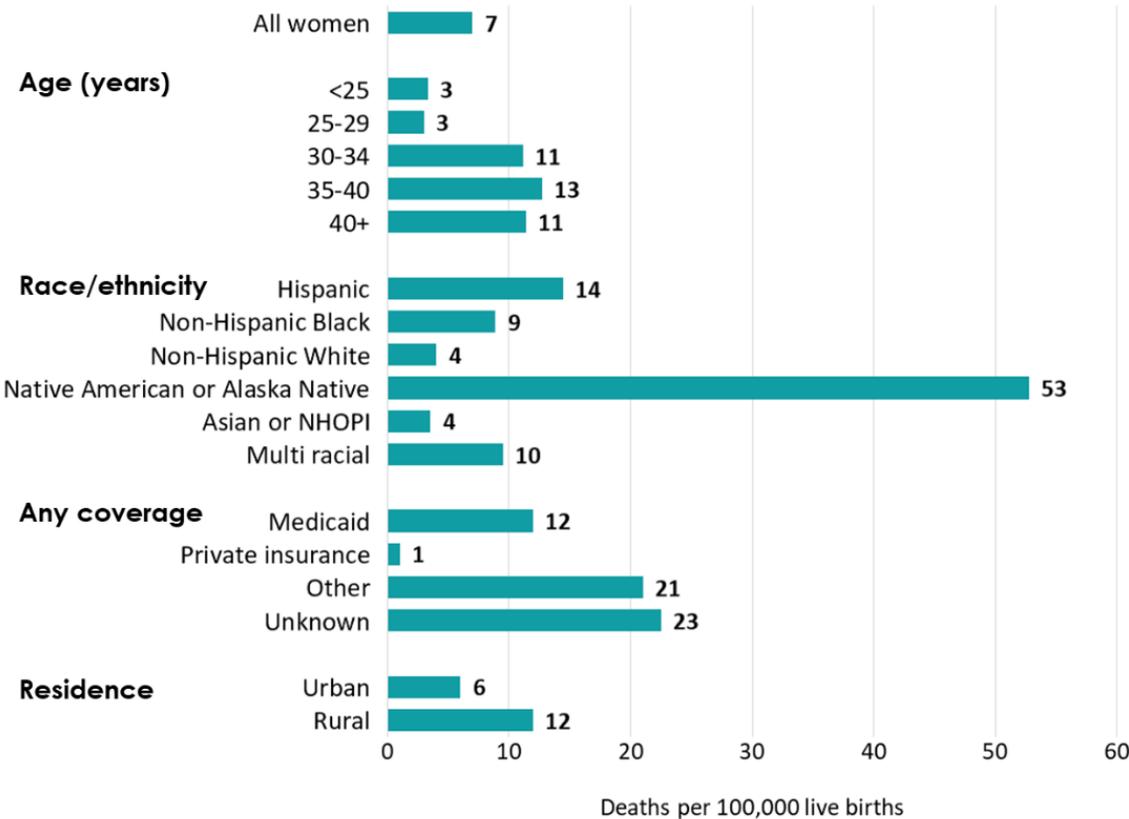
Pregnancy-related Deaths Due to Other Medical Causes (n=19)

The subgroup of deaths called “pregnancy-related deaths from other medical causes” does not include deaths related to suicide and substance overdose. They have been separated out to easily understand and compare to the more “traditional” categorization of pregnancy-related deaths that excludes accidental and incidental deaths, and at the request of the Panel.

Demographics: Pregnancy-related Deaths Due to Other Medical Causes

Maternal mortality ratios for women over 30 years old had highest values. Women with private health insurance coverage had the lowest mortality ratio. See Figure A5.

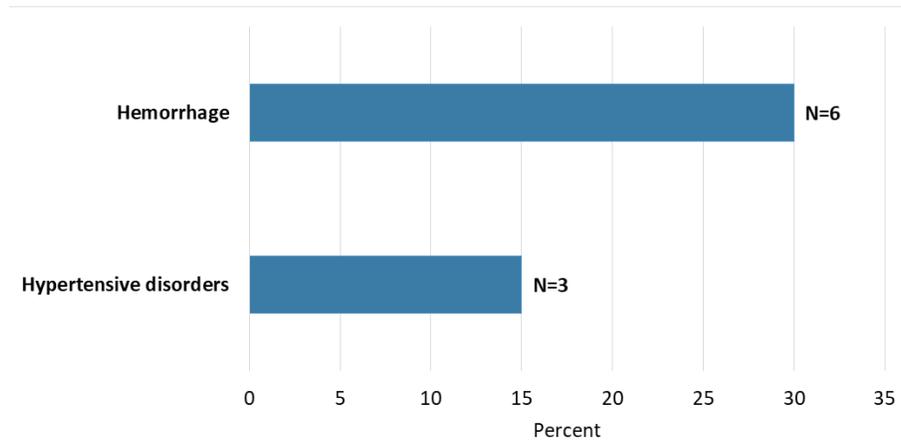
Figure A5: Demographics - Maternal Mortality Ratios for Pregnancy-Related Deaths due to other Medical Causes, Washington State 2014-2016



Underlying Cause of Death: Pregnancy-related Deaths Due to Other Medical Causes

In this sub-group of pregnancy-related deaths, the Panel-determined leading cause of death was hemorrhage (30%) followed by hypertensive disorders in pregnancy (15%) The other causes of death had 2 or fewer deaths and were not included in Figure A6.

Figure A6: MMRP-Determined Underlying Causes of Death, Pregnancy-Related Deaths from Other Medical Causes (N=19), Washington State, 2014-2016

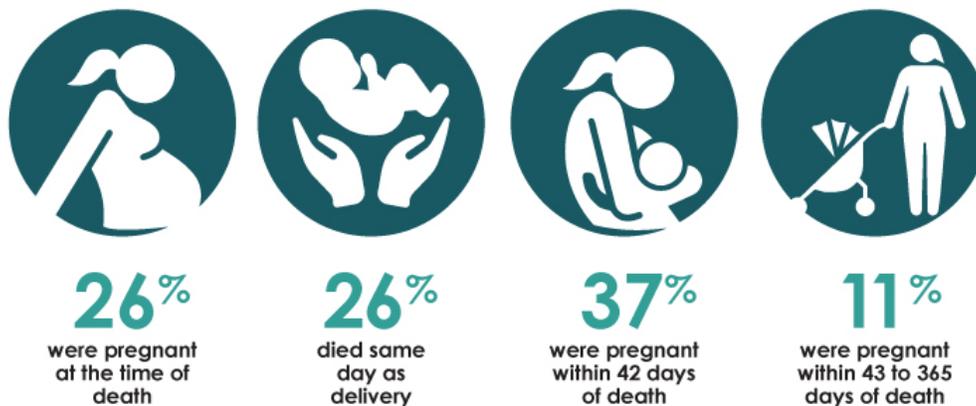


Timing of Death: Pregnancy-related Deaths Due to Other Medical Causes

More than half of the pregnancy-related deaths from natural causes occurred during pregnancy or within 24 hours of delivery. A little over a third of these deaths occurred within 42 days after delivery and only 11% occurred beyond 43 days after delivery (Figure A7).

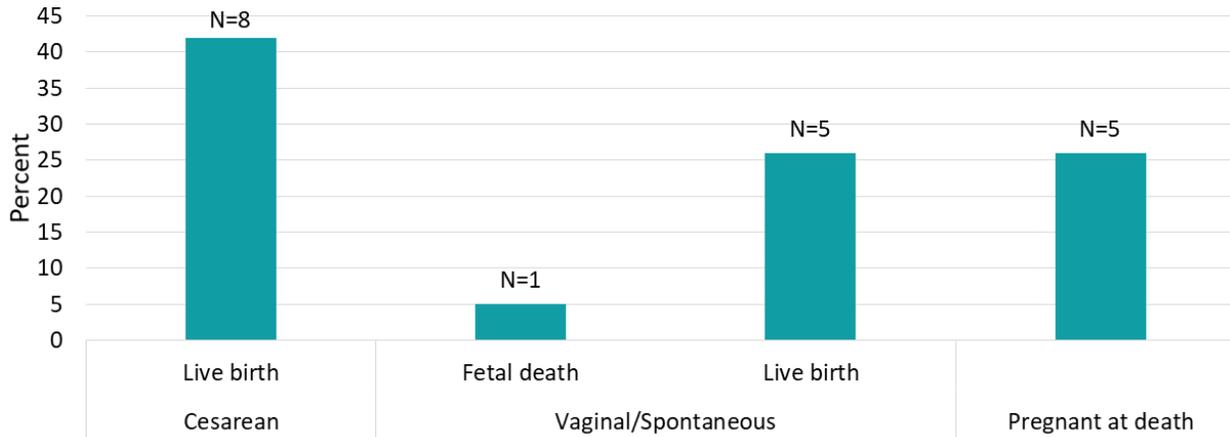
Figure A7: Timing from End of Pregnancy to Death, Pregnancy-Related Deaths from Other Medical Causes (N=19)¹, Washington State, 2014-2016

Of all women who died from pregnancy-related deaths from other medical causes...



The majority of pregnancies in the pregnancy-related deaths from other medical causes resulted in live births (13, 68%). There were two fetal deaths (11%) and three women died while pregnant (16%). One third of the live births were delivered vaginally (6, 32%) and more than half were cesarean births (10, 53%). See Figure A8.

Figure A8: Method of Delivery and Outcome of Pregnancy for Pregnancy-Related Deaths from Other Medical Causes Washington State, 2014-2016



Health Insurance Coverage: Pregnancy-related Deaths Due to Other Medical Causes

Health insurance coverage for women was consistent through the postpartum period. The types of coverage included Medicaid (n=13, 68%), private insurance (n=4, 21%) and other programs such as Tricare (n=2, 11%).

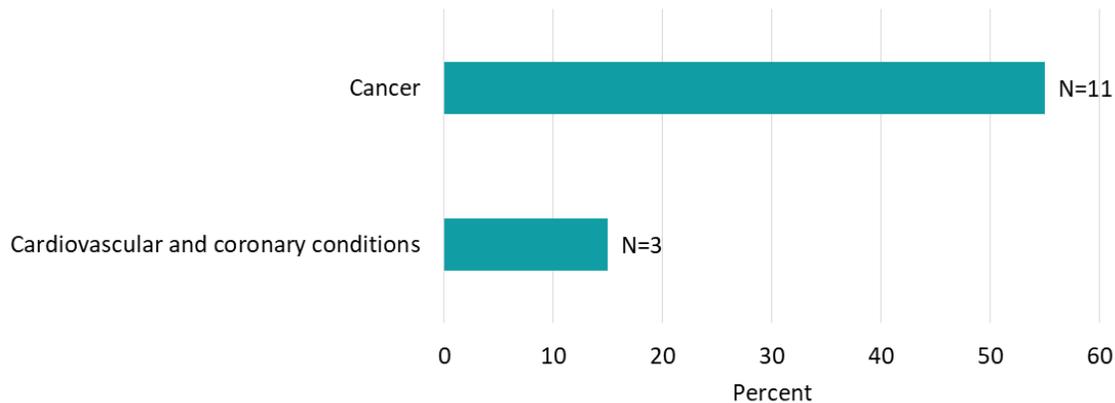
Preventability: Pregnancy-related Deaths Due to Other Medical Causes

The Panel determined that 42% (N=8) of the pregnancy-related deaths from other medical causes were preventable. There was one death for which preventability could not be determined. The majority of preventable deaths occurred during delivery (n=5) or within a week after delivery (n=2).

Pregnancy-associated, not related deaths from other medical causes

There were 20 pregnancy-associated deaths from medical causes that were not related to pregnancy. These deaths did not include deaths from suicide and substance overdose. The leading cause of death, based on the death certificate, was cancer followed by cardiovascular and coronary conditions (Figure A9). The other causes of death had 2 or fewer deaths and were not included in Figure A9.

Figure A9: Pregnancy-associated not related deaths due to other medical conditions: Leading causes of death, Washington State, 2014-2016



Pregnancy-associated deaths due to other injuries

There were 23 pregnancy-associated deaths due to injuries that did not include suicide or overdose. While the numbers of deaths were small, the maternal mortality ratio for pregnancy-associated deaths due to injury was significantly higher for American Indian or Alaska Native women compared to women of other race/ethnic groups with the exception of Non-Hispanic Black women. The majority of pregnancy-associated deaths due to other injuries (18 out of 23) were by motor vehicle accidents.

Table 1A: Counts, Maternal Mortality Ratio (deaths per 100,000 live births) and 95% Confidence Limits for Ratio for Pregnancy-Associated Deaths and Select Subgroups, Washington State, 2014-2016

		Pregnancy-Associated Deaths			All Pregnancy-Related Deaths			Pregnancy-Associated Deaths due to suicide			Pregnancy-Associated Deaths due to accidental substance overdose			WA Total live births 2014-2016
		Count	Ratio	95% Confidence limits for ratio	Count	Ratio	95% Confidence limits for ratio	Count	Ratio	95% Confidence limits for ratio	Count	Ratio	95% Confidence limits for ratio	
All women		100	37	30, 45	30	11	8, 16	13	5	3, 8	15	6	3, 9	268,050
Maternal age	<25	23	38	24, 57	3	5	1, 14	2	3	0, 12	5	8	3, 19	60587
	25-29	21	27	17, 41	4	5	1, 13	1	1	0, 7	4	5	1, 13	78603
	30-34	31	38	26, 54	12	15	8, 26	6	7	3, 16	4	5	1, 13	80799
	35-40	19	48	29, 76	8	20	9, 40	2	5	0, 18	2	5	1, 18	39281
	40+	6	68	25, 149	3	34	7, 100	2	23	3, 82	0	0	0	8780
Race/ethnicity	Hispanic	17	35	20, 56	8	17	7, 33	1	2	0, 12	0	0	0	48332
	Non-Hispanic Black	7	62	25, 128	1	9	0, 49	2	18	2, 64	1	9	0, 49	11268
	Non-Hispanic White	52	32	24, 43	13	8	4, 14	6	4	1, 8	12	7	4, 13	160099
	American Indian or Alaska Native	11	290	145, 519	2	53	6, 191	0	0	0	2	53	6, 191	3790
	Asian and Native Hawaiian or Other Pacific Islander	8	28	11, 57	4	14	4, 36	3	11	2, 31	0	0	0	28515
	Multiple race	5	18	15, 111	2	19	2, 69	1	10	0, 53	0	0	0	10519
	Unknown	0	0	0	0	0	0	0	0	0	0	0	0	5527
Health Insurance Coverage	Medicaid	64	59	45, 75	19	18	11, 27	8	7	3, 15	12	11	6, 19	108520
	Private Insurance	23	17	11, 25	8	6	3, 12	4	3	1, 7	1	1	0, 4	136790
	Other	4	21	6, 55	2	11	1, 39	0	0	0	1	5	0, 30	18732
	Unknown	9	203	93, 384	1	23	1, 125	1	23	1, 125	1	23	1, 125	4444
Residence	Urban	76	32	25, 40	25	11	7, 16	10	4	2, 8	12	5	3, 9	237161
	Rural	16	49	28, 80	5	15	5, 36	2	6	1, 22	3	9	2, 27	32333
	Unknown	8	193	83, 381	0	0	0	1	24	1, 135	0	0	0	4140

Appendix 3: Maternal Mortality Review Panel Committee Decisions Form

MIRIA		MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM V17	
REVIEW DATE	Month Day Year	RECORD ID #	
PREGNANCY-RELATEDNESS: SELECT ONE			
<input type="checkbox"/> PREGNANCY-RELATED	The death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy		
<input type="checkbox"/> PREGNANCY-ASSOCIATED, BUT NOT -RELATED	The death of a woman during pregnancy or within one year of the end of pregnancy from a cause that is not related to pregnancy		
<input type="checkbox"/> PREGNANCY-ASSOCIATED BUT UNABLE TO DETERMINE PREGNANCY-RELATEDNESS			
<input type="checkbox"/> NOT PREGNANCY-RELATED OR -ASSOCIATED	(i.e. false positive, woman was not pregnant within one year of her death)		
ESTIMATE THE DEGREE OF RELEVANT INFORMATION (RECORDS) AVAILABLE FOR THIS CASE:			
<input type="checkbox"/> COMPLETE	All records necessary for adequate review of the case were available		
<input type="checkbox"/> SOMEWHAT COMPLETE	Major gaps (i.e. information that would have been crucial to the review of the case)		
<input type="checkbox"/> MOSTLY COMPLETE	Minor gaps (i.e. information that would have been beneficial but was not essential to the review of the case)		
<input type="checkbox"/> NOT COMPLETE	Minimal records available for review (i.e. death certificate and no additional records)		
<input type="checkbox"/> N/A			
DOES THE COMMITTEE AGREE WITH THE UNDERLYING CAUSE OF DEATH LISTED ON DEATH CERTIFICATE?		<input type="checkbox"/> YES	<input type="checkbox"/> NO
COMMITTEE DETERMINATION OF CAUSE(S) OF DEATH			
TYPE	CAUSE (DESCRIPTIVE)		
IMMEDIATE			
CONTRIBUTING			
UNDERLYING			
OTHER SIGNIFICANT			
IF PREGNANCY-RELATED, COMMITTEE DETERMINATION OF UNDERLYING CAUSE OF DEATH Refer to page 3 for PMSS-MM cause of death list. If more than one is selected, list in order of importance beginning with the most compelling (1-2; no more than 2 may be selected in the system).			
DID OBESITY CONTRIBUTE TO THE DEATH?	<input type="checkbox"/> YES	<input type="checkbox"/> PROBABLY	<input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN
DID MENTAL HEALTH CONDITIONS CONTRIBUTE TO THE DEATH?	<input type="checkbox"/> YES	<input type="checkbox"/> PROBABLY	<input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN
DID SUBSTANCE USE DISORDER CONTRIBUTE TO THE DEATH?	<input type="checkbox"/> YES	<input type="checkbox"/> PROBABLY	<input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN
WAS THIS DEATH A SUICIDE?	<input type="checkbox"/> YES	<input type="checkbox"/> PROBABLY	<input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN
WAS THIS DEATH A HOMICIDE?	<input type="checkbox"/> YES	<input type="checkbox"/> PROBABLY	<input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN
	<input type="checkbox"/> FIREARM <input type="checkbox"/> SHARP INSTRUMENT <input type="checkbox"/> BLUNT INSTRUMENT <input type="checkbox"/> POISONING/ <input type="checkbox"/> OVERDOSE <input type="checkbox"/> HANGING/ <input type="checkbox"/> STRANGULATION/ <input type="checkbox"/> SUFFOCATION	<input type="checkbox"/> FALL <input type="checkbox"/> PUNCHING/ <input type="checkbox"/> KICKING/BEATING <input type="checkbox"/> EXPLOSIVE <input type="checkbox"/> DROWNING <input type="checkbox"/> FIRE OR BURNS <input type="checkbox"/> MOTOR VEHICLE	<input type="checkbox"/> INTENTIONAL <input type="checkbox"/> NEGLIGENCE <input type="checkbox"/> OTHER, SPECIFY:
IF HOMICIDE, WHAT WAS THE RELATIONSHIP OF THE PERPETRATOR TO THE DECEDENT?	<input type="checkbox"/> NO RELATIONSHIP <input type="checkbox"/> PARTNER <input type="checkbox"/> EX-PARTNER <input type="checkbox"/> OTHER RELATIVE	<input type="checkbox"/> OTHER <input type="checkbox"/> ACQUAINTANCE <input type="checkbox"/> OTHER, SPECIFY:	<input type="checkbox"/> UNKNOWN <input type="checkbox"/> NOT APPLICABLE

COMMITTEE DETERMINATION OF PREVENTABILITY

A death is considered preventable if the committee determines that there was at least some chance of the death being averted by one or more reasonable changes to patient, family, provider, facility, system and/or community factors.

WAS THIS DEATH PREVENTABLE?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
CHANCE TO ALTER OUTCOME?	<input type="checkbox"/> GOOD CHANCE	<input type="checkbox"/> SOME CHANCE
	<input type="checkbox"/> NO CHANCE	<input type="checkbox"/> UNABLE TO DETERMINE

CONTRIBUTING FACTORS WORKSHEET

What were the factors that contributed to this death? Multiple contributing factors may be present at each level.

CONTRIBUTING FACTOR LEVEL	CONTRIBUTING FACTOR (SEE BELOW) AND DESCRIPTION OF ISSUE
PATIENT/FAMILY	
PROVIDER	
FACILITY	
SYSTEM	
COMMUNITY	

RECOMMENDATIONS OF THE COMMITTEE

If there was at least some chance that the death could have been averted, what were the specific and feasible actions that, if implemented or altered, might have changed the course of events? [Who?] should [do what?] [when?]

RECOMMENDATIONS OF THE COMMITTEE	LEVEL OF PREVENTION (SEE BELOW)	LEVEL OF IMPACT (SEE BELOW)

CONTRIBUTING FACTOR KEY (DESCRIPTIONS ON PAGE 4)

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> • Delay • Adherence • Knowledge • Cultural/religious • Environmental • Violence • Mental health conditions • Substance use disorder - alcohol, illicit/prescription drugs | <ul style="list-style-type: none"> • Tobacco use • Chronic disease • Childhood abuse/trauma • Access/financial • Unstable housing/ isolation • Equipment/technology • Policies/procedures • Communication | <ul style="list-style-type: none"> • Continuity of care/ care coordination • Clinical skill/ quality of care • Outreach • Law Enforcement • Referral • Assessment • Legal • Other |
|--|---|---|

PREVENTION LEVEL

- **PRIMARY:** Prevents the contributing factor before it ever occurs
- **SECONDARY:** Reduces the impact of the contributing factor once it has occurred (i.e. treatment)
- **TERTIARY:** Reduces the impact or progression of what has become an ongoing contributing factor (i.e. management of complications)

EXPECTED IMPACT LEVEL

- **SMALL:** Education/counseling (community- and/or provider-based health promotion and education activities)
- **MEDIUM:** Clinical intervention and coordination of care across continuum of well-woman visits (protocols, prescriptions)
- **LARGE:** Long-lasting protective intervention (improve readiness, recognition and response to obstetric emergencies/LARC)
- **EXTRA LARGE:** Change in context (promote environments that support healthy living/ensure available and accessible services)
- **GIANT:** Address social determinants of health (poverty, inequality, etc.)

IF PREGNANCY-RELATED, COMMITTEE DETERMINATION OF UNDERLYING CAUSE OF DEATH* PMSS-MM
 If more than one is selected, please list them in order of importance beginning with the most compelling (1-2; no more than 2 may be selected in the system).

***PREGNANCY-RELATED DEATH: THE DEATH OF A WOMAN DURING PREGNANCY OR WITHIN ONE YEAR OF THE END OF PREGNANCY FROM A PREGNANCY COMPLICATION, A CHAIN OF EVENTS INITIATED BY PREGNANCY, OR THE AGGRAVATION OF AN UNRELATED CONDITION BY THE PHYSIOLOGIC EFFECTS OF PREGNANCY.**

- | | | |
|--|---|--|
| <input type="checkbox"/> 10 Hemorrhage (excludes aneurysms or CVA) | <input type="checkbox"/> 83 Collagen vascular/autoimmune diseases | <input type="checkbox"/> 92.1 Epilepsy/seizure disorder |
| <input type="checkbox"/> 10.1 Hemorrhage – rupture/laceration/ intra-abdominal bleeding | <input type="checkbox"/> 83.1 Systemic lupus erythematosus (SLE) | <input type="checkbox"/> 92.9 Other neurologic diseases/NOS |
| <input type="checkbox"/> 10.2 Placental abruption | <input type="checkbox"/> 83.9 Other collagen vascular diseases/NOS | <input type="checkbox"/> 93 Renal disease |
| <input type="checkbox"/> 10.3 Placenta previa | <input type="checkbox"/> 85 Conditions unique to pregnancy (e.g. gestational diabetes, hyperemesis, liver disease of pregnancy) | <input type="checkbox"/> 93.1 Chronic renal failure/End-stage renal disease (ESRD) |
| <input type="checkbox"/> 10.4 Ruptured ectopic pregnancy | <input type="checkbox"/> 88 Injury | <input type="checkbox"/> 93.9 Other renal disease/NOS |
| <input type="checkbox"/> 10.5 Hemorrhage - uterine atony/postpartum hemorrhage | <input type="checkbox"/> 88.1 Intentional (homicide) | <input type="checkbox"/> 95 Cerebrovascular accident (hemorrhage/ thrombosis/aneurysm/ malformation) not secondary to hypertensive disease |
| <input type="checkbox"/> 10.6 Placenta accreta/increta/percreta | <input type="checkbox"/> 88.2 Unintentional | <input type="checkbox"/> 96 Metabolic/endocrine |
| <input type="checkbox"/> 10.7 Hemorrhage due to retained placenta | <input type="checkbox"/> 88.9 Unknown/NOS | <input type="checkbox"/> 96.1 Obesity |
| <input type="checkbox"/> 10.8 Hemorrhage due to primary DIC | <input type="checkbox"/> 89 Cancer | <input type="checkbox"/> 96.2 Diabetes mellitus |
| <input type="checkbox"/> 10.9 Other hemorrhages/NOS | <input type="checkbox"/> 89.1 Gestational trophoblastic disease (GTD) | <input type="checkbox"/> 96.9 Other metabolic/endocrine disorders |
| <input type="checkbox"/> 20 Infection | <input type="checkbox"/> 89.3 Malignant melanoma | <input type="checkbox"/> 97 Gastrointestinal disorders |
| <input type="checkbox"/> 20.1 Postpartum genital tract (e.g. of the uterus/ pelvis/perineum/necrotizing fasciitis) | <input type="checkbox"/> 90 Other malignancies/NOS | <input type="checkbox"/> 97.1 Crohn's disease/ulcerative colitis |
| <input type="checkbox"/> 20.2 Sepsis/septic shock | <input type="checkbox"/> 90.1 Coronary artery disease/myocardial infarction (MI)/atherosclerotic cardiovascular disease | <input type="checkbox"/> 97.2 Liver disease/failure/transplant |
| <input type="checkbox"/> 20.4 Chorioamnionitis/antepartum infection | <input type="checkbox"/> 90.2 Pulmonary hypertension | <input type="checkbox"/> 97.9 Other gastrointestinal diseases/NOS |
| <input type="checkbox"/> 20.5 Non-pelvic infections (e.g. pneumonia, TB, meningitis, HIV) | <input type="checkbox"/> 90.3 Valvular heart disease congenital and acquired | <input type="checkbox"/> 100 Mental health conditions |
| <input type="checkbox"/> 20.6 Urinary tract infection | <input type="checkbox"/> 90.4 Vascular aneurysm/dissection (non-cerebral) | <input type="checkbox"/> 100.1 Depression |
| <input type="checkbox"/> 20.9 Other infections/NOS | <input type="checkbox"/> 90.5 Hypertensive cardiovascular disease | <input type="checkbox"/> 100.9 Other psychiatric conditions/NOS |
| <input type="checkbox"/> 30 Embolism - thrombotic (non-cerebral) | <input type="checkbox"/> 90.6 Marfan Syndrome | <input type="checkbox"/> 999 Unknown COD |
| <input type="checkbox"/> 30.9 Other embolism/NOS | <input type="checkbox"/> 90.7 Conduction defects/arrhythmias | |
| <input type="checkbox"/> 31 Embolism - amniotic fluid | <input type="checkbox"/> 90.8 Vascular malformations outside head and coronary arteries | |
| <input type="checkbox"/> 40 Preeclampsia | <input type="checkbox"/> 90.9 Other cardiovascular disease, including CHF, cardiomegaly, cardiac hypertrophy, cardiac fibrosis, non-acute myocarditis/NOS | |
| <input type="checkbox"/> 50 Eclampsia | <input type="checkbox"/> 91 Pulmonary conditions (excludes ARDS-Adult respiratory distress syndrome) | |
| <input type="checkbox"/> 60 Chronic hypertension with superimposed preeclampsia | <input type="checkbox"/> 91.1 Chronic lung disease | |
| <input type="checkbox"/> 70 Anesthesia complications | <input type="checkbox"/> 91.2 Cystic fibrosis | |
| <input type="checkbox"/> 80 Cardiomyopathy | <input type="checkbox"/> 91.3 Asthma | |
| <input type="checkbox"/> 80.1 Postpartum/peripartum cardiomyopathy | <input type="checkbox"/> 91.9 Other pulmonary disease/NOS | |
| <input type="checkbox"/> 80.2 Hypertrophic cardiomyopathy | <input type="checkbox"/> 92 Neurologic/neurovascular conditions (excluding CVAs) | |
| <input type="checkbox"/> 80.9 Other cardiomyopathy/NOS | | |
| <input type="checkbox"/> 82 Hematologic | | |
| <input type="checkbox"/> 82.1 Sickle cell anemia | | |
| <input type="checkbox"/> 82.9 Other hematologic conditions including thrombophthias/TTP/HUS/NOS | | |

CONTRIBUTING FACTOR DESCRIPTIONS

DELAY OR FAILURE TO SEEK CARE

The provider or patient was delayed in referring or accessing care, treatment, or follow-up care/action.

ADHERENCE TO MEDICAL RECOMMENDATIONS

The provider or patient did not follow protocol or failed to comply with standard procedures (i.e. non adherence to prescribed medications).

KNOWLEDGE - LACK OF KNOWLEDGE REGARDING IMPORTANCE OF EVENT OR OF TREATMENT OR FOLLOW-UP

The provider or patient did not receive adequate education or lacked knowledge or understanding regarding the significance of a health event (e.g. shortness of breath as a trigger to seek immediate care) or lacked understanding about the need for treatment/follow-up after evaluation for a health event (e.g. needed to keep appointment for psychiatric referral after an ED visit for exacerbation of depression).

CULTURAL/RELIGIOUS, OR LANGUAGE FACTORS

Demonstration that any of these factors was either a barrier to care due to lack of understanding or led to refusal of therapy due to beliefs (or belief systems).

ENVIRONMENTAL FACTORS

Factors related to weather or social environment.

VIOLENCE AND INTIMATE PARTNER VIOLENCE (IPV)

Physical or emotional abuse perpetrated by current or former intimate partner, family member, or stranger.

MENTAL HEALTH CONDITIONS

The patient carried a diagnosis of a psychiatric disorder. This includes postpartum depression.

SUBSTANCE USE DISORDER - ALCOHOL, ILLICIT/PRESCRIPTION DRUGS

Substance use disorder is characterized by recurrent use of alcohol and/or drugs causing clinically and functionally significant impairment, such as health problems or disability. The committee may determine that substance use disorder contributed to the death when the disorder directly compromised a woman's health status (e.g. acute methamphetamine intoxication exacerbated pregnancy-induced hypertension, or woman was more vulnerable to infections or medical conditions).

TOBACCO USE

The patient's use of tobacco directly compromised the patient's health status (e.g. long-term smoking led to underlying chronic lung disease).

CHRONIC DISEASE

Occurrence of one or more significant pre-existing medical conditions (e.g. obesity, cardiovascular disease, or diabetes).

CHILDHOOD SEXUAL ABUSE/TRAUMA

The patient experienced rape, molestation, or one or more of the following: sexual exploitation during childhood plus persuasion, inducement, or coercion of a child to engage in sexually explicit conduct; physical or emotional abuse or violence other than that related to sexual abuse during childhood.

LACK OF ACCESS/FINANCIAL RESOURCES

System issues, e.g. lack or loss of healthcare insurance or other financial distress, as opposed to woman's noncompliance, impacted woman's ability to care for herself (e.g. did not seek services because unable to miss work or afford postpartum visits after insurance expired). Other barriers to accessing care: insurance non-eligibility, provider shortage in woman's geographical area, and lack of public transportation.

UNSTABLE HOUSING

Woman lived "on the street" in a homeless shelter, or in transitional or temporary circumstances with family or friends.

SOCIAL SUPPORT/ISOLATION - LACK OF FAMILY/FRIEND OR SUPPORT SYSTEM

Social support from family, partner, or friends was lacking. Inadequate, and/or dysfunctional.

INADEQUATE OR UNAVAILABLE EQUIPMENT/TECHNOLOGY

Equipment was missing, unavailable, or not functional. (e.g. absence of blood tubing connector).

LACK OF STANDARDIZED POLICIES/PROCEDURES

The facility lacked basic policies or infrastructure germane to the woman's needs (e.g. response to high blood pressure, or a lack of or outdated policy or protocol).

POOR COMMUNICATION/LACK OF CASE COORDINATION OR MANAGEMENT/ LACK OF CONTINUITY OF CARE (SYSTEM PERSPECTIVE)

Care was fragmented (i.e. uncoordinated or not comprehensive) among or between healthcare facilities or units, (e.g. records not available between inpatient and outpatient or among units within the hospital, such as Emergency Department and Labor and Delivery).

LACK OF CONTINUITY OF CARE (PROVIDER OR FACILITY PERSPECTIVE)

Care providers did not have access to woman's complete records or did not communicate woman's status sufficiently. Lack of continuity can be between prenatal, labor and delivery, and postpartum providers.

CLINICAL SKILL/QUALITY OF CARE (PROVIDER OR FACILITY PERSPECTIVE)

Personnel were not appropriately skilled for the situation or did not exercise clinical judgment consistent with current standards of care (e.g. error in the preparation or administration of medication or unavailability of translation services).

INADEQUATE COMMUNITY OUTREACH/RESOURCES

Lack of coordination between healthcare system and other outside agencies/organizations in the geographic/cultural area that work with maternal child health issues.

INADEQUATE LAW ENFORCEMENT RESPONSE

Law enforcement response was not in a timely manner or was not appropriate or thorough in scope.

LACK OF REFERRAL OR CONSULTATION

Specialists were not consulted or did not provide care; referrals to specialists were not made.

FAILURE TO SCREEN/INADEQUATE ASSESSMENT OF RISK

Factors placing the woman at risk for a poor clinical outcome recognized, and the woman was not transferred/transported to a provider able to give a higher level of care.

LEGAL

Legal considerations that impacted outcome.

OTHER

Contributing factor not otherwise mentioned. Please provide description.

Appendix 4: RCW 70.54.450

Maternal mortality review panel—Membership—Duties—Confidentiality, testimonial privilege, and liability—Identification of maternal deaths—Reports. (Expires June 30, 2020.)

(1) For the purposes of this section, "maternal mortality" or "maternal death" means a death of a woman while pregnant or within one year of delivering or following the end of a pregnancy, whether or not the woman's death is related to or aggravated by the pregnancy.

(2) A maternal mortality review panel is established to conduct comprehensive, multidisciplinary reviews of maternal deaths in Washington to identify factors associated with the deaths and make recommendations for system changes to improve health care services for women in this state. The members of the panel must be appointed by the secretary of the department of health, must serve without compensation, and may include:

- (a) An obstetrician;
- (b) A physician specializing in maternal fetal medicine;
- (c) A neonatologist;
- (d) A midwife with licensure in the state of Washington;
- (e) A representative from the department of health who works in the field of maternal and child health;
- (f) A department of health epidemiologist with experience analyzing perinatal data;
- (g) A pathologist; and
- (h) A representative of the community mental health centers.

(3) The maternal mortality review panel must conduct comprehensive, multidisciplinary reviews of maternal mortality in Washington. The panel may not call witnesses or take testimony from any individual involved in the investigation of a maternal death or enforce any public health standard or criminal law or otherwise participate in any legal proceeding relating to a maternal death.

(4)(a) Information, documents, proceedings, records, and opinions created, collected, or maintained by the maternity mortality review panel or the department of health in support of the maternal mortality review panel are confidential and are not subject to public inspection or copying under chapter 42.56 RCW and are not subject to discovery or introduction into evidence in any civil or criminal action.

(b) Any person who was in attendance at a meeting of the maternal mortality review panel or who participated in the creation, collection, or maintenance of the panel's information, documents, proceedings, records, or opinions may not be permitted or required to testify in any civil or criminal action as to the content of such proceedings, or the panel's information,

documents, records, or opinions. This subsection does not prevent a member of the panel from testifying in a civil or criminal action concerning facts which form the basis for the panel's proceedings of which the panel member had personal knowledge acquired independently of the panel or which is public information.

(c) Any person who, in substantial good faith, participates as a member of the maternal mortality review panel or provides information to further the purposes of the maternal mortality review panel may not be subject to an action for civil damages or other relief as a result of the activity or its consequences.

(d) All meetings, proceedings, and deliberations of the maternal mortality review panel may, at the discretion of the maternal mortality review panel, be confidential and may be conducted in executive session.

(e) The maternal mortality review panel and the secretary of the department of health may retain identifiable information regarding facilities where maternal deaths, or from which the patient was transferred, occur and geographic information on each case solely for the purposes of trending and analysis over time. All individually identifiable information must be removed before any case review by the panel.

(5) The department of health shall review department available data to identify maternal deaths. To aid in determining whether a maternal death was related to or aggravated by the pregnancy, and whether it was preventable, the department of health has the authority to:

(a) Request and receive data for specific maternal deaths including, but not limited to, all medical records, autopsy reports, medical examiner reports, coroner reports, and social service records; and

(b) Request and receive data as described in (a) of this subsection from health care providers, health care facilities, clinics, laboratories, medical examiners, coroners, professions and facilities licensed by the department of health, local health jurisdictions, the health care authority and its licensees and providers, and the department of social and health services and its licensees and providers.

(6) Upon request by the department of health, health care providers, health care facilities, clinics, laboratories, medical examiners, coroners, professions and facilities licensed by the department of health, local health jurisdictions, the health care authority and its licensees and providers, and the department of social and health services and its licensees and providers must provide all medical records, autopsy reports, medical examiner reports, coroner reports, social services records, information and records related to sexually transmitted diseases, and other data requested for specific maternal deaths as provided for in subsection (5) of this section to the department.

(7) By July 1, 2017, and biennially thereafter, the maternal mortality review panel must submit a report to the secretary of the department of health and the health care committees of the Senate

and House of Representatives. The report must protect the confidentiality of all decedents and other participants involved in any incident. The report must be distributed to relevant stakeholder groups for performance improvement. Interim results may be shared at the Washington state hospital association coordinated quality improvement program. The report must include the following:

(a) A description of the maternal deaths reviewed by the panel during the preceding twenty-four months, including statistics and causes of maternal deaths presented in the aggregate, but the report must not disclose any identifying information of patients, decedents, providers, and organizations involved; and

(b) Evidence-based system changes and possible legislation to improve maternal outcomes and reduce preventable maternal deaths in Washington.

[2016 c 238 § 1.]

NOTES: Expiration date—2016 c 238: "This act expires June 30, 2020." [2016 c 238 § 4.]

Appendix 5: Quality Improvement Updates

Since the last maternal mortality review and report published in 2017, the following activities have taken place as a result of the report and the findings of the Panel:

- A volunteer workgroup comprised of pathologists, coroners, and members from the Panel and the Washington State Perinatal Collaborative created guidelines for maternal death autopsy; these are available to pathologists on the Department [maternal mortality review website](#). In addition, the workgroup made recommendations that led to amendment RCW 70.54.450 to include the requirement that hospitals and licensed birth centers in good faith report maternal deaths that occur during pregnancy or within 42 days after pregnancy to the local coroner or medical examiner. These deaths must receive investigations and autopsy is strongly recommended, and the county where they are done can receive 100 % reimbursement for the autopsies.
- Volunteers from the Panel and the Washington State Perinatal Collaborative created recommendations for maternal care for women with a very high body mass index after maternal obesity was identified in the 2017 report as a major contributing factor of pregnancy related deaths. These guidelines will be made available soon on the Department's maternal mortality review [webpage](#).
 - These recommendations emphasize women with body mass indices (BMI) equal to or greater than 40 need early referral to specialties, including an early anesthesia consultation at 28-32 weeks, and that plans of care should ensure delivery and care occur at appropriate facilities to meet these women's needs.
- As a result of the last maternal mortality review and the high number of deaths that occurred during the first week after pregnancy, obstetric and newborn providers volunteered their time and developed a schedule and best practices for postpartum care for women with hypertension in pregnancy. These guidelines will be made available soon on the Department's maternal mortality review [webpage](#).
- Partners from around the state made recommendations to amend RCW 70.54.450 to strengthen the process, require reporting of some maternal deaths, and allow Washington to contribute to the national picture of maternal mortality. The proposed changes passed in [Second Substitute Senate Bill 5425](#) in the 2019 legislative session and went into effect in July 2019. The changes include:
 - Requiring tribal representation on the panel and expanding the types of providers and representatives that should be included;
 - Allowing the Department to share data with the CDC, local health jurisdictions, tribal health, and regional maternal mortality review efforts, such as the American College of Obstetricians and Gynecologists District VIII;
 - Requiring hospitals and birthing centers to make good faith efforts to report deaths that occur during pregnancy or within 42 days of the end of pregnancy to

the local county coroner or medical examiner. Local coroners and medical examiners will be required to conduct death investigations and autopsies on these reported deaths, which will be reimbursed by the Forensic Investigation Council at 100 %.

- Adding the Department of Children, Youth and Families as an entity from whom the Department can request records for the purposes of the maternal mortality review.
- The Washington State Department of Health, in Partnership with the Washington State Hospital Association, has joined the Alliance for Innovation on Maternal Health (AIM). AIM uses maternal data [and quality improvement strategies](#) to reduce maternal mortality and morbidity at the population level. Birthing hospitals are currently enrolling, data portal access is under way, and the first AIM patient safety bundle the Panel is focusing on is hemorrhage.
- As a result of the maternal mortality review of 2014-2015 deaths, a statewide workgroup was formed by the Department of Health as part of the state's opioid response team to address the needs of parents and children. Many of the initiatives of this workgroup seek to improve access to maternal mental health services and addiction services to improve both maternal and infant outcomes.
- The state legislature indicated its support of the Maternal Mortality Review Panel's work during the 2019 session by passing a law to continue this work and more effectively address disparities. The legislation requires tribal representation on the panel and diversify the representatives serving on the Panel to include all types of obstetric, perinatal, and women's health medical, nursing and service providers, and individuals and/or organizations that represent populations most affected by maternal mortality and lack of access to maternal care. The legislation also requires hospitals and birthing centers to make good faith efforts to report deaths that occur during pregnancy or within 42 days of pregnancy to the local coroner/medical examiner to conduct a death investigation and autopsy. The state will reimburse counties at 100 % for autopsies.

Appendix 6: An Early Look at 2017 Maternal Deaths



Maternal Mortality Review Panel: An early look at 2017 Maternal Deaths



The Washington State Maternal Mortality Review Panel conducts multidisciplinary reviews of maternal deaths to determine if the deaths were related to pregnancy and if the deaths were preventable. Based on these findings, the Panel makes recommendations to reduce preventable maternal deaths and improve women's health care in the state.

Maternal mortality reviews provide an in-depth understanding of the issues that impact maternal health and lead to poor outcomes, and the people who are most affected by poor outcomes and inequities in maternal care. They also provide insight into the quality and state of perinatal health care and systems.

The Panel reviews maternal deaths yearly. This is a summary of preliminary maternal mortality data covering 2017 maternal deaths for the state of Washington. Complete data analyses and recommendations were not yet determined at the time of the publication of the 2019 legislative report. Results presented include data from the Panel's decisions on pregnancy-relatedness and preventability. Full analyses and interpretation of this data will be published in the next legislative report.

October 2019

Summary of findings from the review of 2014-2016 maternal deaths

Rates of maternal mortality in Washington are stable. Historical data collected on maternal deaths that occurred between 2000 and 2016 show maternal mortality rates in Washington varied over time, but are relatively stable and are not increasing like they are nationally.

In 2014-2016, there were:

100 pregnancy-associated deaths, which are deaths that occurred during pregnancy or within the first year after pregnancy from any cause.

This includes deaths from all types of causes, including obstetric complications, motor vehicle accidents, cancer, and homicide.

30 pregnancy-related deaths, which are deaths that the state's maternal mortality review panel decided were directly caused by or linked to complications from pregnancy, a chain of events started by pregnancy, or an unrelated condition that was made worse by pregnancy.

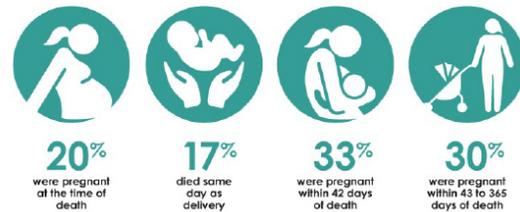
The leading causes of pregnancy-related deaths were mental and behavioral health conditions

The leading underlying cause of *pregnancy-related* deaths (N=30) were mental and behavioral health conditions (30%), suicide and substance overdose/ poisoning). This was followed by hemorrhage during childbirth or soon after, (20%) and hypertensive disorders in pregnancy (10%).

For persons with disabilities, this document is available in other formats. Please call 800-525-0127 (TTY 711) or email civil.rights@doh.wa.gov

60% of pregnancy-related deaths occurred during pregnancy or within the first six weeks of pregnancy.

Of all women who died from pregnancy-related deaths...



The leading factors contributing to deaths include access to health care services, quality of care and provider skill, and lack of care coordination.

The Maternal Mortality Review Panel identified factors that contributed to pregnancy-related deaths, including:

- Access to health care services,
- Gaps in continuity of care (especially postpartum),
- Gaps in clinical skill and quality of care (including delays in diagnoses, treatment, referral and transfer), and



Find out more about maternal deaths in Washington State and what is being done to improve health care for women. Go to doh.wa.gov/maternalmortality.

Maternal Mortality Review Coordinator
Prevention and Community Health
Washington State Department of Health
maternalmortalityreview@doh.wa.gov

Appendix 7: Review of 2014-2016 Maternal Deaths Fact Sheet



Maternal Deaths 2014-2016

Washington State Maternal Mortality Review Panel

The Washington State Legislature established a Maternal Mortality Review Panel within the Department of Health in 2016. The Panel reviews maternal deaths in the state and produces findings and recommendations to prevent future maternal deaths.

Goals of the review include determining whether a death was related to pregnancy, whether it was preventable, the factors that contributed to the death, and opportunities for interventions.

By analyzing maternal deaths, the health system can be more effective at addressing the factors causing these deaths.

The MMRP is made up of more than 60 perinatal and women's health and service professionals from diverse backgrounds who live and work throughout the state. Panel members are appointed by the Secretary of Health and serve on the panel for three to five years. Panel members must adhere to strict confidentiality rules and have no access to any identifiable information. Panel members are not paid for their participation.

October 2019

100
Pregnancy-associated deaths
Death of a woman during pregnancy or within a year of pregnancy from any cause.

30
Pregnancy-related deaths
Death of a woman during pregnancy or within a year of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

60%
Pregnancy-related deaths were preventable

Summary of findings from the review of 2014-2016 maternal deaths

Rates of maternal mortality in Washington are stable. Historical data collected on maternal deaths that occurred between 2000 and 2016 show maternal mortality rates in Washington varied over time, but are relatively stable and are not increasing like they are nationally.

In 2014-2016, there were:

100 pregnancy-associated deaths, which are deaths that occurred during pregnancy or within the first year after pregnancy from any cause.

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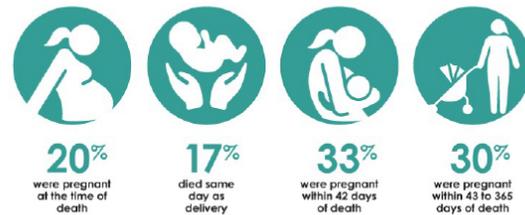
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The leading underlying cause of *pregnancy-related* deaths (N=30) were mental and behavioral health conditions (30%), suicide and substance overdose/ poisoning). This was followed by hemorrhage during childbirth or soon after, (20%) and hypertensive disorders in pregnancy (10%).

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