Maternal Mortality and Severe Maternal Morbidity Nevada, 2022-2023 Preliminary

July 2024

Office of Analytics

and

Maternal, Child, and Adolescent Health Section,

Division of Public and Behavioral Health

Department of Health and Human Services

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Data and Equity Statement

Demographic language may differ throughout this report depending on the sources from which data were retrieved. To report the data accurately, variables such as race, ethnicity and sex are described in the data as they were in the source data. Every effort has been made to be inclusive and equitable across every demographic to provide a fair and accurate representation of the people of Nevada. We recognize the terms female and woman do not include all birthing people but used descriptors as presented in source data, such as when referring to rates per 100,000 women of reproductive age.

Background

The Nevada Maternal Mortality Review Committee was established in 2020. The committee reviews all pregnancy-associated deaths in Nevada (encompassing all deaths of Nevadans while pregnant or within one year of the end of pregnancy, due to any cause) and develops recommendations to prevent future deaths. [1]Nevada Revised Statutes (NRS) 442.767 states that the Department of Health and Human Services compile and publish a biennial report on or before December 31 of each even-numbered year consisting of data concerning maternal mortality and severe maternal morbidity in this State. This report will cover the years 2022 through 2023; these are the most recent two years for which complete, final data is available.

Maternal Mortality

Maternal mortality is defined as deaths due to complications from pregnancy or childbirth. This report provides insight into demographic characteristics, cause of death, and drug overdose deaths associated with pregnancy-associated deaths from January 2022 to December 2023. This report also provides data on pregnancy-related deaths from Pregnancy Maternal Surveillance System (PMSS) during 2012 through 2019. PMSS is a national surveillance program conducted by the Centers for Disease Control and Prevention (CDC) to understand better the risk factors for and causes of pregnancy-related deaths in the United States. The Nevada Department of Health and Human Services Office of Analytics annually provides a list of pregnancy-associated deaths to the CDC. [2]Medically trained epidemiologists at the CDC review and analyze the cases provided, determine which cases meet the CDC's definition of pregnancy-related mortality, and send a list of cases back to the Office of Analytics. At the time of this report, 2019 data was the latest year available which is included in this report. For more information on PMSS, please visit CDC PMSS.

Severe Maternal Morbidity

Maternal morbidity is a continuum from mild adverse effects to life-threatening events or death. [3]Severe Maternal Morbidity (SMM) refers to conditions and diagnoses which indicate potentially life-threatening maternal complications. SMM includes unexpected outcomes of labor and delivery resulting in significant short- or long-term consequences to health. SMM relates to higher risks of adverse pregnancy outcomes like preterm birth and infant death. [4]SMM is associated with a high rate of preventability. SMM can be considered a near miss for maternal mortality because, without identification and treatment, the conditions would lead to maternal death in some cases. Identifying SMM is important for preventing injuries leading to mortality and highlighting opportunities to avoid repeat injuries. This report highlights Nevada disparity data on severe maternal morbidity across race, ethnicity, geography, insurance status, education, age, as well as prenatal and delivery characteristics such as

[1] Nevada Legislature website. https://www.leg.state.nv.us/nrs/nrs-442.html#NRS442Sec767

[2] https://www.cdc.gov/maternal-mortality/preventing-pregnancy-related-deaths/?CDC_AAref_Val=https://www.cdc.gov/reproductivehealth/maternal-mortality/preventing-pregnancy-related-deaths.html

[3] Severe Maternal Morbidity, New York City, 2008-2014. https://www.nyc.gov/assets/doh/downloads/pdf/data/severe-maternal-morbidity-data.pdf

[4] https://www.acog.org/clinical/clinical-guidance/obstetric-care-consensus/articles/2016/09/severe-maternal-morbidity-screening-and-review.

prenatal care initiation, adequacy of prenatal care, parity, method of delivery, plurality, and chronic disease.

This report is divided into a section on MM, SMM, and MM prevention recommendations of the Nevada Maternal Mortality Review Committee and the Advisory Committee of the Office of Minority Health and Equity per NRS 442.767.

Maternal Mortality Data

As noted previously, maternal mortality is defined as deaths due to complications from pregnancy or childbirth. There are three terms or definitions related to maternal mortality and they are described below and shown in Figure 1.

Definitions Associated with Maternal Mortality

Pregnancy-Associated Death (PAD) is the death of a person while pregnant or within one year of the termination of pregnancy, regardless of the cause. Pregnancy-associated death ratio is the number of pregnancy-associated deaths per 100,000 live births.

Pregnancy-Related Death (PRD) is the death of a person 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 ratio is the number of pregnancy-related deaths per 100,000 live births.

Maternal Death is the death of a person while pregnant or within 42 days of the termination of pregnancy, regardless of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

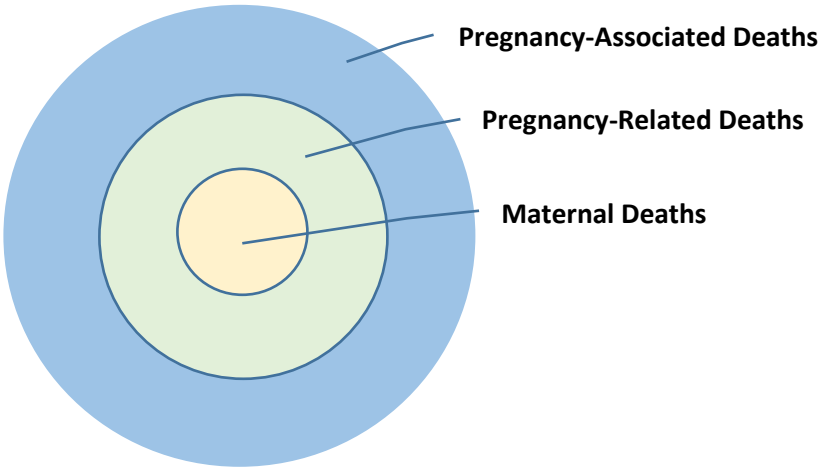


Figure 1 Relationship Among Three Parts of Maternal Mortality – Pregnancy-Associated Deaths, Pregnancy-Related Deaths, and Maternal Deaths

The Maternal Mortality section of this report will explore Pregnancy-Associated Deaths, then Pregnancy-Related Deaths, and finally Maternal Deaths.

Pregnancy-Associated Death (PAD)

Methodology

Data Sources

Web-Enabled Vital Records Registry Systems (WEVRRS)

Statewide births, deaths, and fetal deaths are collected by the Office of Vital Records, in the Division of Public and Behavioral Health. WEVRRS is a software utilized by physicians, registered nurses, midwives, informants or funeral directors, and other individuals to collect and consolidate birth and death-related information.

Hospital Billing Data (Emergency Department Encounter and Hospital Inpatient Admissions)

The hospital billing data provides health billing data for emergency department encounters and inpatient admissions for Nevada's non-federal hospitals. NRS 449.485 mandates all hospitals in Nevada report information as prescribed by the Director of the Department of Health and Human Services. The data are collected using a standard universal billing form. The data includes demographics such as age, gender, race/ethnicity, and uses International Classification of Diseases-9-Clinical Modification (ICD-9-CM) diagnoses codes and International Classification of Diseases-10-Clinical Modification (ICD-10-CM) diagnoses. ICD-10-CM diagnoses codes replaced ICD-9-CM diagnoses codes in the last quarter of 2015. Therefore, data prior to last quarter in 2015 may not be directly comparable to data thereafter. In addition, the data includes billed hospital charges, procedure codes, discharge status, and external cause of injury codes. The billing information is for billed charges and not the actual payment received by the hospital.

State Demographer Data

The Nevada State Demographer provides the Nevada population of women of reproductive age which is used in calculating rates.

Identification of Pregnancy-Associated Deaths

The methodology is based on Reference Guide for Pregnancy-Associated Death Identification which was developed by the Pregnancy-Associated Death Identification Workgroup, consisting of members from state departments of health and the Centers for Disease Control and Prevention (CDC)[5] .

Identifying by Vital and Hospital Discharge Records Linkages

A death data set is created for a given year for all Nevada female residents ages 10-60 years. Two data sets (birth and fetal death records, delivery and postpartum emergency department encounter and hospital inpatient admission records) are created for the same given calendar year and previous calendar year. Death records of people ages 10-60 years are first linked with birth and fetal death records based on mother's social security number (SSN). Death records of people ages 10-60 years that are not linked using SSN are then matched to birth and fetal death records using mother's first name, mother's last name, and mother's date of birth. Non-matched death records are then linked with delivery and postpartum emergency department encounter and hospital inpatient admission records based on mother's SSN, mother's name, and date of birth. SAS software is used for the linkages.

Identifying by Causes of Death Information

Some pregnancy-associated deaths, such as those occurred early during pregnancy, will not have birth or fetal death records to link. In order to identify pregnancy-associated deaths among those death records, we select death records of female ages 10-60 where the underlying causes of death were coded in A34 and O00-O99.9 (i.e. ICD-10 codes related to pregnancy) and/or the literal death cause field contains any of the following pregnancy-related terms: amniotic, chorioamnionitis, eclampsia, ectopic, intrauterine fetal demise, peripartum, peripartum cardiomyopathy, placental, postpartum, pregnancy, pregnant, uterine hemorrhage, and uterine rupture. Selected pregnancy-associated deaths should be confirmed with additional data sources to avoid misclassification. Examples of additional confirmatory sources are provided in the section on Additional Data Sources.

Identifying by Pregnancy Checkboxes on the Death Records

We also select death records of female ages 10-60 where the pregnancy checkbox on the death record was checked as: pregnant at time of death, not pregnant but pregnant within 42 days of death or not pregnant but pregnant 43 days to one year before death. Selected pregnancy-associated deaths should be confirmed with additional data sources to avoid misclassification. Examples of additional confirmatory sources are provided in the section on Additional Data Sources.

[5] Centers for Disease Control and Prevention (CDC). "Reference Guide for Pregnancy-Associated Death Identification." https://www.cdc.gov/maternal-mortality/dfe-module/pdfs/DRH_Busacker_Web_Reference-for-the-Identification-of-Pregnancy-Associated-Deaths_Dec2023.pdf

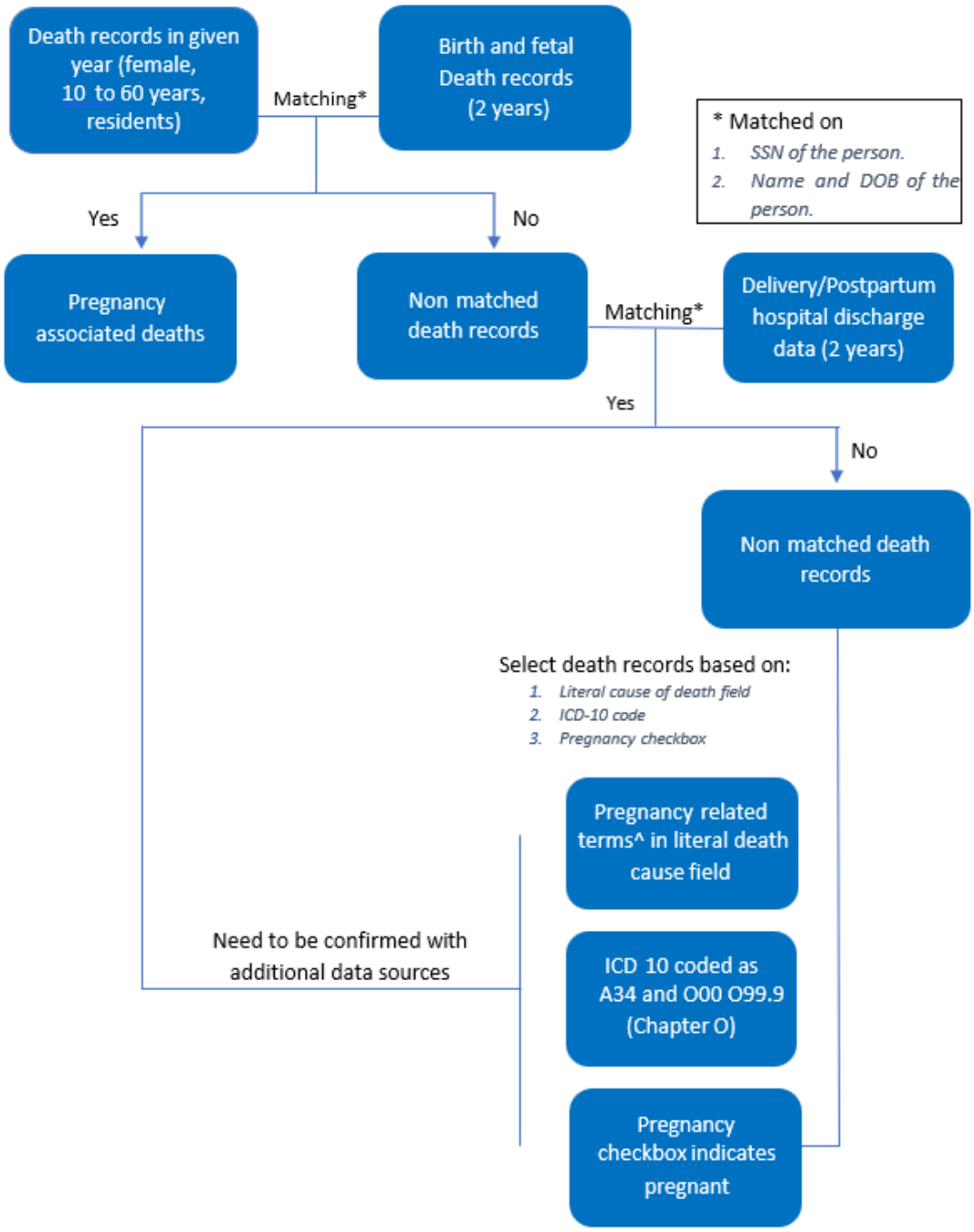


Figure 2 Flow Chart of Identifying Pregnancy-Associated Deaths

^ Pregnancy-related terms are amniotic, chorioamnionitis, eclampsia, ectopic, intrauterine fetal demise, peripartum, peripartum cardiomyopathy, placental, postpartum, pregnancy, pregnant, uterine hemorrhage, and uterine rupture.

Additional Data Sources

Additional data sources identified by the Pregnancy-Associated Death Identification Workgroup that can help confirm pregnancy for deaths which do not link to vital records and hospital discharge records, but have pregnancy indicated by causes of death information and/or pregnancy checkbox on the death record.

- Obituaries
- Social Media
- Media and News Reports
- Certifier Confirmation
- Autopsy Reports

Analysis

The analyses in the report are for pregnancy-associated deaths for Nevada residents only. Pregnancy-associated death ratio is the number of pregnancy-associated deaths per 100,000 live births. The calculation for maternal mortality ratio = (Number of resident maternal deaths/Number of resident live births) x 100,000. Pregnancy-related death rate is the number of pregnancy-related deaths per 100,000 women of reproductive age. The calculation for maternal mortality rate = (Number of resident maternal deaths/Number of resident women of reproductive age) x 100,000.

The linkages and analyses were performed by using SAS 9.4.

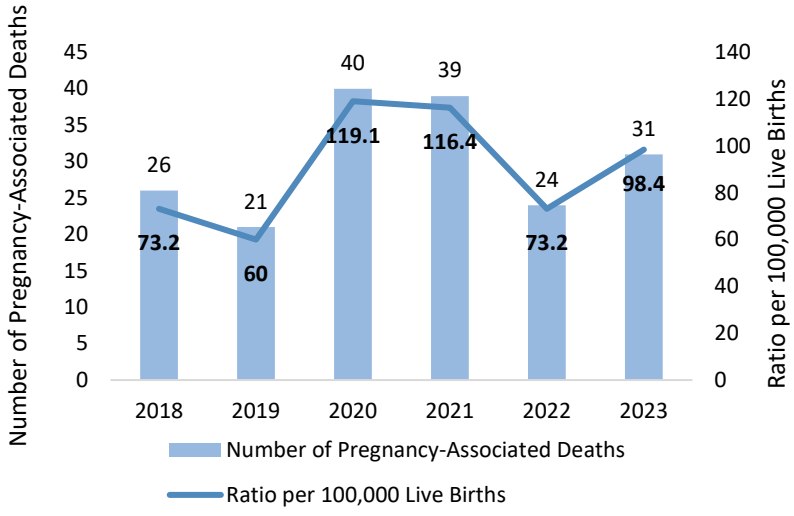
General Statistics

There were 181 pregnancy-associated deaths in Nevada from 2018 to 2023 (sum of counts by year in Figure 3). There were total of 55 pregnancy-associated deaths from January 2022 to December 2023.

The highest ratio was in 2020, at 119.1 per 100,000 live births (Figure 3) and a rate of 6.3 per 100,000 women of reproductive age (Figure 4).

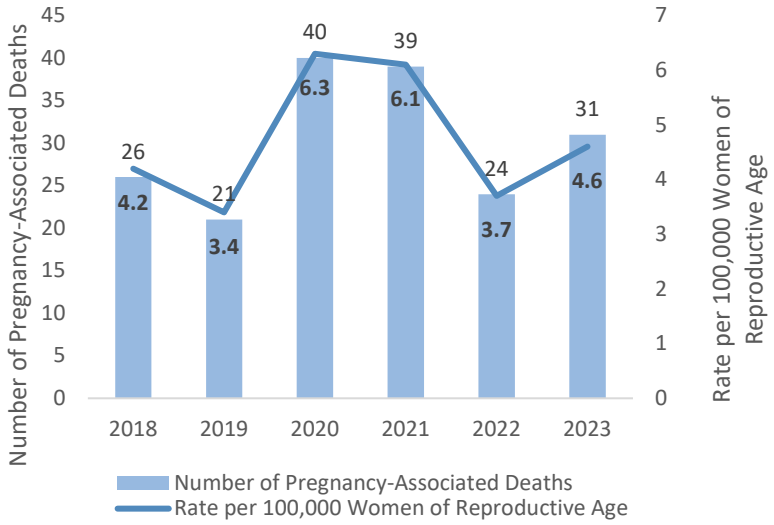
Figure 3 Number of Pregnancy-Associated Deaths (PAD) and Death Ratio per 100,000 Live Births, Nevada, 2018-2023

Data Sources: Hospital Inpatient Billing and



Web-Enabled Vital Record Registry System (WEVRRS)

Figure 4 Number of Pregnancy-Associated Deaths (PAD) and Death Rate per 100,000 Women of Reproductive Age, Nevada, 2018-2023



Data Sources: *Hospital Inpatient Billing, State Demographer, Web-Enabled Vital Record Registry System (WEVRRS)*

Maternal Demographics

A total of 55 Nevadans had a pregnancy-associated death from 2022 through 2023. By race and ethnicity, these Nevadans who died were 36% White, non-Hispanic, 31% Black, non-Hispanic, 24% Hispanic, 7% Asian/Pacific Islander (API), non-Hispanic, 0% were American Indian/Alaska Native (AI/AN), non-Hispanic.

Figure 5 shows that Black, non-Hispanic Nevadans had highest pregnancy-associated death ratio at 196.1 per 100,000 live births and accounted for 31% of the pregnancy-associated deaths. Excluding the Other/Unknown category, White, non-Hispanic Nevadans had the second highest ratio at 83.9 per 100,000 live births. Hispanic Nevadans had the lowest death ratio at 52.6 per 100,000 live births, accounting for 24% of all pregnancy-associated deaths and there were not any AI/AN, non-Hispanic Nevadans.

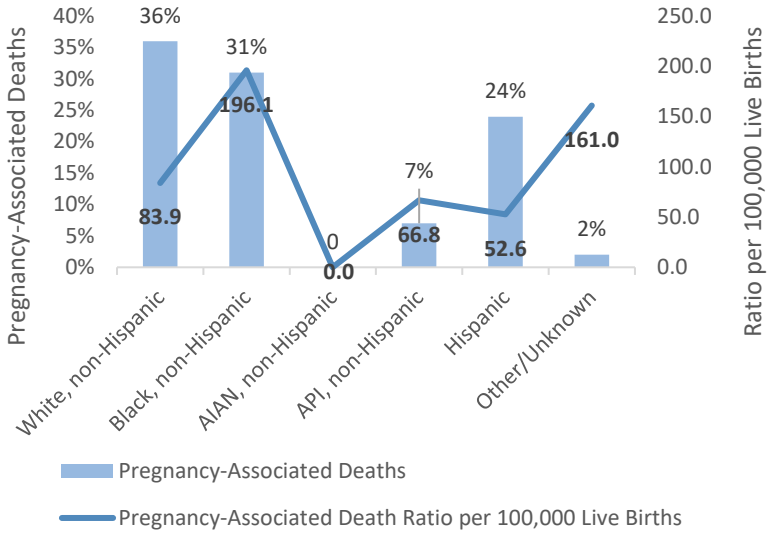


Figure 5 Pregnancy-Associated Death (PAD) Ratio and Percent by Maternal Race/Ethnicity, Nevada, 2022-2023

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Hospital Inpatient Billing and Web-Enabled Vital Record Registry System (WEVRRS)*

Black, non-Hispanic Nevadans had the highest death rate at 13.9 per 100,000 women of reproductive age (Figure 6).

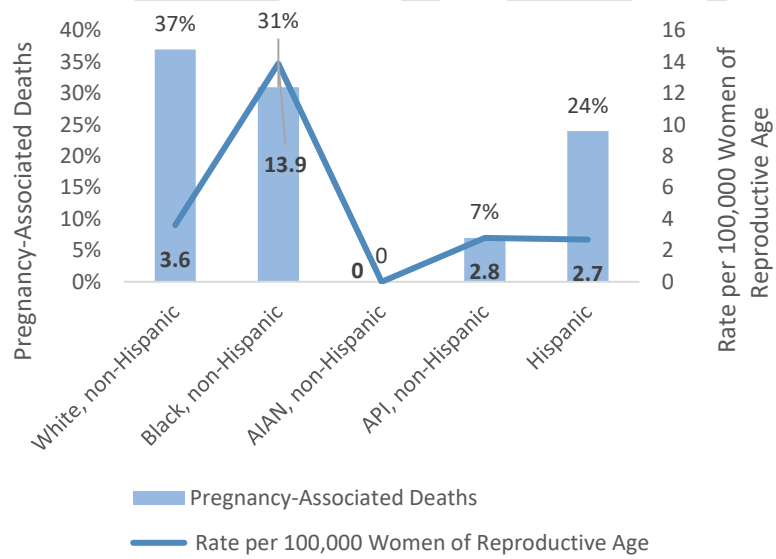


Figure 6 Pregnancy-Associated Death (PAD) Rate and Percent by Race/Ethnicity, Nevada, 2022-2023

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Hospital Inpatient Billing, State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

Nevadans aged between 10-19 had the highest pregnancy-associated death ratio at 241.9 per 100,000 live births, followed by the 40+ age group at a ratio of 202.9 per 100,000 live births (Figure 7). Nevadans aged between 30-34 accounted for a total of 27% of deaths.

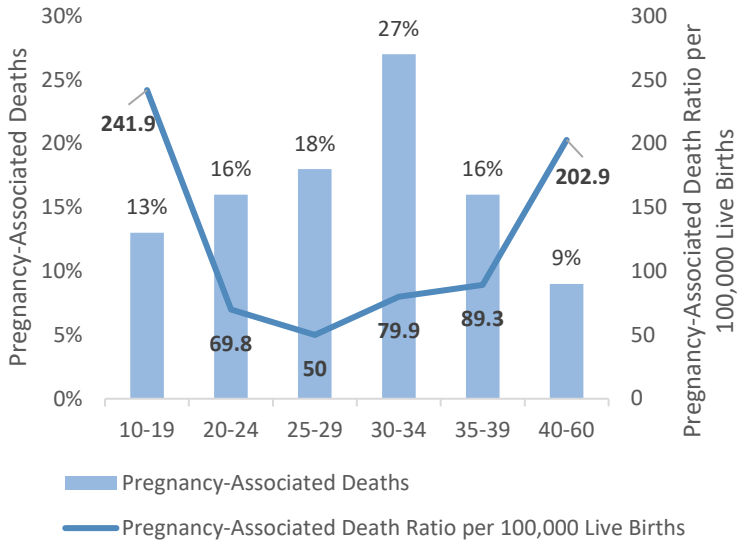


Figure 7 Pregnancy-Associated Death (PAD) Ratio and Percent by Maternal Age, Nevada 2022-2023

Data Sources: *Hospital Inpatient Billing and Web-Enabled Vital Record Registry System (WEVRRS)*

Nevadans aged 30-34 had the highest pregnancy-associated death rate at 6.5 per 100,000 women of reproductive age (Figure 8).

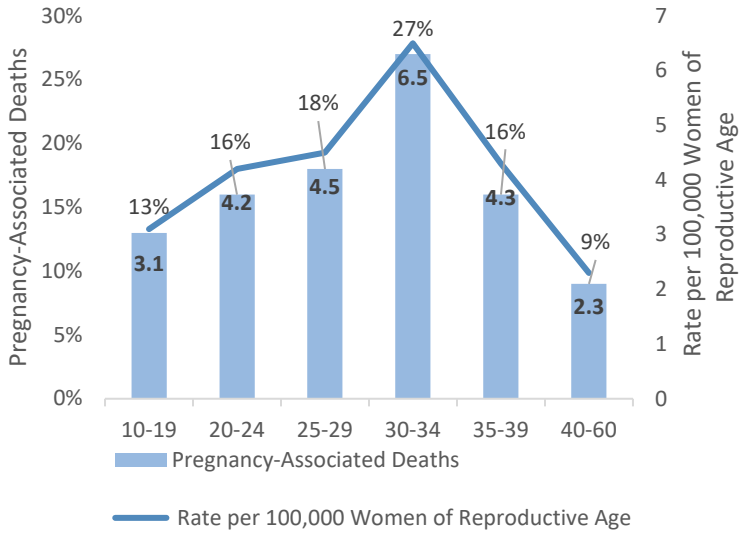


Figure 8 Pregnancy-Associated Death (PAD) Rate and Percent by Maternal Age, Nevada 2022-2023

Data Sources: *Hospital Inpatient Billing, State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

Figure 9 illustrates the pregnancy-associated death ratio for each race and ethnicity within the age groups of <25, 25-34, and 35 and older. For age group <25, White, non-Hispanic Nevadans had the highest PAD ratio at 179.1 per 100,000 live births. For age group 35+, Black, non-Hispanic Nevadans had the highest PAD ratio at 323.4 per 100,000 live births, followed by Asian/Pacific Islander (API), non-Hispanic at 229.1 per 100,000 live births; there was no count for American Indian/Alaska Native (AI/AN) and Asian/Pacific Islander (API) for age group <25 and 25-34 age group.

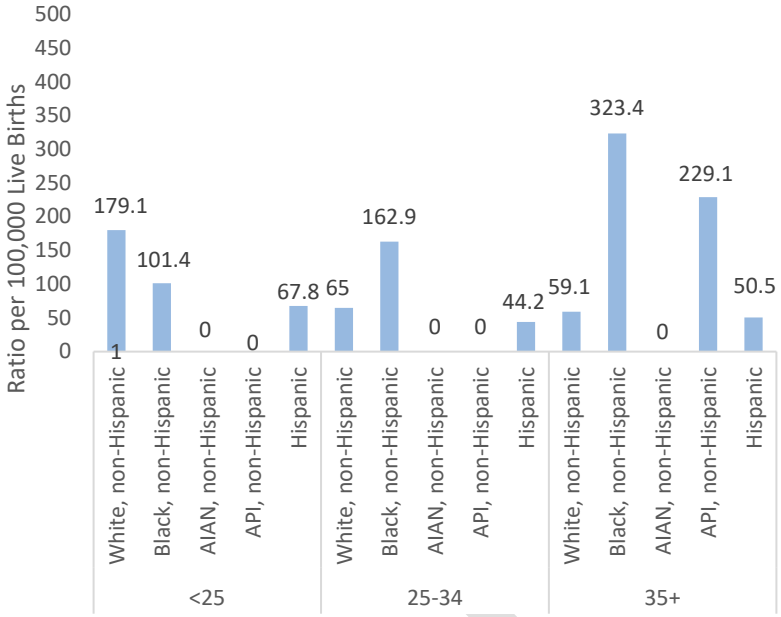


Figure 9 Pregnancy-Associated Death (PAD) Ratio by Maternal Age and Race/Ethnicity, Nevada 2022-2023

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Hospital Inpatient Billing and Web-Enabled Vital Record Registry System (WEVRRS)*

Black, non-Hispanic Nevadans within the age group 25-34 had the highest pregnancy-associated death rates at 20.9 per 100,000 women of reproductive age each (Figure 10).

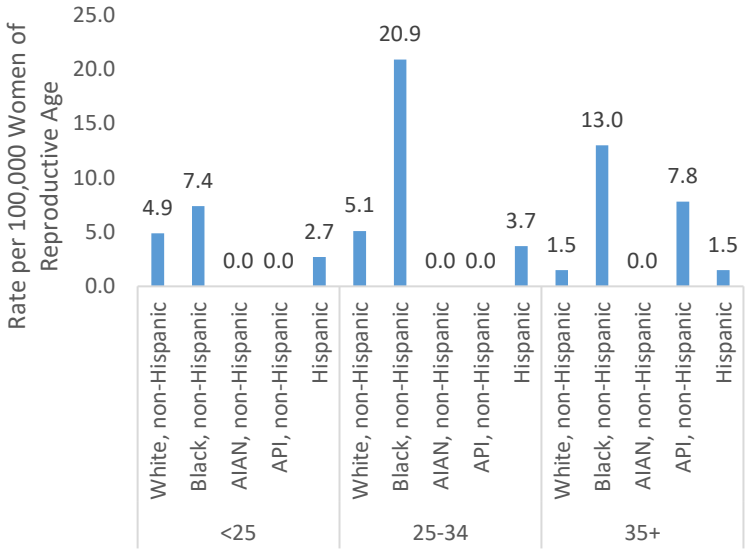


Figure 10 Pregnancy-Associated Death (PAD) Rate by Maternal Age and Race/Ethnicity, Nevada 2022-2023

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Hospital Inpatient Billing, State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

Most pregnancy-associated deaths occurred in Clark County (76%) (Figure 11). However, the Rest of State category had the highest pregnancy-associated death ratio at 112.1 per 100,000 live births and Washoe County had the lowest ratio at 62.3 per 100,000 live births. Counties included in the category of Rest of State were Carson City,

Churchill, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Pershing, Storey, and White Pine.

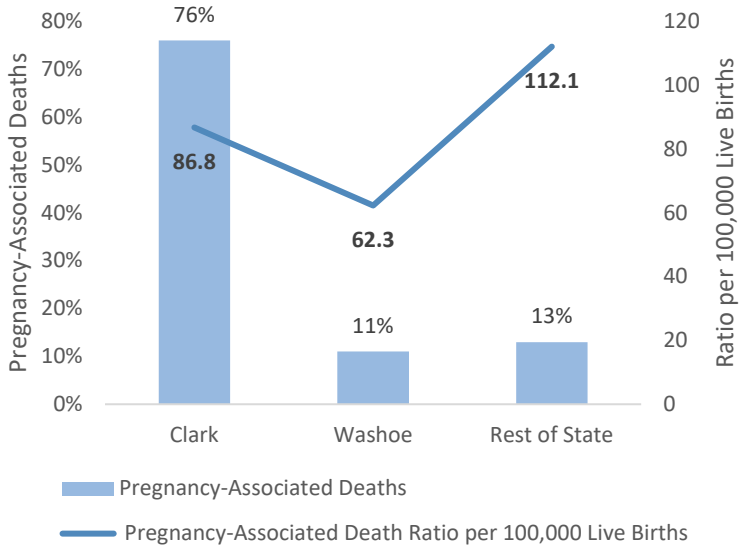


Figure 11 Pregnancy-Associated Death (PAD) Ratio by County of Residence, Nevada 2022-2023

Data Sources: *Hospital Inpatient Billing and Web-Enabled Vital Record Registry System (WEVRRS)*

Clark County had the highest pregnancy-associated death rate at 4.3 per 100,000 women of reproductive age, if Rest of State is excluded. (Figure 12).

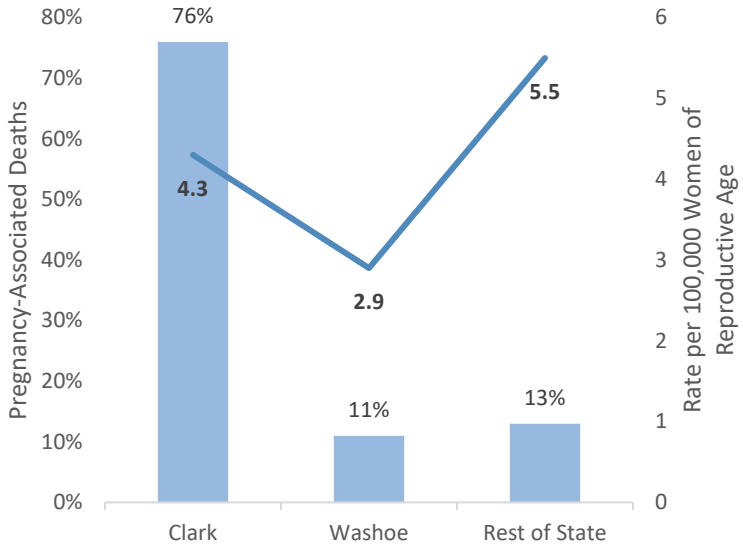


Figure 12 Pregnancy-Associated Death (PAD) Rate by County of Residence, Nevada 2022-2023

Data Sources: *Hospital Inpatient Billing, State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

The pregnancy-associated death ratio for each race and ethnicity group within Clark County, Washoe County and Rest of State can be seen in Figure 13. In Clark County, Black, non-Hispanic Nevadans had the highest PAD ratio at 182.7 per 100,000 live births. In Washoe County, Black, non-Hispanic Nevadans had the highest PAD ratio at 537.6 per 100,000 live births. In the Rest of State, White, non-Hispanic Nevadans had the highest PAD ratio at 144.2 per 100,000 live births.

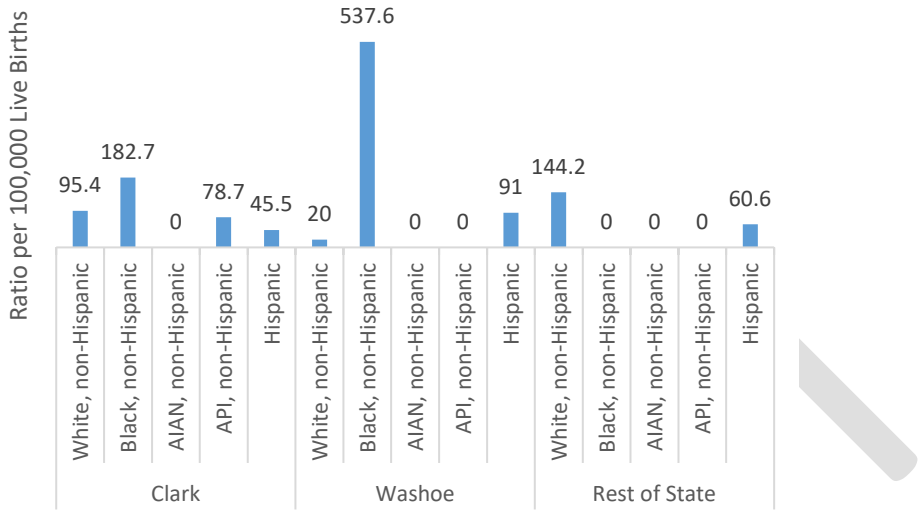


Figure 13 Pregnancy-Associated Death (PAD) Ratio by County of Residence and Maternal Race/Ethnicity, Nevada 2022-2023

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Hospital Inpatient Billing and Web-Enabled Vital Record Registry System (WEVRRS)*

In Washoe County, Black, non-Hispanic Nevadans had the highest rate of PAD at 35.1 per 100,000 women of reproductive age (Figure 14).

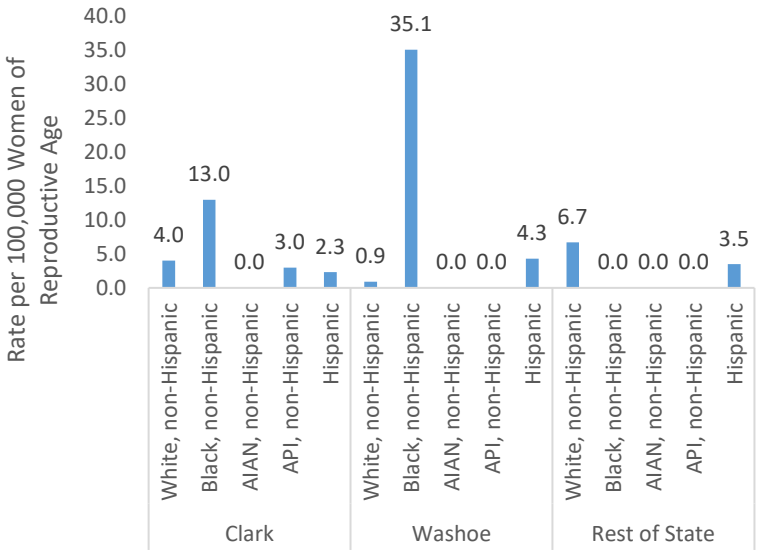


Figure 14 Pregnancy-Associated Death (PAD) Rate by County of Residence and Maternal Race/Ethnicity, Nevada 2022-2023

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Hospital Inpatient Billing, State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

Underlying Causes of Pregnancy-Associated Deaths

During the years 2022 through 2023, the most common underlying cause of pregnancy-associated death were *non-transport accidents and Pregnancy, childbirth, and the puerperium a*ccounting for 23.6% and 21.8% of all pregnancy-associated deaths respectively. The next most common cause of death was *Diseases of the heart* at 10.9% of pregnancy-associated deaths (Figure 15).

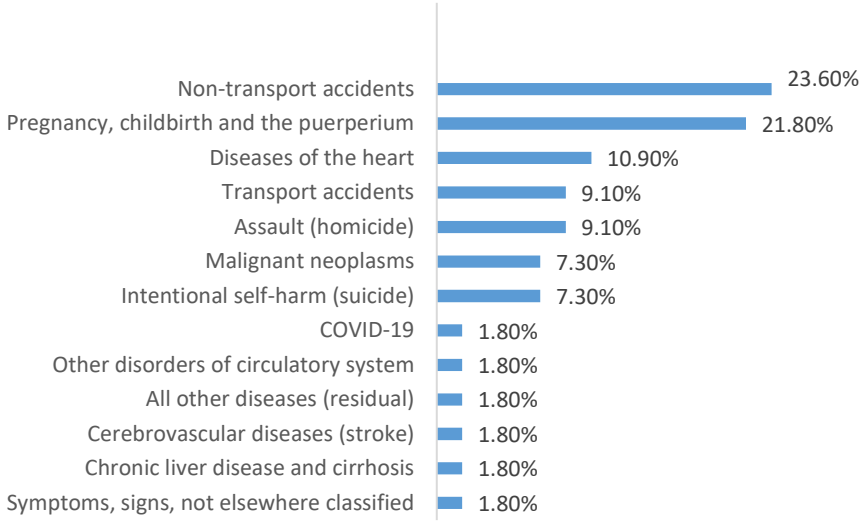


Figure 15 Underlying Causes of Death for Pregnancy-Associated Deaths by Percent, Nevada, 2022-2023

Data Sources: *Hospital Inpatient Billing and Web-Enabled Vital Record Registry System (WEVRRS)*

Table 1 Underlying Causes of Death for Pregnancy-Associated Deaths by Race/Ethnicity, Nevada, 2022-2023

Causes of Death	White, non-Hispanic		Black, non-Hispanic		AIAN, non-Hispanic		API, non-Hispanic		Hispanic		Other/ Unknown		**Total**	
	N	%	N	%	N	%	N	%	N	%	N	%	**N**	**%**
Non-transport accidents	8	38.1%	3	17.6%	0	0.0%	0	0.0%	2	15.4%	0	0.0%	13	23.6%
Pregnancy, childbirth, and the puerperium	5	23.8%	2	11.8%	0	0.0%	1	25.0%	4	30.8%	0	0.0%	12	21.8%
Diseases of the heart	1	4.8%	4	23.5%	0	0.0%	1	25.0%	0	0.0%	0	0.0%	6	10.9%
Transport accidents	1	4.8%	1	5.9%	0	0.0%	0	0.0%	3	23.1%	0	0.0%	5	9.1%
Assault (homicide)	2	9.5%	1	5.9%	0	0.0%	0	0.0%	2	15.4%	0	100.0%	5	9.1%
Malignant neoplasms	0	0.0%	2	11.8%	0	0.0%	2	50.0%	0	0.0%	0	0.0%	4	7.3%
Intentional self-harm (suicide)	3	14.3%	0	0.0%	0	0.0%	0	0.0%	1	7.7%	0	0.0%	4	7.3%
COVID-19	0	0.0%	1	5.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Other disorders of circulatory system	0	0.0%	1	5.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
All other diseases (residual)	0	0.0%	1	5.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Cerebrovascular diseases (stroke)	0	0.0%	1	5.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Chronic liver disease and cirrhosis	1	4.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Symptoms, signs, not elsewhere classified	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	7.7%	0	0.0%	1	1.8%
Total	21	100.0%	17	100.0%	0	0.0%	4	100.0%	13	100.0%	0	100.0%	55	100.0%

Abbreviations: Asian or Pacific Islander (API); American Indian/Alaska Native (AIAN).
Data Sources: Hospital Billing Data, Nevada Electronic Birth and Death Registry

Table 2 Underlying Causes of Death for Pregnancy-Associated Deaths by County of Residence, Nevada, 2022-2023

Causes of Death	Clark		Washoe		Rest of State		Unknown		Total	
	N	%	N	%	N	%	N	%	N	%
Non-transport accidents	8	19.0%	3	50.0%	2	28.6%	0	0.0%	13	23.6%
Pregnancy, childbirth, and the puerperium	10	23.8%	0	0.0%	2	28.6%	0	0.0%	12	21.8%
Diseases of the heart	5	11.9%	1	16.7%	0	0.0%	0	0.0%	6	10.9%
Transport accidents	4	9.5%	0	0.0%	1	14.3%	0	0.0%	5	9.1%
Assault (homicide)	4	9.5%	1	16.7%	0	0.0%	0	0.0%	5	9.1%
Malignant neoplasms	4	9.5%	0	0.0%	0	0.0%	0	0.0%	4	7.3%
Intentional self-harm (suicide)	2	4.8%	0	0.0%	2	28.6%	0	0.0%	4	7.3%
COVID-19	1	2.4%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Other disorders of circulatory system	0	0.0%	1	16.7%	0	0.0%	0	0.0%	1	1.8%
All other diseases (residual)	1	2.4%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Cerebrovascular diseases (stroke)	1	2.4%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Chronic liver disease and cirrhosis	1	2.4%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Symptoms, signs, not elsewhere classified	1	2.4%	0	0.0%	0	0.0%	0	0.0%	1	1.8%
Total	42	100.0%	6	100.0%	7	100.0%	3	100.0%	55	100.0%

Data Sources: Hospital Billing Data, Nevada Electronic Birth and Death Registry

Drug Overdose Deaths

Pregnancy-associated deaths can intersect with substance use-related drug overdoses. The underlying cause of death for pregnancy-associated deaths were described above; however, additional information may be available on the death certificate which can provide more information surrounding the circumstances of death. These conditions are known as non-underlying causes of death or multiple causes of death.[6]

To identify drug overdose-related non-underlying causes of death for Nevadans with confirmed pregnancy-associated deaths, certain ICD-10 codes were looked for on the death records: X40-X44 (unintentional), X60-X64 (suicide), X85 (homicide), and Y10-Y14 (undetermined). These codes are related to the cause of death category of *Injury by drug overdose* (which can refer to an overdose caused by any opioid, heroin, natural and semisynthetic opioids, methadone, or other synthetic opioids (other than methadone)).

Figure 16 displays underlying causes of death for pregnancy-associated deaths that also had an ICD10 code on the death certificate confirming *Injury by drug overdose.* Most drug overdoses identified in pregnancy-associated deaths were associated with the underlying cause of death of *non-transport accidents* (85.7%).

[6] Centers for Disease Control and Prevention (CDC). Health, United States 2020-2021 – Cause of Death. https://www.cdc.gov/nchs/hus/sources-definitions/cause-of-death.htm

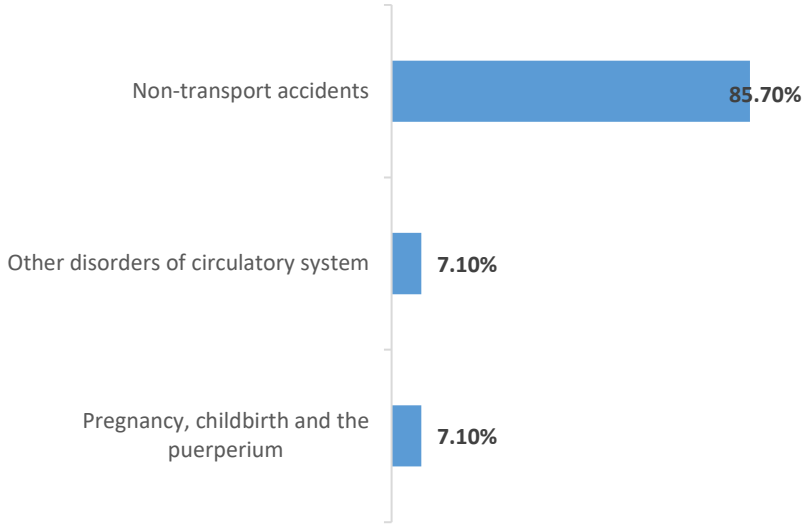


Figure 16 Percent of Drug Overdoses Associated with Pregnancy-Associated Deaths by Underlying Cause of Death, Nevada, 2022-2023

Drug overdose deaths are identified using underlying and contributing ICD-10 cause-of-death codes X40-X44(unintentional), X60-X64(suicide), X85(homicide), and Y10-Y14(undetermined)
Data Sources: *Hospital Inpatient Billing and Web-Enabled Vital Record Registry System (WEVRRS)*

Of the drug overdoses associated with pregnancy-associated deaths, 100% were coded as unintentional overdoses (Figure 17).

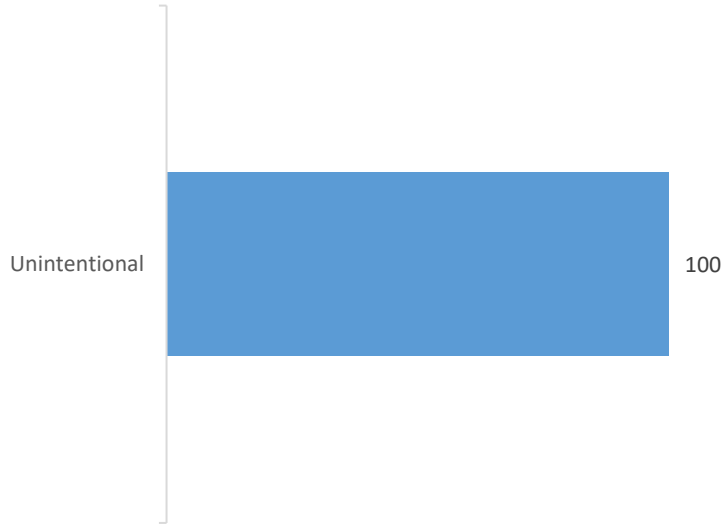


Figure 17 Percent of Drug Overdoses Associated with Pregnancy-Associated Deaths by Overdose Intention, Nevada, 2022-2023

Drug overdose deaths are identified using underlying and contributing ICD-10 cause-of-death codes X40-X44(unintentional), X60-X64(suicide), X85(homicide), and Y10-Y14(undetermined)Data Sources: *Hospital Inpatient Billing and Web-Enabled Vital Record Registry System (WEVRRS)*

Pregnancy-Related Death (PRD)

Methodology

Data Sources

Web-Enabled Vital Records Registry Systems (WEVRRS)

Statewide births, deaths, and fetal deaths are collected by the Office of Vital Records, in the Division of Public and Behavioral Health. WEVRRS is a software utilized by physicians, registered nurses, midwives, informants or funeral directors, and other individuals to collect and consolidate birth and death-related information.

State Demographer

The Nevada State Demographer provides the Nevada population of women of reproductive age which is used in calculating rates.

Pregnancy Mortality Surveillance System (PMSS)

The Centers for Disease Control (CDC) manage this system which collects national data regarding pregnancy-related deaths in the United States.

Identification of Pregnancy-Related Deaths

CDC conducts National pregnancy-related mortality surveillance to better understand the risk factors for and causes of pregnancy-related deaths in the United States. The Pregnancy Mortality Surveillance System (PMSS) defines a pregnancy-related death as the death of a woman while pregnant or within 1 year of the end of pregnancy from any cause related to or aggravated by the pregnancy. The Nevada Department of Health and Human Services Office of Analytics annually provides a list of pregnancy-associated deaths to the CDC. Medically trained epidemiologists at the CDC review and analyze the cases provided, determine which cases meet the CDC's definition of pregnancy-related mortality, and send a list of cases back to the Office of Analytics.

General Statistics

There were 52 pregnancy-related deaths for Nevada residents from 2012 to 2019 according to data from the Pregnancy Mortality Surveillance System (total of years shown in Figure 18) -- the most recent year of data available from PMSS is 2019. The highest ratio occurred in 2017, at 33.7 per 100,000 live births.

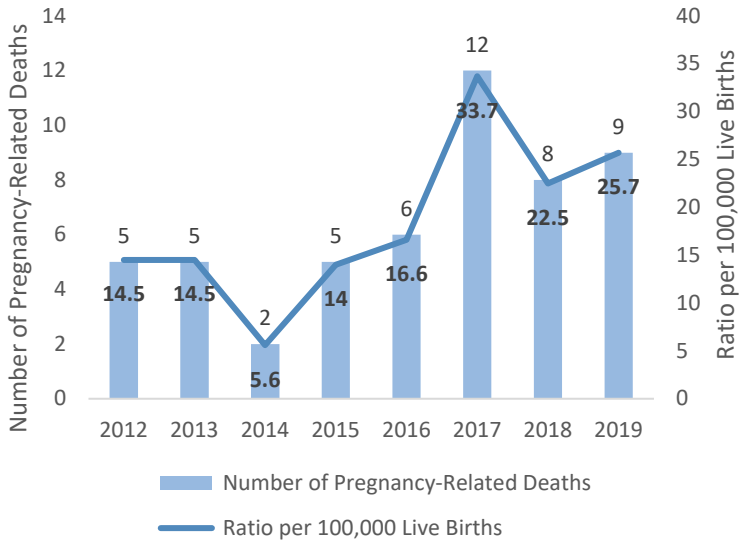


Figure 18 Number of Pregnancy-Related Deaths (PRD) and Death Ratio per 100,000 Live Births, Nevada, 2012 - 2019

Data Sources: *Pregnancy Mortality Surveillance System (PMSS) and Web-Enabled Vital Record Registry System (WEVRRS)*

The highest pregnancy-related death rate was in 2017 at 2.0 per 100,000 women of reproductive age (Figure 19).

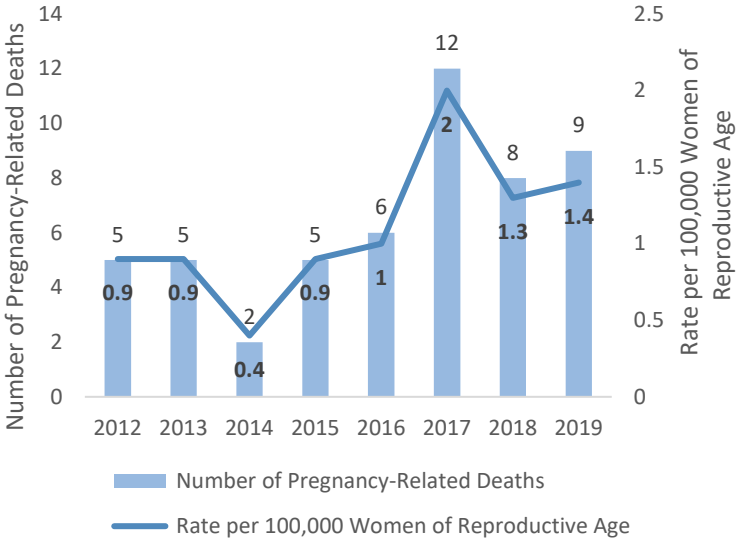


Figure 19 Number of Pregnancy-Related Deaths (PRD) and Death Rate per 100,000 Women of Reproductive Age, Nevada, 2012 - 2019

Data Sources: *Pregnancy Mortality Surveillance System (PMSS), State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

Maternal Demographics

Black, non-Hispanic Nevadans had the highest pregnancy-related death ratio at 49.9 per 100, 000 live births (Figure 20) and 29% of the pregnancy-related deaths occurring between 2018 through 2019. Hispanic Nevadans had the lowest death ratio of those who died at 15.4 per 100,000 live births, accounting for 24% of all deaths. AIAN, non-Hispanic Nevadans had no pregnancy-related deaths in the years under review.

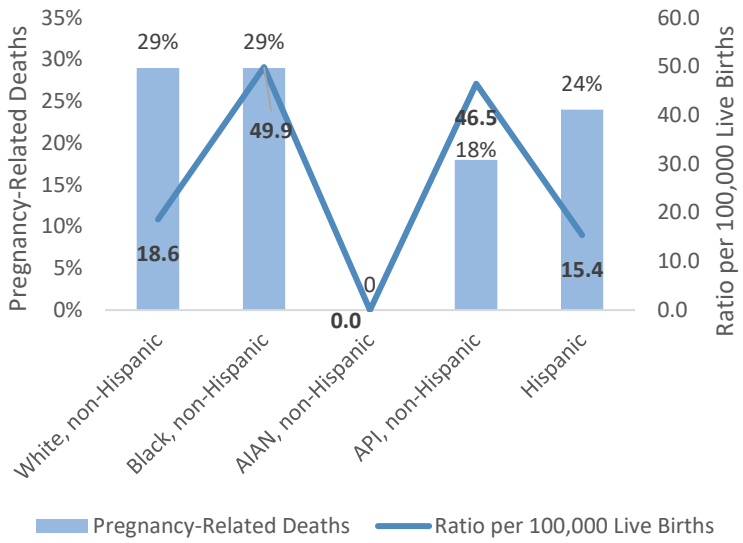


Figure 20 Pregnancy-Related Death (PRD) Ratio per 100,000 Live Births and Percent by Race/Ethnicity, Nevada, 2018 - 2019

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Pregnancy Mortality Surveillance System (PMSS) and Web-Enabled Vital Record Registry System (WEVRRS)*

Black, non-Hispanic Nevadans had the highest death rate at 4.3 per 100,000 women of reproductive age (Figure 21).

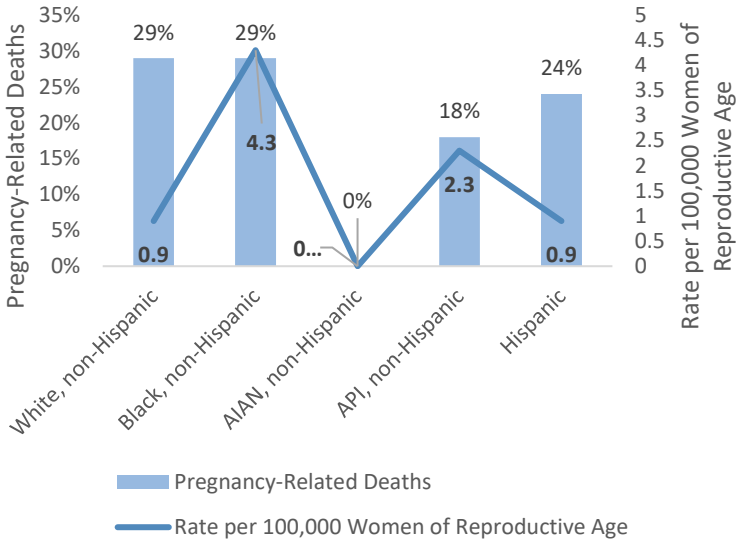


Figure 21 Pregnancy-Related Death (PRD) Rate per 100,000 Women of Reproductive Age and Percent by Race/Ethnicity, Nevada, 2018 – 2019

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Pregnancy Mortality Surveillance System (PMSS), State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

Nevadans aged 35-39 had the highest pregnancy-related death ratio at 69.0 per 100,000 live births, followed by 40+ age group at a ratio of 40.4 per 100,000 live births (Figure 22). Among the 30 to 39 age group, sixty-five percent of the deaths occurred in total.

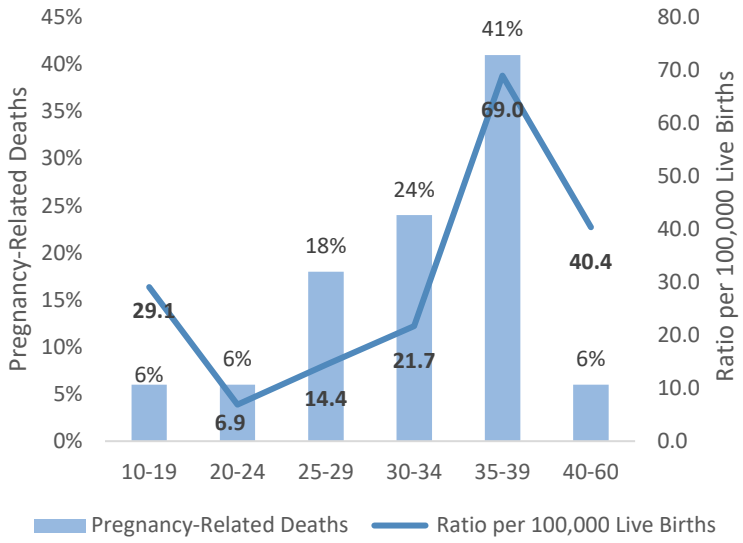


Figure 22 Pregnancy-Related Death (PRD) Ratio and Percent by Maternal Age, Nevada, 2018 - 2019

Data Sources: *Pregnancy Mortality Surveillance System (PMSS) and Web-Enabled Vital Record Registry System (WEVRRS)*

For the age group 35-39, the highest pregnancy-related death rate was at 3.4 per 100,000 women of reproductive age followed by the age group 30-34 at 2.0 per 100,000 women of reproductive age (Figure 23).

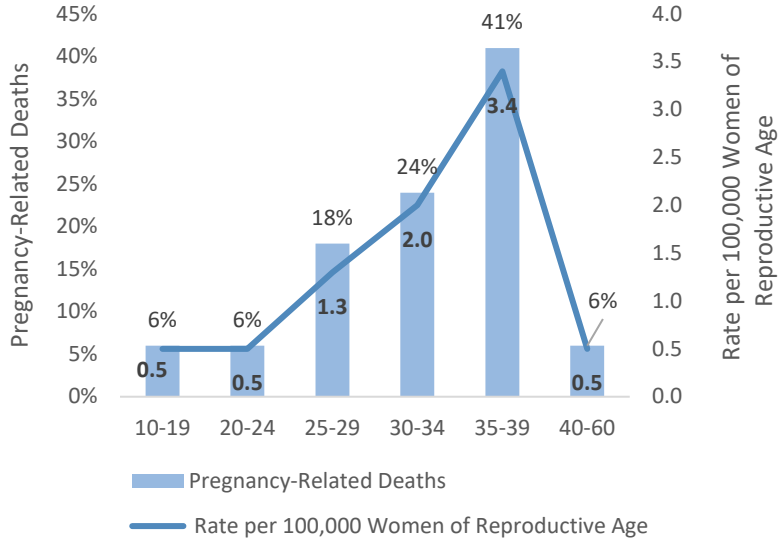


Figure 23 Pregnancy-Related Death (PRD) Rate and Percent by Maternal Age, Nevada, 2018 – 2019

Data Sources: *Pregnancy Mortality Surveillance System (PMSS), State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

Figure 24 illustrates the pregnancy-related death ratio for each race and ethnicity within age groups of under 25, 25-34, and 35 and older. For ages 35 and above, Black, non-Hispanic Nevadans had the highest death ratio at 270.3

per 100,000 live births and followed by Asian/Pacific Islander (API), non-Hispanic Nevadans with death ratio at 105.9 per 100,000 live births. For 25 and under, White, non-Hispanic Nevadans had the highest death ratio at 37.8 per 100,000 live births.

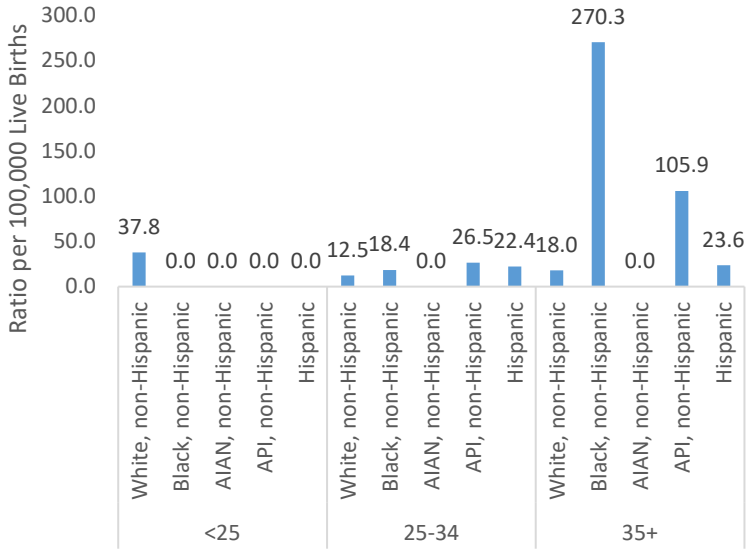


Figure 24 Pregnancy-Related Death (PRD) Ratio by Maternal Age and Race/Ethnicity, Nevada, 2018 – 2019

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Pregnancy Mortality Surveillance System (PMSS) and Web-Enabled Vital Record Registry System (WEVRRS)*

For the age group 35 and above, Black, non-Hispanic Nevadans had the highest death rate at 18.6 per 100,000 women of reproductive age (Figure 25).

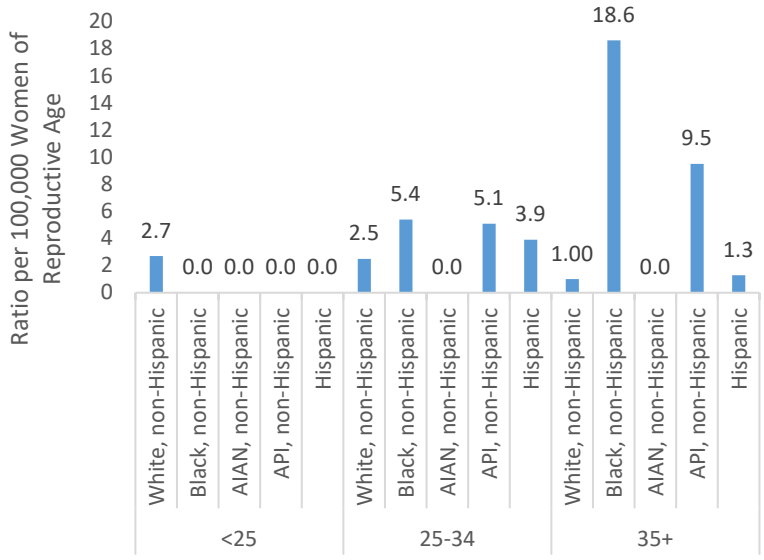


Figure 25 Pregnancy-Related Death (PRD) Rate by Maternal Age and Race/Ethnicity, Nevada, 2018 – 2019

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Pregnancy Mortality Surveillance System (PMSS), State Demographers, and Web-Enabled Vital Record Registry System (WEVRRS)*

Clark County had the highest pregnancy-related death ratio at 30.2 per 100,000 live births, accounting for 94% of all pregnancy-related deaths, Washoe had 6% of all pregnancy-related deaths, and Rest of State did not have any pregnancy-related death (Figure 26).

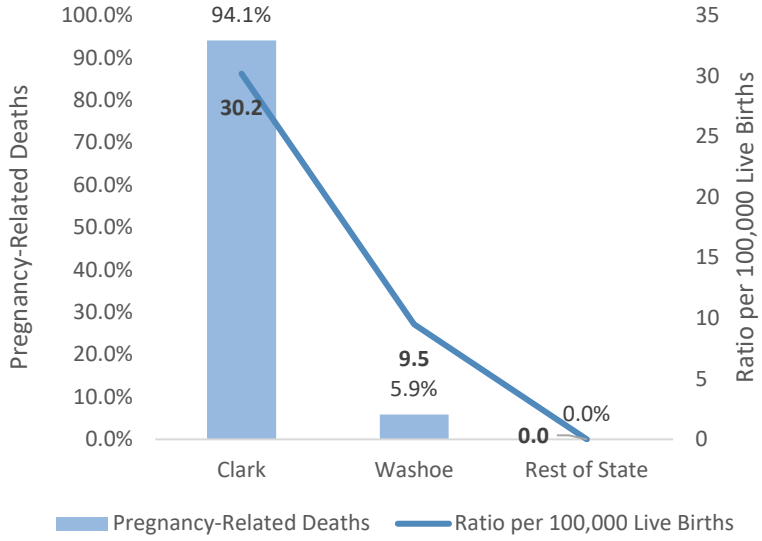


Figure 26 Pregnancy-Related Death (PRD) Ratio by County of Residence, Nevada, 2018 – 2019

Data Sources: *Pregnancy Mortality Surveillance System (PMSS) and Web-Enabled Vital Record Registry System (WEVRRS)*

The highest pregnancy-related death rate was in Clark County at 1.7 per 100,000 women of reproductive age (Figure 27).

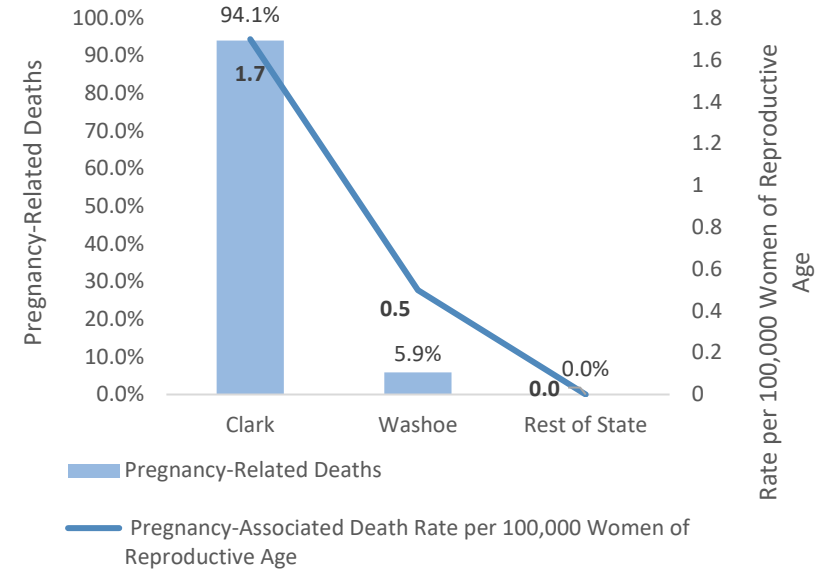


Figure 27 Pregnancy-Related Death (PRD) Rate by County of Residence, Nevada, 2018 – 2019

Data Sources: *Pregnancy Mortality Surveillance System (PMSS), State Demographers, and Web-Enabled Vital Record Registry System (WEVRRS)*

Figure 28 illustrates the pregnancy-related death ratio for each race and ethnicity group within Clark County, Washoe County and Rest of State. In Clark County, API, non-Hispanic Nevadans had the highest ratio at 54.6 per 100,000 live births. In Washoe County, Hispanic Nevadans had the highest ratio at 27.9 per 100,000 live births, and

Rest of State did not have any pregnancy-related death. There is no ratio for AIAN non-Hispanic for any of the category and Black non-Hispanic, API non-Hispanic and White non-Hispanic for Washoe county.

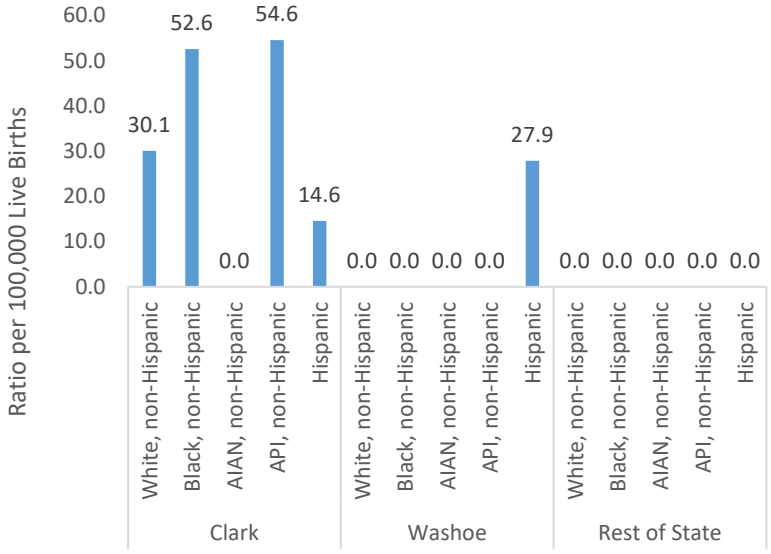


Figure 28 Pregnancy-Related Death (PRD) Ratio by County of Residence and Race/Ethnicity, Nevada, 2018 – 2019

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: *Pregnancy Mortality Surveillance System (PMSS) and Web-Enabled Vital Record Registry System (WEVRRS)*

In Clark County, Black, non-Hispanic Nevadans had the highest rate at 4.6 per 100,000 women of reproductive age. In Washoe County, Hispanic Nevadans had the highest rate at 1.8 per 100,000 women of reproductive age and did not have any rates for other races (Figure 29).

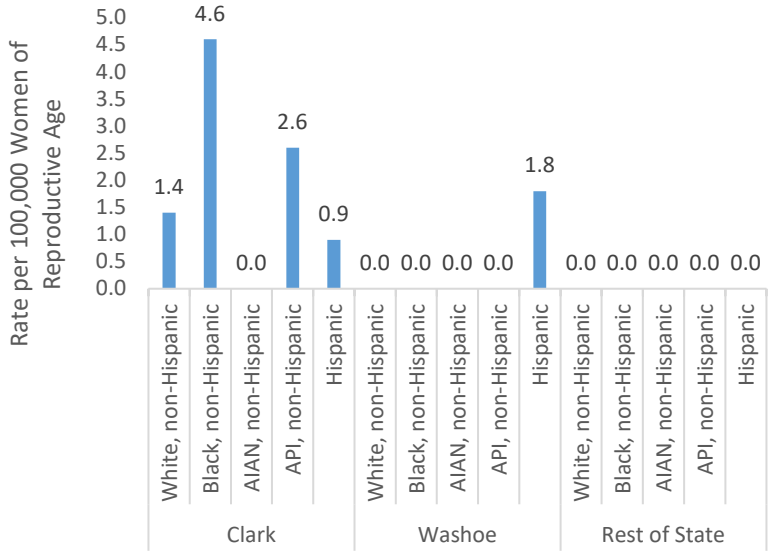


Figure 29 Pregnancy-Related Death (PRD) Rate by County of Residence and Race/Ethnicity, Nevada, 2018 – 2019

*Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)**Islander***
Data Sources: *Pregnancy Mortality Surveillance System (PMSS), State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

Underlying Causes of Pregnancy-Related Deaths

During 2018 and 2019, the most common causes of pregnancy-related death were *Hemorrhage,* which accounted for 29.4% of all pregnancy-related deaths, followed by *Infection*, and *Other non-cardiovascular conditions* both accounted for 17.6%, *Hypertensive disorders of pregnancy* and C*ardiovascular conditions* both accounted for 11.8%, *Thrombotic embolism, and Cardiomyopathy* both accounted for 5.9% of all pregnancy-related deaths.

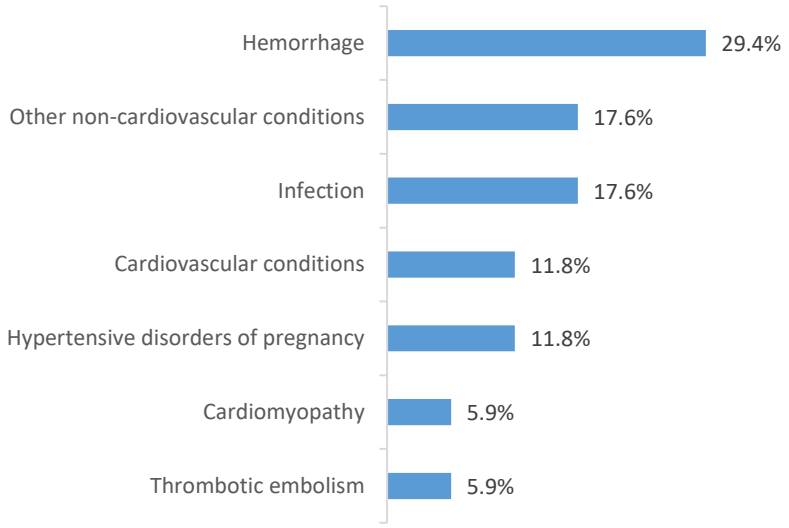


Figure 30 Underlying Causes of Death of Pregnancy-Related Deaths, Nevada, 2018 - 2019

Data Sources: *Pregnancy Mortality Surveillance System (PMSS) and Web-Enabled Vital Record Registry System (WEVRRS)*

Table 3 Count of Pregnancy-Related Deaths by Underlying Causes of Death, Nevada, 2018 - 2019

Cause of Death	White, non-Hispanic		Black, non-Hispanic		AIAN, non-Hispanic		API, non-Hispanic		Hispanic		Other/ Unknown		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Hemorrhage	1	20.0%	3	60.0%	0	0 %	1	33.3%	0	0%	0	0 %	5	29.4%
Other non-cardiovascular conditions	2	40.0%	1	20.0%	0	0 %	0	0%	0	0%	0	0 %	3	17.6%
Infection	0	0%	0	0%	0	0 %	1	33.3%	2	50.0%	0	0 %	3	17.6%
Cardiovascular conditions	1	20.0%	0	0%	0	0 %	0	0%	1	25.0%	0	0 %	2	11.8%
Hypertensive disorders of pregnancy	0	0%	0	0%	0	0 %	1	33.3%	1	25.0%	0	0 %	2	11.8%
Cardiomyopathy	0	0%	1	20.0%	0	0 %	0	0%	0	0%	0	0 %	1	5.9%
Thrombotic embolism	1	20.0%	0	0%	0	0 %	0	0%	0	0%	0	0 %	1	5.9%
Total	**5**	**100%**	**5**	**100%**	**0**	**0 %**	**3**	**100%**	**4**	**100%**	**0**	**0 %**	**17**	**100%**

AIAN stands for American Indian Alaska Native, and API is Asian Pacific Islander.

Data Sources: Pregnancy Mortality Surveillance System (PMSS), Nevada Electronic Birth Registry.

Table 4 Count of Pregnancy-Related Deaths by Underlying Causes of Death by County, Nevada, 2018 - 2019

Cause of Death	Clark		Washoe		Rest of State		Total	
	N	%	N	%	N	%	N	%
Hemorrhage	5	31.3	0	0%	0	0%	5	29.4%
Other non-cardiovascular conditions	3	18.8	0	0%	0	0%	3	17.6%
Infection	2	12.5	1	100.0	0	0%	3	17.6%
Cardiovascular conditions	2	12.5	0	0%	0	0%	2	11.8%
Hypertensive disorders of pregnancy	2	12.5	0	0%	0	0%	2	11.8%
Cardiomyopathy	1	6.3	0	0%	0	0%	1	5.9%
Thrombotic embolism	1	6.3	0	0%	0	0%	1	5.9%
Total	**16**	**100**	**1**	**100**	**0**	**0%**	**17**	**100%**

Data Sources: Pregnancy Mortality Surveillance System (PMSS), Nevada Electronic Birth Registry.

Maternal Deaths

Methodology

Data Sources

Data sources used to identify maternal deaths are the same as those used to identify pregnancy-related deaths.

Identification of Maternal Deaths

Methodology to identify maternal deaths is based upon that used to identify pregnancy-related deaths but is restricted to individuals who died while pregnant or within 42 days of the termination of pregnancy, regardless of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes regardless of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

General Statistics

There were 27 maternal deaths in Nevada from 2016 to 2019 (sum of counts by year in Figure 31).

The highest ratios were in 2017 at 25.2 per 100,000 live births (Figure 31) and a rate of 1.5 per 100,000 women of reproductive age (Figure 32).

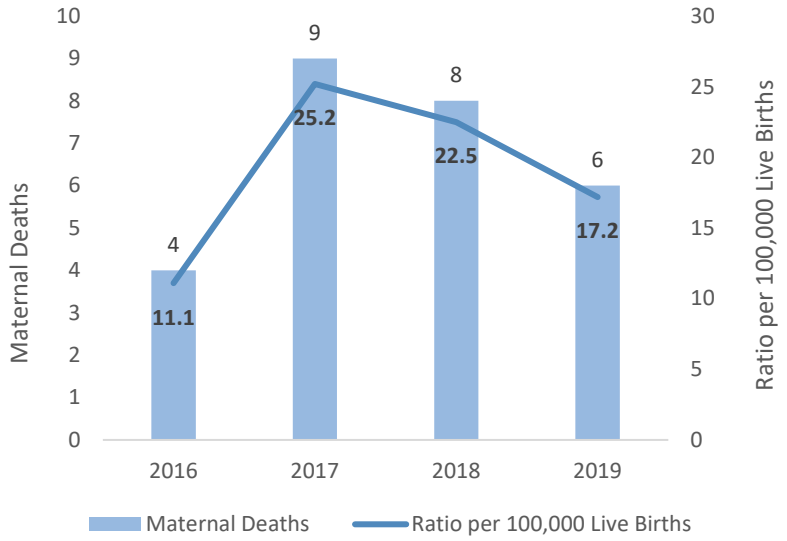


Figure 31 Number of Maternal Deaths (MD) and Death Ratio per 100,000 Live Births, Nevada, 2016-2019

Data Sources: *Pregnancy Mortality Surveillance System (PMSS) and Web-Enabled Vital Record Registry System (WEVRRS)*

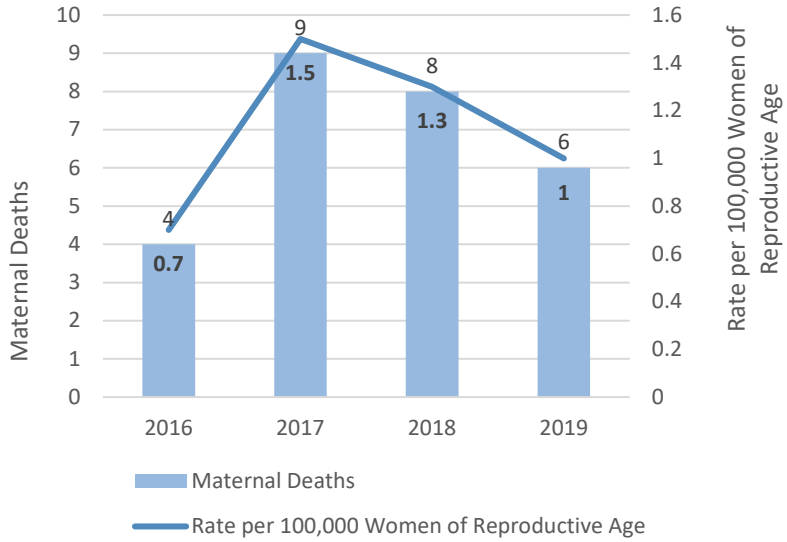


Figure 32 Number of Maternal Deaths (MD) and Death Rate per 100,000 Women of Reproductive, Nevada, 2016-2019

Data Sources: *Pregnancy Mortality Surveillance System (PMSS), State Demographer, and Web-Enabled Vital Record Registry System (WEVRRS)*

Maternal Demographics

A total of 27 Nevadans had a maternal death during 2016 to 2019. By race and ethnicity, the Nevadans who died were 9 White, non-Hispanic, 7 Black, non-Hispanic, 4 Asian/Pacific Islander and 7 Hispanic. There are 6 Nevadans for the age group 10-29, 7 for age group 30-34, and 14 for age group above 35.

Definition

As noted in the Background section of this report, maternal morbidity is a continuum from mild adverse effects to life-threatening events or death.**Error! Bookmark not defined.** [7]Severe Maternal Morbidity (SMM) refers to conditions and diagnoses which indicate potentially life-threatening maternal complications. SMM includes unexpected outcomes of labor and delivery resulting in significant short- or long-term consequences to health. [8]Figure 33 below illustrates the maternal morbidity continuum.

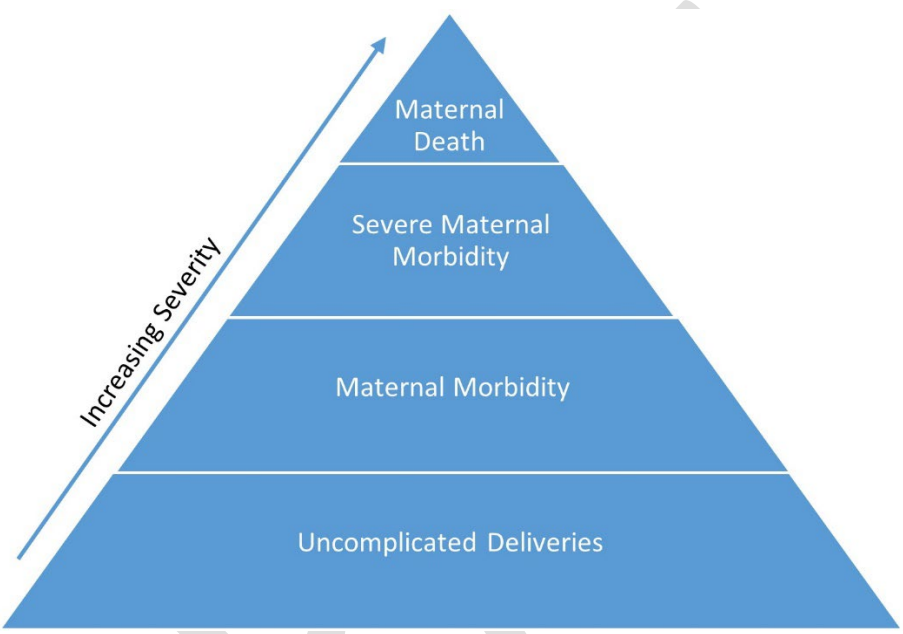


Figure 33 Maternal Morbidity Continuum

Methodology

Data Sources

Nevada Electronic Birth Registry Data

Nevada Department of Health and Human Services, Office of Vital Records used Web-enabled Vital Records Registry System (WEVRRS) to collect information on all live births in Nevada and issue birth certificates. The birth certificate contains demographic information, such as the mother's age, race, education, and pregnancy information, such as parity and prenatal care.

Hospital Inpatient Billing (HIB) Data

The Hospital Inpatient Billing data provides health billing data for patients discharged from Nevada's non-federal hospitals. NRS 449.485 mandates all hospitals in Nevada report information as prescribed by the director of the Department of Health and Human Services. The data are collected using a standard universal billing form. The data are for patients admitted for at least 24 hours as an inpatient but do not include patients discharged from the emergency room. The data consists of demographics such as age,

7 Severe Maternal Morbidity, New York City, 2008-2012. https://www1.nyc.gov/assets/doh/downloads/pdf/data/maternal-morbidity-report-08-12.pdf

8 American College of Obstetricians and Gynecologists and the Society for Maternal-Fetal Medicine, Kilpatrick SK, Ecker JL. Severe maternal morbidity: screening and review. Am J Obstet Gynecol. 2016;215(3): B17–B22.

gender, race/ethnicity and uses International Classification of Diseases-10-Clinical 5 Modification (ICD-10-CM) diagnoses (up to 33 diagnoses respectively). In addition, the data includes billed hospital charges, procedure codes, length of hospital stay, discharge status, and external cause of injury codes. The billing data information is for billed charges and not the actual payment received by the hospital.

Identification of Severe Maternal Morbidity

Nevada birth certificates were matched with the mother's delivery hospitalization record from Hospital Inpatient Billing (HIB) data. Multiple births (e.g., twins, triplets) were counted as one delivery (only one birth certificate was matched per hospital discharge record, even with multiple births). The total number of live births to Nevada residents was 63,271 from January 2022 to December 2023. The total number of deliveries was 55,685 comprising all records from singleton births and one record per multiple births. Approximately 95.9% of all deliveries were matched with a hospital discharge record. All analyses are based on matched data (N=53,391). Birth certificates and hospital discharge records were matched with the mother's social security number, name, birth date, medical record number, and the facility of the delivery hospitalization. Non-matched birth certificates may be due to home births, missing social security numbers, misspelled names, etc.

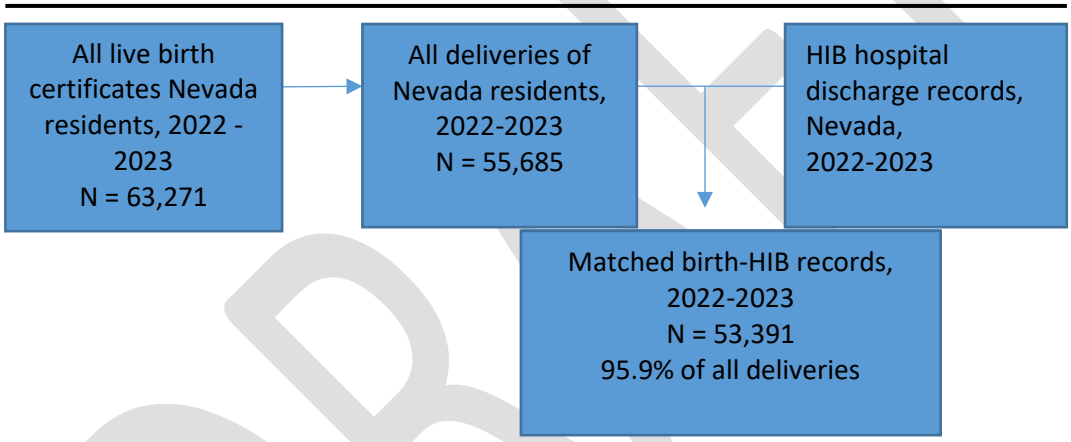


Figure 34 Data Matching Process for Birth Certificates and HIB Records, Nevada, 2022-2023

SMM events were identified during delivery hospitalizations using an algorithm developed by researchers at the CDC.[9] The algorithm used ICD-9/10-CM codes to identify 25 indicators of SMM that represent either serious complications of pregnancy or delivery, such as disseminated intravascular coagulation or eclampsia, or procedures used to manage serious conditions, such as blood transfusion or hysterectomy. The Alliance for Innovation on Maternal Health (AIM) methods were used to identify pregnancy deliveries, and ICD-9 was converted to ICD-10 to identify SMM indicators. Four out of 25 ICD-9 indicators did not have corresponding ICD-10 codes. Of the 21 indicators remaining, 16 were identified using ICD-10 diagnosis codes, and five were identified using ICD-10 procedure codes. A complete list of conditions and ICD-10 codes is listed in Appendix A.

To ensure that only the most severe cases of these 21 indicators during delivery hospitalizations were captured, these indicators were classified as SMM only if they additionally met one of the following criteria:

- The mother's length of stay was equal to or greater than the 90th percentile by delivery method.

[9] Callaghan WM, Creanga AA, Kuklina EV. Severe Maternal Morbidity Among Delivery and Postpartum Hospitalizations in the United States. Obstetrics and Gynecology 2012; 120:1029-36

- The mother was transferred before or after delivery to a different facility.
- The mother died during delivery hospitalization.
- At least one of the five procedure indicators was present.

Analysis

All SMM rates were calculated per 10,000 live deliveries that successfully matched with a HIB record. Chi-square test was used to test the significance of the association between maternal characteristics and SMM. The analyses in this report include blood transfusion in SMM calculation unless otherwise noted. P-values less than 0.05 were deemed statistically significant.

Records with missing data on a variable of interest were not represented in the graph of SMM but are represented in the tables.

All analyses were conducted using SAS 9.4.

General Statistics

Between January 2022 to December 2023, there were 1034 identified SMM cases in Nevada.

The SMM rate in Nevada increased during 2018 to 2021 from 154.1 to 205 and then slightly decreased to 201.1, with the highest rate in 2021, at 205.0 per 10,000 deliveries with a total of 629 cases in that year (Figure 35).

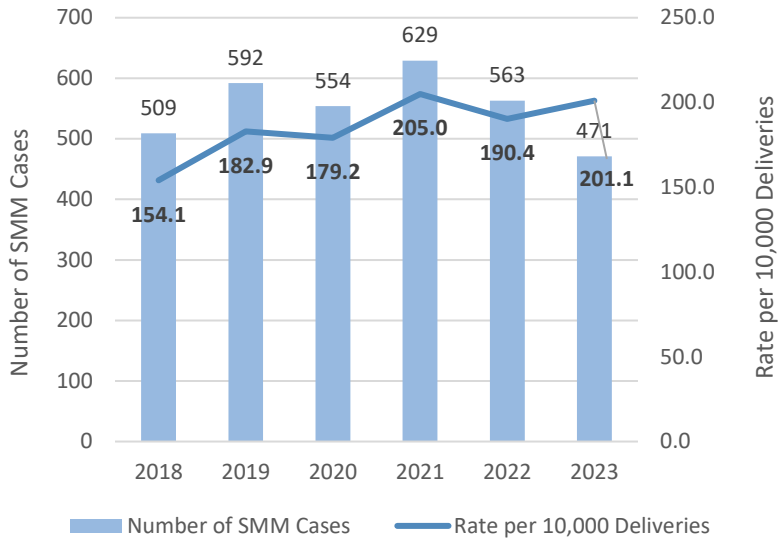


Figure 35 Severe Maternal Morbidity (SMM) Rate per 10,000 Deliveries and Number of Cases, Nevada, 2016 - 2023

Data Sources: Hospital Inpatient Billing and Nevada Electronic Birth Registry

Indicators Associated with SMM

There are 21 procedure-based or diagnosis-based indicators associated with SMM (list available in Table 5). See Appendix A for a complete list including the ICD or procedure codes used to identify these SMM indicators.

Most deliveries with SMM during 2022 to 2023 were associated with one indicator (86%), although 7% of deliveries during this time were associated with two indicators, and 6% had three or more indicators present (Figure 36).

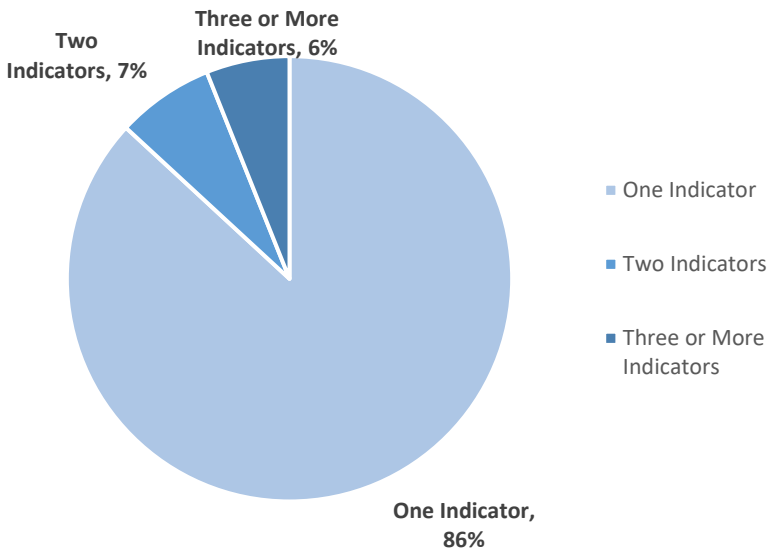


Figure 36 Distribution of Severe Maternal Morbidity (SMM) Indicators, Nevada, 2022 – 2023

Data Sources: Hospital Inpatient Billing and Nevada Electronic Birth Registry

Table 5 below displays the rates of SMM per 10,000 deliveries during 2022 to 2023 by diagnosis-based and procedure-based indicators.

The top five diagnosis-based indicators of SMM during these years were *Disseminated intravascular coagulation* (17.0 per 10,000 deliveries), *Adult respiratory distress syndrome* (16.3 per 10,000 deliveries), *Acute Renal Failure* (14.3 per 10,000 deliveries), *Shock* (11.1 per 10,000 deliveries), *Sepsis* (10.8 per 10,000 deliveries), and *Eclampsia* (9.8 per 10,000 deliveries). Around 18.8% of *adult respiratory distress syndrome* cases were confirmed COVID-19 cases in these two years.[12]

Table 5 Rate of Severe Maternal Morbidity (SMM) by Diagnosis-Based and Procedure-Based Indicators per 10,000 Deliveries, Nevada, 2022 – 2023

SMM Indicator	Rate per 10,000 deliveries
Diagnosis-Based Indicators	
Disseminated intravascular coagulation	17.0
Adult respiratory distress syndrome*	16.3
Acute Renal Failure	14.3
Shock	11.1
Sepsis	10.8
Eclampsia	9.8
Pulmonary edema	6.0
Thrombotic embolism	3.4
Puerperal cerebrovascular disorders	1.1
Procedure-Based Indicators	
Blood transfusion	153.6
Hysterectomy	14.9
Ventilation	8.7
Temporary tracheostomy	0.2
SMM with Blood Transfusion Rate	**195.1**

** Around 18.8% of adult respiratory distress syndrome SMM cases were confirmed COVID-19 cases in these two years.*

The top three leading procedure-based indicators of SMM were *Blood transfusion* (153.6 per 10,000 deliveries), *Hysterectomy* (14.9 per 10,000 deliveries), and *Ventilation* (8.7 per 10,000 deliveries).

Blood transfusion is often associated with SMM as shown in national data previously mentioned. The 1034 SMM cases identified in Nevada during January 2022 through December 2023 included all cases associated with blood transfusions. When excluding cases associated with blood transfusions, the SMM case count dropped to 297 and the rate decreased from 195.1 to 56.0 per 10,000 deliveries (Figure 37).

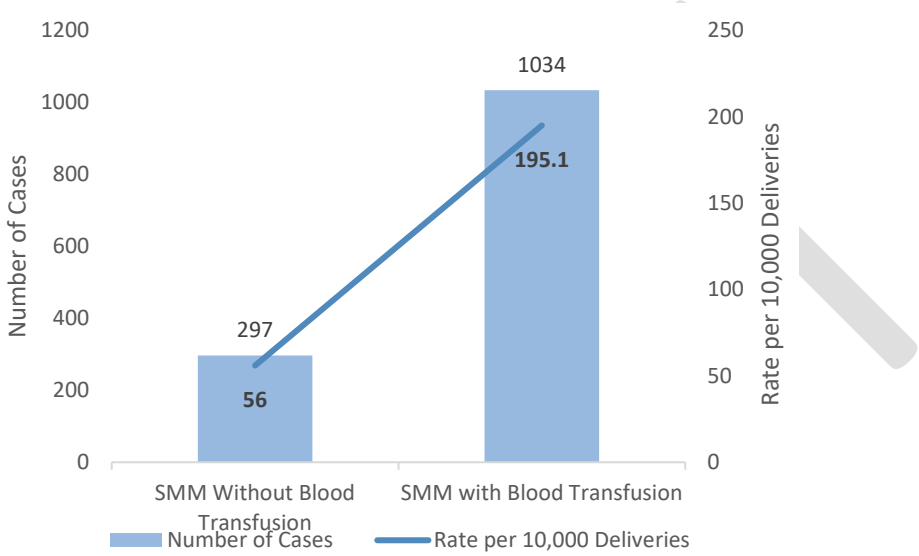


Figure 37 Severe Maternal Morbidity (SMM) Rate per 10,000 Deliveries and Number of Cases by Blood Transfusion Indicator, Nevada, 2022 - 2023

Data Sources: Hospital Inpatient Billing and Nevada Electronic Birth Registry

Maternal Demographics

When comparing the race and ethnicity of pregnant Nevadans among the 1034 SMM cases identified during 2022 to 2023 and excluding the Unknown category, AI/AN, non-Hispanic Nevadans had the highest rate of SMM at 308.1 per 10,000 deliveries (Figure 38). The second highest group was Black, non-Hispanic Nevadans with an SMM rate of 272.1 per 10,000 deliveries, followed by API, non-Hispanic Nevadans at 270.3 per 10,000 deliveries. Hispanic Nevadans accounted for the highest proportion of SMM cases (36.1%) followed by White, non-Hispanic (28.7%). Hispanic and White, non-Hispanic Nevadans had the lowest rates of SMM (180.1 and 155.3 per 10,000 deliveries, respectively).

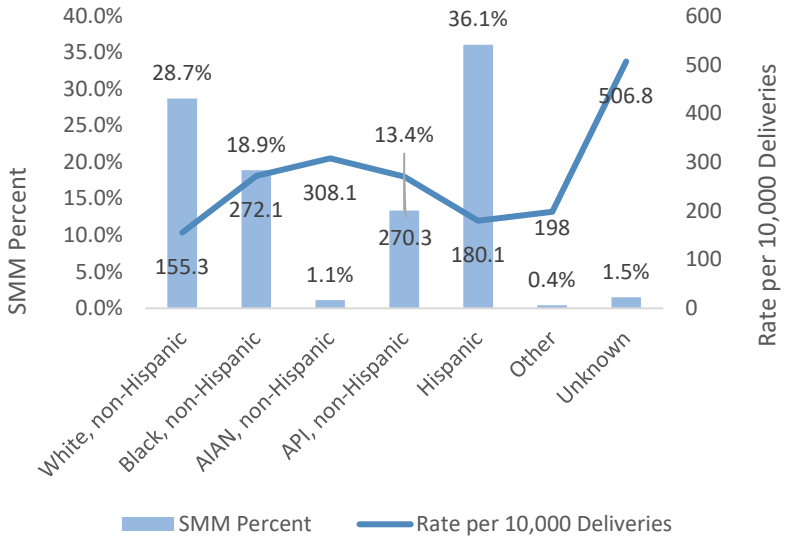


Figure 38 Severe Maternal Morbidity (SMM) Rate and Percent by Maternal Race/Ethnicity, Nevada, 2022 - 2023

Abbreviations: Asian or Pacific Islander (API); American Indian (AI); Alaska Native (AN)
Data Sources: Hospital Inpatient Billing and Nevada Electronic Birth Registry

When stratifying SMM cases by age groups, although the 40 years and older age group only accounted for 7.3% of all SMM cases, they had the highest SMM rate of 355.5 per 10,000 deliveries (Figure 39). The 25-29 age group accounted for approximately 25.3% of SMM cases and had the lowest rate of SMM (173.4.0 per 10,000 deliveries).

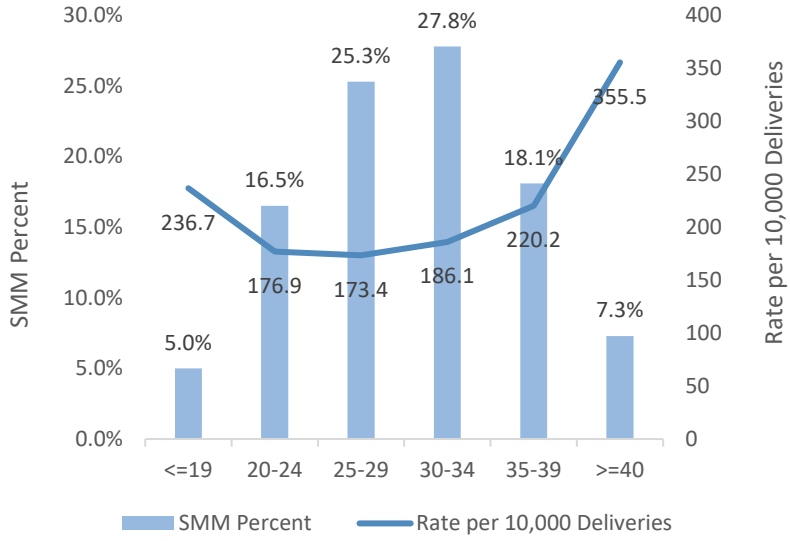


Figure 39 Severe Maternal Morbidity (SMM) Rate and Percent by Maternal Age, Nevada, 2022 – 2023

Data Sources: Hospital Inpatient Billing and Nevada Electronic Birth Registry

Table 6 shows the comparisons of maternal demographic characteristics among SMM cases. When considering the SMM rate including blood transfusions, the SMM is significantly associated with maternal age ($p < 0.0001$), maternal race and ethnicity ($p < 0.0001$), education ($p < 0.0001$), and health insurance status ($p = 0.2911$).

Table 6 Severe Maternal Morbidity by Maternal Demographics, Nevada, 2022 – 2023

Maternal Demographics	Count of SMM Cases	Rate per 10,000 Deliveries	Count of All Deliveries	Percent of All Deliveries	Percent of SMM Cases	Chi-Square P-value
Maternal Age (Years)						
<=19	52	236.7	2197	4.1%	5.0%	<0.0001
20-24	171	176.9	9668	18.2%	16.5%	
25-29	262	173.4	15113	28.5%	25.3%	
30-34	287	186.1	15422	29.1%	27.8%	
35-39	187	220.2	8493	16.0%	18.1%	
>=40	75	355.5	2110	4.0%	7.3%	
Race/ Ethnicity						
White	297	155.3	19126	36.1%	28.7%	<0.0001
Black	195	272.1	7167	13.5%	18.9%	
Native American	11	308.1	357	0.7%	1.1%	
Asian	139	270.3	5142	9.7%	13.4%	
Hispanic	373	180.1	20713	39.1%	36.1%	
Other	4	198.0	202	0.4%	0.4%	
Unknown	15	506.8	296	0.6%	1.5%	
Education						
Less than High School	168	247.6	6786	12.8%	16.2%	<0.0001
High School Graduate	373	212.2	17576	33.2%	36.1%	
Some College	247	172.4	14331	27.0%	23.9%	
College Graduate or Higher	200	161.5	12383	23.4%	19.3%	
Unknown	46	238.7	1927	3.6%	4.4%	
Health Insurance Status*						
Medicaid	442	207.7	21281	40.2%	42.7%	0.2911
Other Government	19	198.7	956	1.8%	1.8%	
Private	539	186.7	28866	54.5%	52.1%	
Self-pay	26	221.5	1174	2.2%	2.5%	
Other	8	123.8	646	1.2%	0.8%	
Unknown	0	0.0	80	0.2%	0.0%	

** Health Insurance status indicates the primary payer for the delivery as recorded on hospital discharge form.*

Table 7 shows that the SMM rate including blood transfusions is significantly associated with prenatal care initiation (p=< 0.0001), adequacy of prenatal care (p <0.0001), parity (p <0.0001), method of delivery (p <0.0001), plurality (p <0.0001), and chronic disease status (p <0.0001).

Table 7 Severe Maternal Morbidity by Maternal Prenatal and Delivery-Related Characteristics, Nevada, 2022 – 2023

Maternal Prenatal and Delivery-Related Characteristics	Count of SMM Cases	Rate per 10,000 Deliveries	Count of All Deliveries	Percent of All Deliveries	Percent of SMM Cases	Chi-Square P-value
Prenatal Care Initiation						
No Care	99	390.2	2537	4.8%	9.6%	<0.0001
First Trimester	695	176.3	39430	74.4%	67.2%	
Second Trimester	164	199.1	8237	15.5%	15.9%	
Third Trimester	36	230.2	1564	3.0%	3.5%	
Had Care but Unknown Start Date	16	237.4	674	1.3%	1.5%	
Unknown	24	427.8	561	1.1%	2.3%	
Adequacy of Prenatal Care						
Data Missing/Unknown	142	356.6	3982	7.5%	13.7%	<0.0001
Inadequate	131	229.5	5709	10.8%	12.7%	
Intermediate	81	157.8	5132	9.7%	7.8%	
Adequate	292	147.2	19840	37.4%	28.2%	
Adequate Plus	388	211.6	18340	34.6%	37.5%	
Parity						
0 Previous Live Births	416	201.7	20628	38.9%	40.2%	<0.0001
1 Previous Live Births	234	151.3	15461	29.2%	22.6%	
2+ Previous Live Births	382	227.2	16815	31.7%	36.9%	
Unknown	2	202	99	0.2%	0.2%	
Method of Delivery*						
Repeat Cesarean	294	346.6	8482	16.0%	28.4%	<0.0001
Primary Cesarean	372	385.7	9646	18.2%	36.0%	
Vaginal	368	105.5	34875	65.8%	35.6%	
Plurality						
Singleton Birth	963	184.7	52149	98.4%	93.1%	<0.0001
Multiple Birth	71	831.4	854	1.6%	6.9%	
Pre-Pregnancy BMI~						
Underweight (<18.5)	33	180.5	1828	3.4%	3.2%	0.2716
Normal Weight (18.5- 24.9)	369	187.4	19693	37.2%	35.7%	
Overweight (25.0 - 29.9)	247	174.6	14147	26.7%	23.9%	
Class I (30.0 - 34.9)	182	201.4	9037	17.0%	17.6%	
Class II (35.0 - 39.9)	89	207.6	4288	8.1%	8.6%	
Class III (>=40)	70	233.9	2993	5.6%	6.8%	
Unknown	44	432.6	1017	1.9%	4.3%	

Chronic Disease^						
No Chronic Disease	970	189.1	51288	96.8%	93.8%	<0.0001
Any Chronic Disease	64	373.4	1714	3.2%	6.2%	

**Method of delivery was identified from hospital discharge data using ICD-10 codes. Four indicators were not carried over to ICD-10-CM codes system from ICD -9-CM*
*~ Pre-pregnancy BMI was calculated using the formula (weight(lb.)/height(in)^2) *703 with mother's weight and height as recorded on birth certificate.*
^ Any chronic disease includes deliveries to pregnant people with chronic hypertension, pre-existing diabetes or chronic heart disease as recorded on birth certificate.

Data Summary

Maternal Mortality

Pregnancy-Associated Death (PAD)

The pregnancy-associated death ratios in the years 2022 and 2023 have decreased from the ratios in 2020-2021 (from a high of 119.1 per 100,000 births in 2020 to a low of 98.4 per 100,000 live births in 2023). Pregnancy-associated deaths rate have decreased from 6.3 per 100,000 live births in 2020 to 3.7 per 100,000 live births in 2022 and then a slight increase at 4.6 in 2023.

In the years 2022 to 2023, Black, non-Hispanic Nevadans had the highest pregnancy-associated death ratio at 196.1 per 100,000 live births followed by White, non-Hispanic Nevadans at 83.9 per 100,000 live births.

Nevadans with a maternal age of 35 and older accounted for 25% of pregnancy-associated deaths, and the 10 to 19 age group had the highest pregnancy-associated death ratio at 241.9 per 100,000 live births.

The most common underlying cause of death was *non-transport accidents*, accounting for 23.6% of all pregnancy-associated deaths. The second most common cause of death was *Pregnancy, childbirth, and the puerperium* at 21.8% of pregnancy-associated deaths.

Pregnancy-Related Death (PRD)

The pregnancy-related death data is available through 2019; the highest PRD death ratio occurred in 2017, at 33.7 per 100,000 live births increasing from previous years. The highest pregnancy-related death rate was also in 2017 at 2.0 per 100,000 women of reproductive age.

During 2017 to 2018, Black, non-Hispanic Nevadans had the highest pregnancy-related death ratio at 49.9per 100,000 live births and 29% of the pregnancy-related deaths occurring in this time.
Black, non-Hispanic Nevadans had the highest death rate at 4.3 per 100,000 women of reproductive age.

Nevadans aged 35-39 had the highest PRD ratio at 69.0 per 100,000 live births, followed by 40+ age group at a ratio of 40.4 per 100,000 live births.

During 2017 and 2018, the most common underlying causes of pregnancy-related death were *Hemorrhage,* which accounted for 29.4% of all pregnancy-related deaths, followed by *Other non-cardiovascular conditions and*

Infection both accounted for 17.6%, *Hypertensive disorders of pregnancy* and C*ardiovascular conditions* both accounted for 11.8%, *Thrombotic embolism, and Cardiomyopathy* both accounted for 5.9% of all pregnancy-related deaths.

Maternal Deaths
There were 27 maternal deaths in Nevada from 2016 to 2019.

The highest ratios were in 2017 at 25.2 per 100,000 live births and a rate of 1.5 per 100,000 women of reproductive age.

By race and ethnicity, the Nevadans who died were 9 White, non-Hispanic, 7 Black, non-Hispanic, 4 Asian/Pacific Islander and 7 Hispanic. There are 6 Nevadans for the age group 10-29, 7 for age group 30-34, and 14 for age group above 35.

Severe Maternal Morbidity

Nevada's Severe Maternal Morbidity (SMM) rate has increased from 2018 to 2021 and then decreased in 2022 with highest rate in 2021 at 205.0 per 10,000 deliveries.

Most deliveries with SMM in 2022 to 2023 were associated with one indicator (86%). The top three leading diagnosis-based indicators for SMM were *Disseminated intravascular coagulation* (17.0 per 10,000 deliveries), *Adult respiratory distress syndrome* (16.3 per 10,000 deliveries), *and Acute Renal Failure* (14.3 per 10,000 deliveries). The leading procedure-based indicator was *Blood transfusion*.

When comparing maternal demographic characteristics, maternal age, race/ethnicity, health insurance status, adequacy of prenatal care, parity, method of delivery, plurality, and chronic disease are all risk factors for severe maternal morbidity.

AI/AN, non-Hispanic Nevadans accounted for 1.1% of SMM cases but had the highest SMM rate followed by Black, non-Hispanic Nevadans who accounted for 18.9% of SMM cases (308.1 and 272.1 per 10,000 deliveries, respectively). Nevadans aged 40 years and older had the highest rate of SMM (355.5 per 10,000 deliveries) but accounted for only 7.3% of cases. The 25-29 age group had the lowest rate of SMM (173.4 per 10,000 deliveries) and accounted for 25.3% of cases.

Recommendations

2024 Maternal Mortality Review Committee recommendations

The Committee identified recommendations to improve care in Nevada and to improve the work of the Committee and identified perceived level of impact if implemented (giant through small) and level (system, facility, etc.) at which the recommendation would be implemented, per CDC best practices. Implementation of these recommendations would decrease preventable MM and SMM in Nevada through a range of interventions spanning medical best practices, systems level changes, social services and referral pathways, disparity and bias reduction to increase birth equity, and through policy recommendations. Recommendations were generated by MMRC members in relation to a specific MM case review based of the facts available.

Giant Impact Recommendations

1. Access to trauma informed therapy resources. (Level: System)
2. State of Nevada agencies and programs such as the Nevada Department of Education and Department of Health and Human Services should develop and implement at least two robust evidence-based education-based programs and support to effectively screen for and address ACEs in education settings by December 31, 2024. (Level: System) (*Mentioned four times*)
3. Nevada State Medicaid should provide acceptable and timely transportation for healthcare needs for Medicaid recipients by July 1, 2024, with the Division of Health Care Financing and Policy assessing current system adequacy. (Level: System)
4. Extended access to Medicaid after delivery might have been life changing for this patient. We are grateful to Legislature for passing SB232 for expanded Medicaid coverage. (Level: System)
5. Give patients or consumers of healthcare a list of approved or in network providers immediately upon signing them up for insurance or making a referral for a condition. Increase awareness and strengthen those seeking care with support in navigating resources in mental health or in social crisis. (Level: System)
6. State of Nevada Agencies should improve awareness of community resources for inadequate housing such as Nevada 2-1-1. (Level: System)
7. Realignment of payment models to incentive value rather than volume with a focus on prevention. (Recommended twice – once for structural racism and once for access/financial to address treatment and insurance disparities) (Level: System)
8. State and federal funding needs to improve access to outpatient care for low socioeconomic status. Prioritize ER referrals. (Level: System)
9. When we are coordinating care for high-risk patients at increased risk of maternal mortality, clinicians should engage in more direct care coordination including warm hand-offs as an example vs just providing information/referrals for continuity of care including both physical/mental health and social determinants of health. (Level: System)
10. Providers and systems should have systematic follow-up with prenatal care patients to ensure continued care; a warm hand-off should be provided with patients changing to another provider to ensure the new provider's system/practice engages and follows the patient. (Level: System)
11. More robust evidence-based education based programs and support to address ACEs. (Level: System)
12. Relevant State of Nevada agencies and programs should mandate priority access to mental health and medication assisted substance use treatment for pregnant women. (Level: Community) (A repeat from 2022 Legislative Report.)
13. Health systems and payers should be incentivized to address upstream determinants of poor outcomes, such as extreme morbid obesity.

14. Providers and facilities should ensure that obese patients are counseled about weight management, risks of morbid obesity, and available treatment modalities, and documented in the medical record. (Level: Provider)
15. Providers and facilities should ensure that obese patients are counseled about weight management, risks of morbid obesity, and available treatment modalities, and documented in the medical record. (Level: Facility)

Extra Large Impact Recommendations

1. Kratom should be regulated by the Nevada Board of Pharmacy as a controlled substance. Education to public and providers regarding Kratom use. (Level: Community)
2. State of Nevada needs to implement more programs for free medication-assisted substance use treatment and ensure providers are available to provide the treatment in order to reduce the use of Kratom for self-treatment of opioid use disorder. (Level: Community)
3. State of Nevada should address the shortage of mental health care available in the state of Nevada through increasing access and coordination. (Level: System)
4. State of Nevada needs to audit implementation of referral to admission of pregnant person with substance use disorder to evaluate the effectiveness of SAPTA. (Level: System)
5. State of Nevada agencies and programs such as the Department of Health and Human Services, Division of Public and Behavioral Health, and Behavioral Health and Wellness Program, as well as groups such as the Perinatal Health Initiative, should develop a focused campaign and dedicate funding for substance use. (Level: System)
6. The State needs to increase access for inpatient and long-term mental health for pregnant and postpartum women. Provide more resources for mental health for women during pregnancy and postpartum. Encourage mental health screening in OB offices during pregnancy, not only postpartum. Provide a service like "care everywhere" where outside source information may pull for the patient from other sources which cues continuity of care for diagnoses, for example, if this was in place the OB office may have seen the bipolar disorder diagnosis and could have worked with their patient regarding this. (Level: System)
7. State of Nevada agencies and programs such as the Department of Health and Human Services, Division of Public and Behavioral Health, and Behavioral Health and Wellness Program, as well as groups such as the Perinatal Health Initiative, should develop a focused campaign and dedicate funding for substance use in pregnancy reduction. (Level: System)
8. State of Nevada agencies and programs should mandate priority access to mental health and medications for substance use treatment for pregnant persons by July 1, 2025. (Level: System)
9. The State of Nevada should develop a Perinatal Quality Collaborative to improve uptake of current standard of care recommendations. (Level: System)
10. Providers should take implicit bias and cultural competency training which states we need to recognize and reduce unconscious bias and links to a training at HHS as an example. (Level: Provider)
11. Health care providers should practice meeting the patient where they are at. Call in behavioral health for consultation to discover why patient may be apprehensive to the medical interventions proposed. Shared decision making. (Level: System)
12. Patient's choice 17 years prior to death should have been continually reassess, and shared decision making readdressed. (Level: Provider)
13. Evidence-based methods should be used in pain management. (Level: Facility)
14. Perinatal Quality Collaborative should be established to drive the use of evidence-based guidelines for DVT prevention at admission should be followed. (Level: System)

Large Impact Recommendations

1. The patient should have been placed on a baby aspirin daily as this has been shown to decrease the chance of developing severe pre-eclampsia and eclampsia. (Level: Provider)
2. Nevada Department of Health should implement a statewide health information exchange to ensure provider have health history information. (Level: System)
3. Narcan should be widely available in the community for bystander administration, State should provide funding and training for support and access to Narcan. (Level: System)
4. Providers should diagnose and treat medical conditions in obese individuals, rather than attributing all symptoms/signs to obesity. Training for providers in motivational interviewing. (Level: System)
5. Provider education about contraindications for specific contraceptive methods. (Level: System)
6. Health care system needs to require appropriate screening, interventions, treatment for mental health during the perinatal period. (Level: System) (case 0029 in 3.2024)
7. A Lifevest was indicated after her sentinel admission for the birth. She had a "new" diagnosis of Heart Failure with reduced Ejection Fraction with severe mitral regurgitation - Lifevest effective left ventricular ejection fraction <5%. Her risk of sudden cardiac death was high. Medicaid covers Lifevests. Social services should be obtained. (Level: System)
8. Community programs should be developed to educate medical consumers of color about advocating for themselves in medical environments. Implicit bias training for providers. (Level: Community)
9. Emergency departments/hospitals should arrange for in-house dermatologic or other biopsies for diagnosis of potential life-threatening conditions urgently in that facility rather than referring to outpatient. (Level: Facility)
10. Health care system needs to require appropriate screening, interventions, treatment for mental health during the perinatal period. (Level: System) (This is a repeat from 2022 Legislative Report.)
11. We should create a Perinatal Quality Collaborative to drive best practices to discuss the importance of screening for and treating anemia in pregnancy and postpartum. (Level: Large)
12. Evidence-based treatment for Deep Vein Thrombosis (DVT) should be followed. (Level: Provider)

Medium Impact Recommendations

1. Recommend Office of Suicide prevention reach out to CPS and social workers to do training standardized depression screening. (Level: System)
2. Communication with patients should be in their native language. Language lines to be utilized unless patient refuses. If refused it should be documented. Family often provides inaccurate translation. (Level: Provider)
3. Appropriate referral should be obtained in a timely manner without delay. (Level: Provider)
4. Facilities should ensure provider have access to medical translation services. (Level: Facility)
5. Ongoing coordination of outpatient care for chronic disease. (Level: System)
6. The providers should be using universal validated questionnaires to screen for mental health and substance use disorders. (Level: Provider)
7. Providers should follow standard of care in documentation of mental health, risk factors, screenings and referrals. (Level: Provider)
8. The obstetric providers should be using universal questionnaire based screening for mental health and substance use using validated questionnaires. (Level: Provider)
9. Narcan should be widely available in the community for bystander administration and should be given by first responders to any unresponsive person when etiology is unknown. (Level: Provider)
10. Anemia in pregnancy should be evaluated and treated. Her anemia was not worked up and when it did not respond to oral iron, she did not receive IV iron either before during or after childbirth. PQC related recommendation. (Level: Provider)

11. Clinicians should universally screen all patients for mental health and substance use disorders at minimum at the first prenatal visit. (Level: Provider)
12. Clinicians should universally screen all patients for mental health and substance use disorders at minimum at the first prenatal visit, also to include inpatient and ER/Triage as locations/clinicians that should conduct universal screening on this patient population to include Inpatient standards for offering CARA plans of care for substance exposed/affected infants prior to discharge. (Level: System)
13. If reports are accurate, clinicians should have suspected malignancy at some point over the previous years of patient/family complaining of the issue but progressing to stage 4. (Level: Provider)
14. Prudent that we ensure naturopaths/holistic clinicians offer evidence based treatments in addition to alternatives for malignancy or suspected malignancy. The evidence supports a dramatically increased mortality rate for those that chose to not treat with evidenced based methods and rely on holistic/natural ones solely. (Level: Provider)
15. Providers/clinics outpatient should ensure an accurate diagnosis. (Level: Provider)
16. Trauma informed care techniques should be required by relevant boards and certification agencies as a standard of practice when providing substance use treatment, by July 1, 2025, as well as by the State of Nevada, Division of Child and Family Services and local child welfare entities in child protection service provision. (Level: System)
17. Trauma informed care techniques should be required by relevant boards and certification agencies as a standard of practice when providing substance use treatment, by July 1, 2025, as well as by the State of Nevada, Division of Child and Family Services and local child welfare entities in child protection service provision. (Level: Facility)
18. Trauma informed care techniques should be required by relevant boards and certification agencies as a standard of practice when providing substance use treatment, by July 1, 2025, as well as by the State of Nevada, Division of Child and Family Services and local child welfare entities in child protection service provision. (Level: Provider)
19. Providers should establish a safety plan with any patient at risk for suicide. (Level: Provider)
20. Facilities should have a policy that a safety plan should be established with any patient at risk for suicide. (Level: Facility)
21. Postmortem genetic testing for inherited thrombophilia (blood clotting) should be performed when an unexplained clotting disorder is suspected in a young individual (such as when pulmonary thromboembolism or unprovoked myocardial infarction is detected at autopsy). (Level: Facility)
22. Outpatient systems should be in place to address wounds, especially those in vulnerable populations. (Level: System)
23. We should create a Perinatal Quality Collaborative to drive best practices and to highlight the importance of using nondiscriminatory language around elevated BMIs. (Level: System)
24. Providers can communicate and coordinate care and utilize risk management and multidisciplinary care teams between providers and the patients, so the patient understands the risk of leaving against medical advice. This should include informed consent regarding risks and benefits of treatment. (Level: Provider)

Small Impact Recommendations

1. Education to patient on importance of follow up after pregnancy. (Level: Provider)
2. The patient should have received magnesium sulfate upon the diagnosis of HELLP syndrome. (Level: Provider)
3. Provider intervention to address substance use. (Level: Provider)
4. Availability of mental health services; the state should use housing-first treatment plans. Pregnant women should be moved to the front of the list. (Level: System)

5. Psychoeducation and outreach/community campaigns about HIV treatment, access points for treatment. Community campaigns to address the experience of POC in health care systems/implicit biases training for providers. (Level: Community)
6. Community should engage in robust psychoeducation about disease processes/risks/signs and symptoms post childbirth when to activate EMS or seek care. (Level: Patient/Family)
7. Increased awareness of signs and symptoms of a cardiac event. Education on when to access the healthcare system. (Level: Community)
8. Referral process should include education about how to access systems of care in native languages when possible. Post discharge follow up calls could be helpful in closing this gap in services. (Level: System)

2024 Nevada Office of Minority Health and Equity Advisory Committee Recommendations

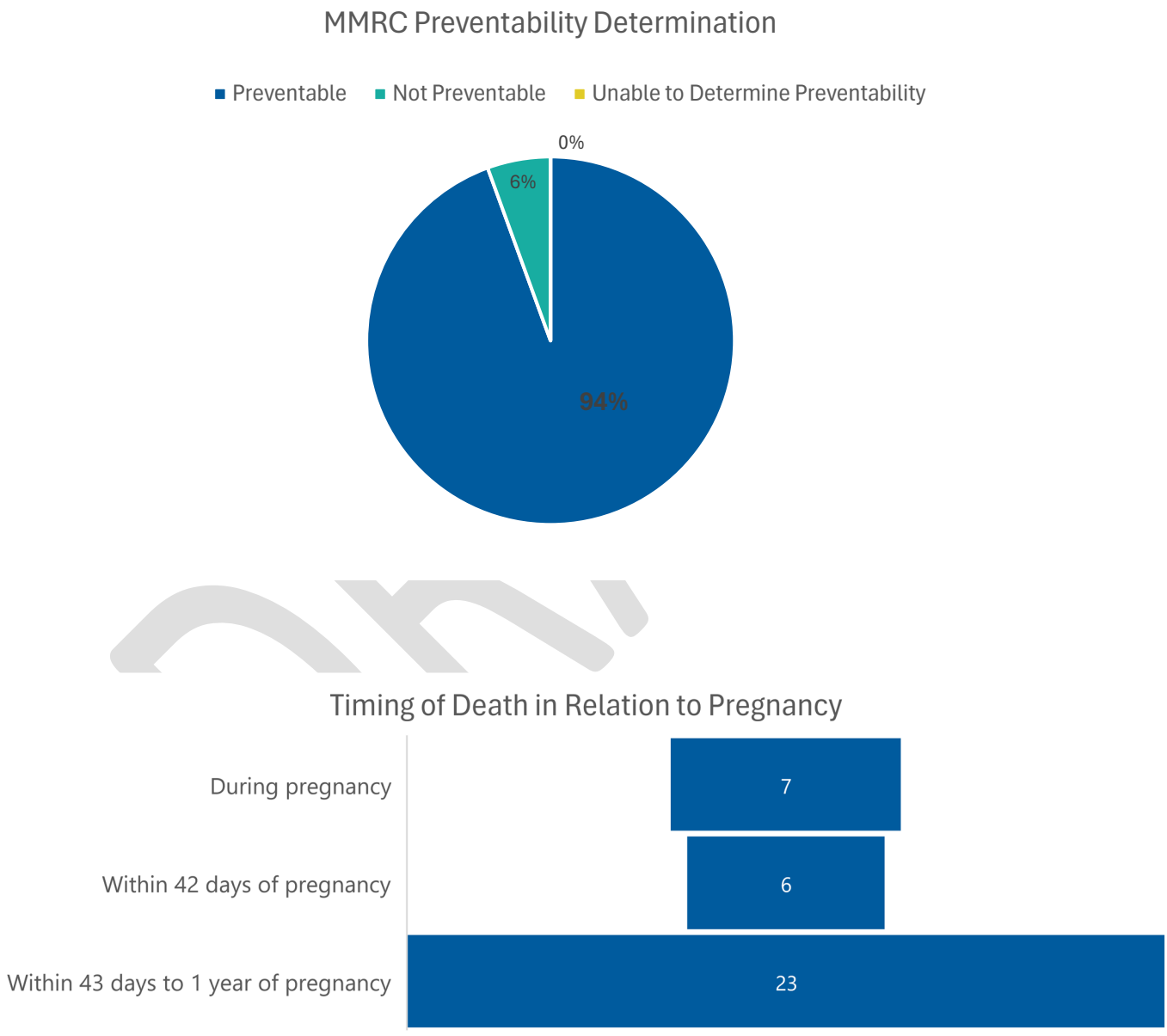
At the September 10, 2024, meeting of the Nevada Office of Minority Health and Equity Advisory Committee, recommendations were provided and feedback on the MMRC recommendations was shared by the Committee. Implementation of these recommendations would decrease preventable MM and SMM in Nevada through a range of interventions spanning medical best practices, systems level changes, social services and referral pathways, disparity and bias reduction to increase birth equity, and through policy recommendations. Recommendations were generated by Committee members in relation to the draft 2024 Maternal Mortality and Severe Maternal Morbidity Report data, the associated MMRC recommendations, infographics based on the report, and the expertise of the Committee members. The Committee members were asked if there were recommendations they would like to add or highlight any MMRC recommendations and Committee members provided additional recommendation feedback. Recommendations were not made in relation to MMRC individual cases as only the MMRC reviews these per Nevada Revised Statutes.

1. American Indian/Alaskan Native data needs to be better represented throughout the report and suppression to prevent individual identification needs better highlighted so as not to not inadvertently create the impression that maternal mortality isn't occurring among these populations. More resources specific to the 28 Nevada Tribes was recommended.
2. Feedback was shared that equity and disparity isn't highlighted in the recommendations and the words ethnic minority and people of color were infrequent or absent in the recommendations.
3. Recommendations should focus on particular ethnic minorities rather than conglomerating into the concept of people of color. It was suggested to move some of the recommendations that talk about people of color and ethnic minorities to the Giant recommendations section as opposed to the Small and Large recommendations sections where people of color are mentioned.
4. In the Large impact recommendation seven (7), the wording "…community programs should be developed to educate medical consumers of color about advocating for themselves," was noted as problematic by many Committee members and as obscuring systemic systems roles. Suggesting patients advocating for themselves as opposed to making structural systemic changes was identified as akin to telling people to "save yourself." It was noted this recommendation could be changed to all medical consumers as opposed to people of color.
5. Recommendation number five (5) under the Giant impact category stated, "…give patients a list of approved in-network providers," and it was recommended there be plans to also give non-medical providers, including doulas, a list of approved in-network providers available for patients. It was also noted that it is good recommendation 5 is touching on these issues, but there is a higher level of responsibility of how to get this population into care and specific disparities were mentioned that need addressed specific to individual underserved populations, including for people who are American Indian/Alaskan Native.
6. Recommendation ten (10) under Extra-large impact, "…healthcare providers should practice meeting the patient where they're at and then call in the behavioral health consult," spurred a recommendation to also add doulas as professionals who can be called in addition to behavioral health for consultation, where available.

7. Under the Medium impact recommendation, the need to add a clarification about what it means to provide referrals in a timely manner was highlighted, as was a possible gap of when mothers can see lactation consultants, especially in hospital postpartum rooms.
8. Adding a recommendation about addressing Cesarean-sections was made focused on how sometimes Cesarean-sections can be prevented, especially repeat Cesarean-sections. It seemed as there was no language in the recommendations about this, especially if providers want to perform vaginal birth after cesarean.
9. Adding a recommendation on adding any language about the undocumented in reporting of findings for PAD and PRD was made, including how to overcome the challenges of lack of information and sharing data.
10. Adding a recommendation to address the challenges in accessing doula care given doulas address many of the disparities addressed in the report, noting evidence-based data shows doulas in prenatal and postpartum care help address many of those disparities.
11. Sexual orientation and data on Sexual and Gender Minority populations should be considered like any other ethnic and racial minority group in maternal mortality and severe maternal morbidity reporting and recommendations. This is important to know especially in relation to increased access to culturally competent care and any barriers to accessing care.
12. Adding a recommendation to provide data regarding how substance use was divided between recreational opioids and prescription opioids was noted as important in showing where people are getting access to these substances, and it was noted as an opportunity for the Office of Analytics in framing this data more clearly and explaining the ICD codes in more detail, as well as better showing the relationship between non-transport accidents and drug overdose in the report.
13. For recommendations on increasing mental health services and timely access to those services, it could be helpful to note there are many complications when it comes to increasing access specifically for mental health services (largely because of licensure laws), defining what constitutes a mental health professional, and the ethics behind how professionals practice with vulnerable persons.
14. Adding a recommendation to identify why between 2014 and 2017 there was a dip in the maternal mortality rates.
15. Adding to recommendation ten (10) under Giant impact unbundling prenatal care for federally qualified health centers under Medicaid so primary care providers can continue to provide their primary care which addresses the issue of the high percentage of individuals with chronic disease morbidity.
16. Recommendation eleven (11) does not reference recreational or prescribed, but it does mention medication-based treatment, as opposed to treatment in general. It was noted there isn't available medication-based treatment for all substances, and it was recommended to rephrase the verbiage to encompass treatment that it isn't necessarily medication based.
17. Adding a recommendation on provision of education as to the importance of continuation of care was suggested.
18. Adding a recommendation for the Silver State Health Insurance Exchange to do targeted marketing specifically to pregnant women; for example, they could promote the advanced premium tax credit for individuals who are over the income limit for Medicaid.
19. A recommendation under the Medium impact category was referenced on postmortem genetic testing for blood clotting. It was noted due to the high percentage of pregnancy-related deaths, this recommendation should be in the Large or Giant impact category.

MMRC Data

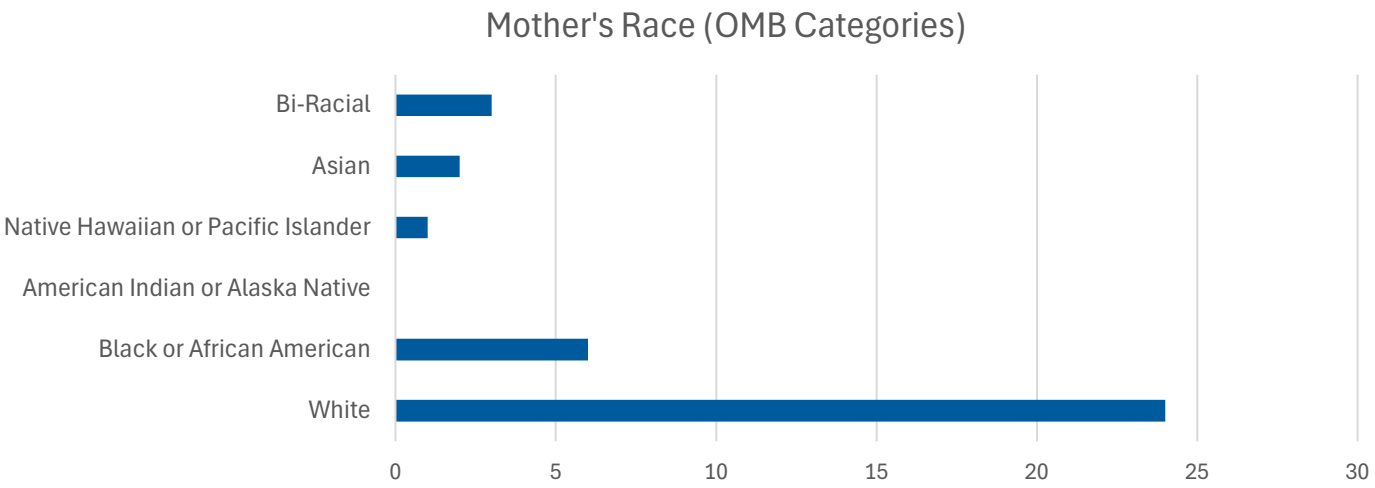
The following aggregate data includes cases reviewed and finalized by the MMRC from 2018 to 2020 (1 case reviewed in 2018 and a partial year of data from 2020). Since its inception, the MMRC has reviewed a total of 36 deaths to date. The following data charts use N=36 and are pulled out of the Maternal Mortality Review Information Application (MMRIA) Data System.

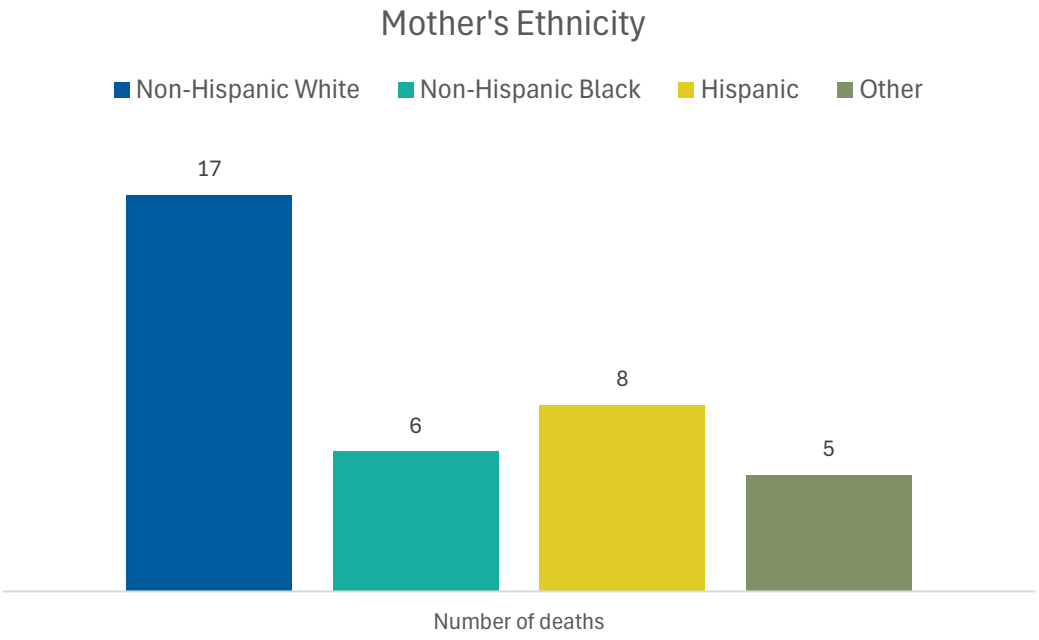


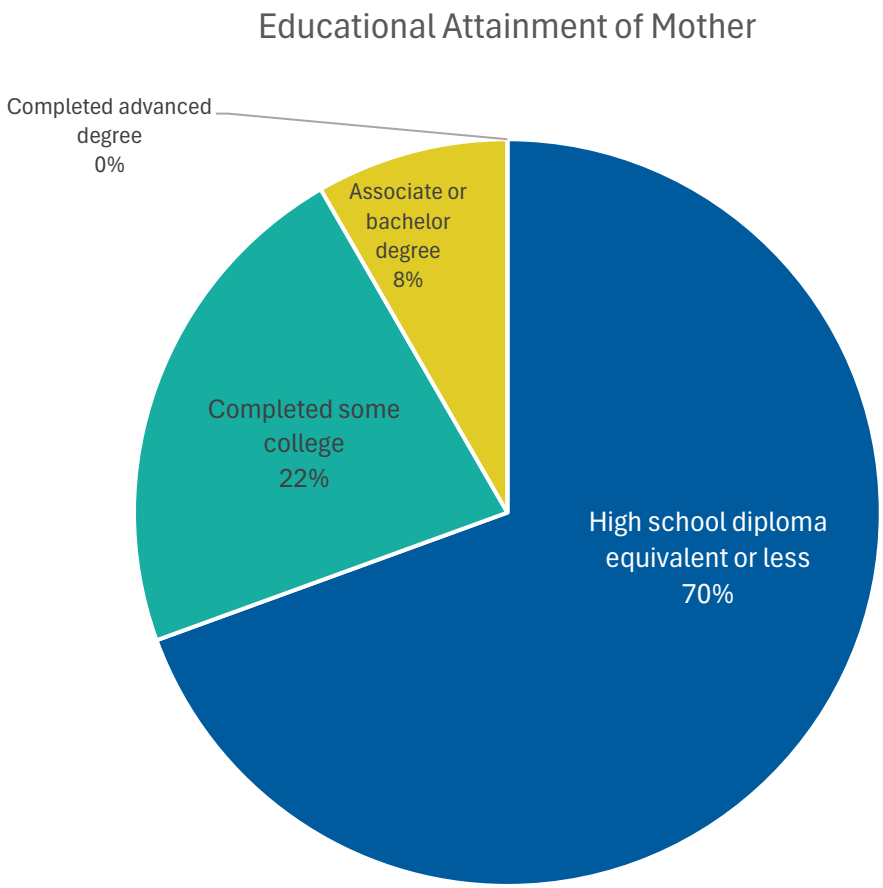
Committee Determinations	Yes	No	Probably	Unknown
Did obesity contribute to the death?	4	29	3	0
Did discrimination contribute to the death?	3	16	6	11
Did mental health conditions contribute to the death?	7	16	8	5
Did substance use disorder contribute to the death?	14	17	3	2
Was this death a suicide?	4	29	0	3
Was this death a homicide?	2	34	0	0

Social or emotional stressor	Number of deaths
Child Protective Services involvement	19
History of childhood trauma	12
History of domestic violence	16
History of psychiatric hospitalizations or treatment	13
History of substance use	20
History of substance use treatment	11
Pregnancy unwanted	11
Prior suicide attempts	9
Recent trauma	5
Unemployment	20
Other	8
Unknown	6
None	3

Age of mother at death (years)	Number of deaths
< 20	2
20-24	5
25-29	10
30-34	6
35-39	10
40-44	3
45+	0
Total	36


Mother's Race (OMB Categories)
Bi-Racial
Asian
Native Hawaiian or Pacific Islander
American Indian or Alaska Native
Black or African American
White
0
5
10
15
20
25
30


Mother's Ethnicity
Non-Hispanic White
Non-Hispanic Black
Hispanic
Other
17
6
8
5
Number of deaths


Educational Attainment of Mother
Completed advanced degree 0%
Associate or bachelor degree 8%
Completed some college 22%
High school diploma equivalent or less 70%

Appendix

Complete List of SMM Indicators and Associated ICD-10-CM Codes

Classification	Severe Maternal Morbidity Indicator	ICD-10/Procedure Codes
Diagnosis	Acute myocardial infarction	121.xx, 122.x
	Aneurysm	171.xx, 179.0
	Acute renal failure	N17.x, O90.4
	Adult respiratory distress syndrome	J80, J95.1, J95.2, J95.3, J95.82x, J96.0x, J96.2x, R09.2
	Amniotic fluid embolism	O88.1x
	Cardiac arrest/ventricular fibrillation	I46.x, I49.0x
	Disseminated intravascular coagulation	D65, D68.8, D68.9, O72.3
	Eclampsia	O15.x
	Heart failure/arrest during surgery or procedure	I97.12x, I97.13x, I97.710, I97.711
	Puerperal cerebrovascular disorders	I60.xx-I68.xx, O22.51, O22.52, O22.53, I97.81x, I97.82x, O873
	Pulmonary edema/Acute heart failure	J81.0, I50.1, I50.20, I50.21, I50.23, I50.30, I50.31, I50.33, I50.40, I50.41, I50.43, I50.9
	Severe anesthesia complications	O74.0, O74.1, O74.2, O74.3, O89.0x, O89.1, O89.2
	Sepsis	O85, O86.04, T80.211A, T81.4XXA, R65.20, A40.x, A41.x, A32.7
	Shock	O75.1, R57.x, R65.21, T78.2XXA, T88.2XXA, T88.6 XXA, T81.10XA, T81.11XA, T81.19XA
	Sickle cell disease with crisis	D57.0x, D57.21x, D57.41x, D57.81x
	Air and thrombotic embolism	I26.x, O88.0x, O88.2x, O88.3x, O88.8x
Procedure	Conversion of cardiac rhythm	5A2204Z, 5A12012
	Blood transfusion	30230H0, 30230K0, 30230L0, 30230M0, 30230N0, 30230P0, 30230R0, 30230T0, 30230H1, 30230K1, 30230L1, 30230M1, 30230N1, 30230P1, 30230R1, 30230T1, 30233H0, 30233K0, 30233L0, 30233M0, 30233N0, 30233P0, 30233R0, 30233T0, 30233H1, 30233K1, 30233L1, 30233M1, 30233N1, 30233P1, 30233R1, 30233T1, 30240H0, 30240K0, 30240L0, 30240M0, 30240N0, 30240P0, 30240R0, 30240T0, 30240H1, 30240K1, 30240L1, 30240M1, 30240N1, 30240P1, 30240R1, 30240T1, 30243H0, 30243K0, 30243L0, 30243M0, 30243N0, 30243P0, 30243R0, 30243T0, 30243H1, 30243K1, 30243L1, 30243M1, 30243N1, 30243P1, 30243R1, 30243T1
	Hysterectomy	0UT90ZZ, 0UT94ZZ, 0UT97ZZ, 0UT98ZZ, 0UT9FZZ, 0UT90ZL
	Temporary tracheostomy	0B110Z4, 0B110F4, 0B113Z4, 0B113F4, 0B114Z4, 0B114F4
	Ventilation	5A1935Z, 5A1945Z, 5A1955Z