

Maternal Mortality and Severe Maternal Morbidity Nevada, 2020

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Accessibility Disclosure

We understand the importance of making reports accessible to everyone. If you have any problems related to the accessibility or need any enhanced accessibility, please email data@dhhs.nv.gov.

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Background

Nevada Revised Statutes (NRS) 442.767 states that the Department of Health and Human Services compile and publish an annual report on or before April 1 that “consists of data concerning maternal mortality and severe maternal morbidity in this State during the immediately preceding year.”¹

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 death associated with pregnancy-associated deaths in 2020. This report also provides data on pregnancy-related deaths from Pregnancy Maternal Surveillance System (PMSS) from 2012 to 2017. PMSS is a national surveillance conducted by Centers for Disease Control and Prevention (CDC) to better understand 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. Medical 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, 2017 data was the latest year available.

For more information on PMSS, please visit: [CDC PMSS](#).

Maternal morbidity is a continuum from mild adverse effects to life-threatening events or death.² Severe Maternal Morbidity (SMM) refers to conditions and diagnoses which indicate potentially life-threatening maternal complication. SMM includes unexpected outcomes of labor and delivery resulting in significant short- or long-term consequences to health.³ SMM relates to higher risks of adverse pregnancy outcomes like preterm birth and infant death. SMM is associated with a high rate of preventability. SMM can be considered a near miss for maternal mortality because without identification and treatment, in some cases the conditions would lead to maternal death. Identifying SMM is important for preventing injuries leading to mortality and for highlighting opportunities to avoid repeat injuries.

This report is divided into a section for maternal mortality and a section for SMM.

Maternal Mortality

Methodology

Data Sources

Web-Enabled Vital Records Registry Systems (WEVRRS)

Statewide births, deaths, and fetal births 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 include demographics such as age, gender, and 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.

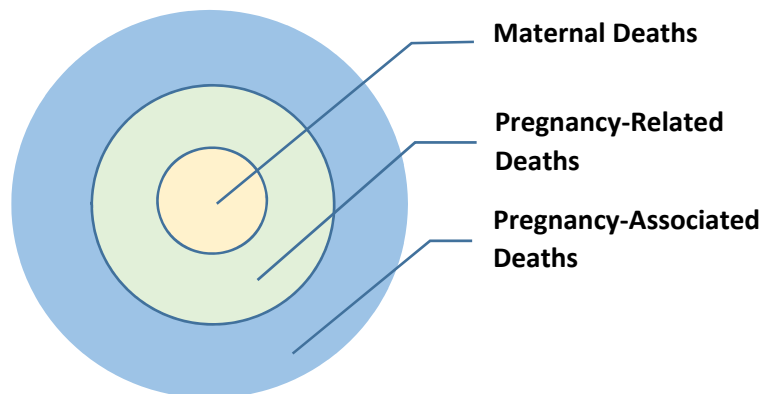
Definitions

Pregnancy-Associated Death is the death of a woman 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 is the death of a woman during pregnancy or within one year of the end of pregnancy, from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy. Pregnancy-related death ratio is the number of pregnancy-related deaths per 100,000 live births.

Maternal Death is the death of a woman 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 Definitions



Identification of Pregnancy-Associated Deaths

The methodology is based on the 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)¹.

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 to 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 women ages 10 to 60 years are first linked with birth and fetal death records based on mother's social security number (SSN). Death records of women ages 10 to 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 which 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, the death records of female ages 10-60 are selected 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 that contain 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

Death records of female ages 10 to 60 were selected 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.

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

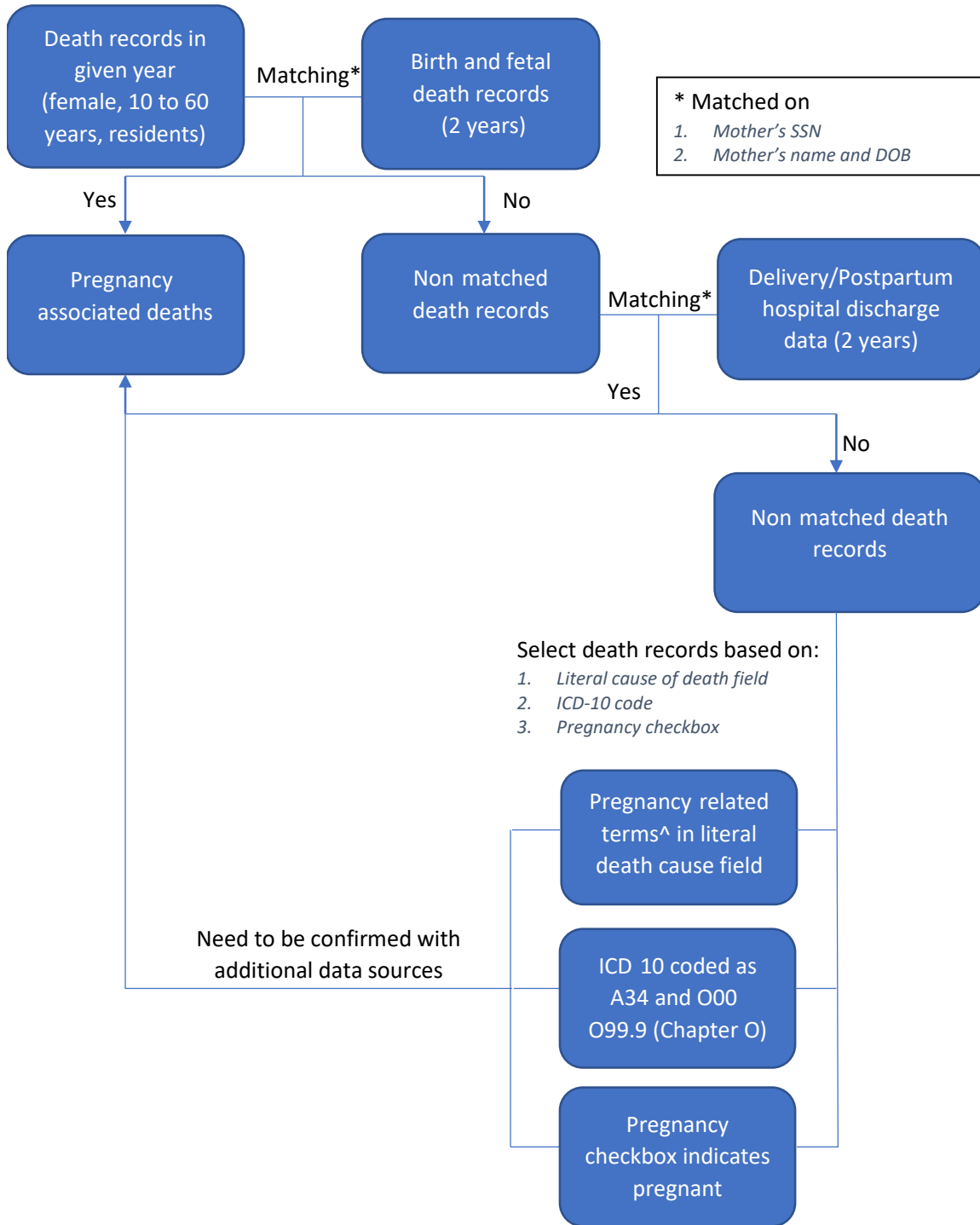
- Media and News Reports
- Certifier Confirmation
- Autopsy Reports

Analysis

The analyses in this report are for pregnancy-associated deaths for Nevada residents only. The pregnancy-associated death ratio was calculated as the number of pregnancy-associated deaths per 100,000 live births. The pregnancy-related death ratio was calculated as the number of pregnancy-related deaths per 100,000 live births.

The linkages and analyses were performed by using SAS 9.4.

Figure 2. Flow Chart of Identifying Pregnancy-Associated Deaths



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

Findings

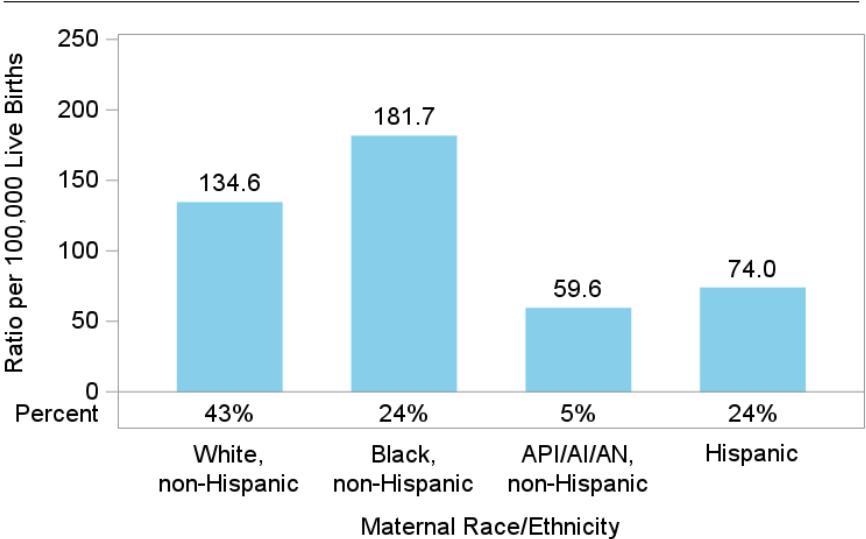
There were 37 pregnancy-associated deaths in 2020, with a ratio of 113.1 per 100,000 live births. The sections below explain the demographics, underlying causes of death, and drug overdose deaths that are associated with pregnancy-associated deaths in 2020. Data for 2020 are preliminary and subject to changes.

Demographics

In 2020, 37% of all births to Nevada mothers were Hispanic, followed by White, non-Hispanic (36%), Black, non-Hispanic (15%), and Asian/Pacific Islander/American Indian/American Native (API/AI/AN), non-Hispanic (10%).

Figure 3 illustrates that Black, non-Hispanic women had the highest pregnancy-associated death ratio at 181.7 per 100,000 live births and 24% of the pregnancy-associated deaths. Asian/Pacific Islander/American Indian/American Native (API/AI/AN), non-Hispanic women had lowest death ratio at 59.6 per 100,000 live births, accounting for 5% of all deaths.

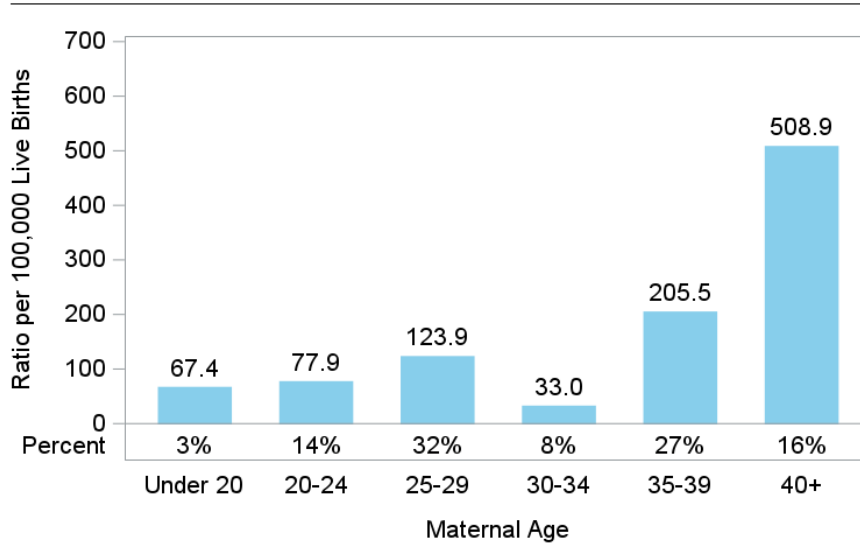
Figure 3. Pregnancy-Associated Death Ratio and Percent by Race/Ethnicity Nevada, 2020



2020 data are preliminary and subject to changes.

Figure 4 illustrates that women aged 40 and older had the highest pregnancy-associated death ratio at 508.9 per 100,000 live births, followed by women aged 35-39 at a ratio of 205.5 per 100,000 live births. Forty-three percent of the deaths occurred among women aged 35 and older.

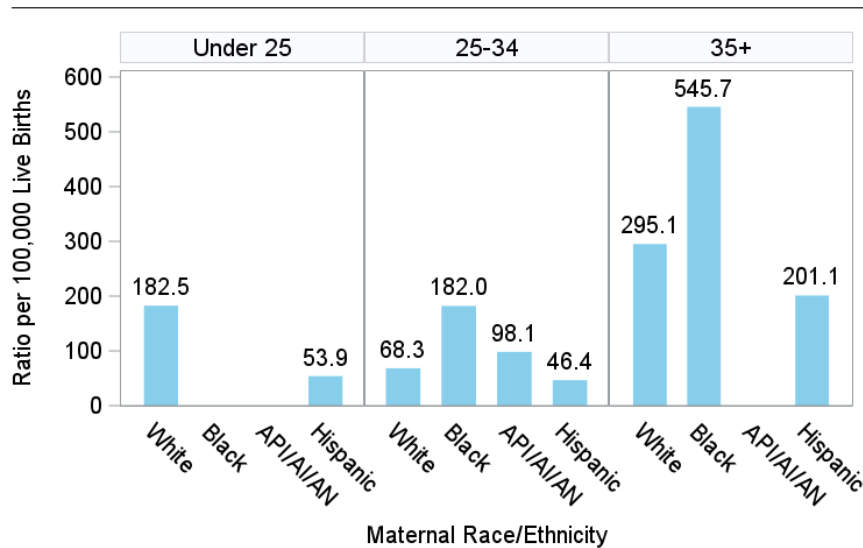
Figure 4. Pregnancy-Associated Death Ratio and Percent by Maternal Age Nevada, 2020



2020 data are preliminary and subject to changes.

Figure 5 illustrates the pregnancy-associated death ratio for each race and ethnicity within the age groups of under 25, 25-34, and 35 and older. For women aged 25 to 34, and 35 and older, Black, non-Hispanic women had the highest death ratio, at 182.5 per 100,000 live births and 545.7 per 100,000 live births, respectively. For women aged 25 and under, White non-Hispanic women had the highest death ratio at 182.5 per 100,000 live births.

Figure 5. Pregnancy-Associated Death Ratio by Maternal Age and Race/Ethnicity, Nevada, 2020

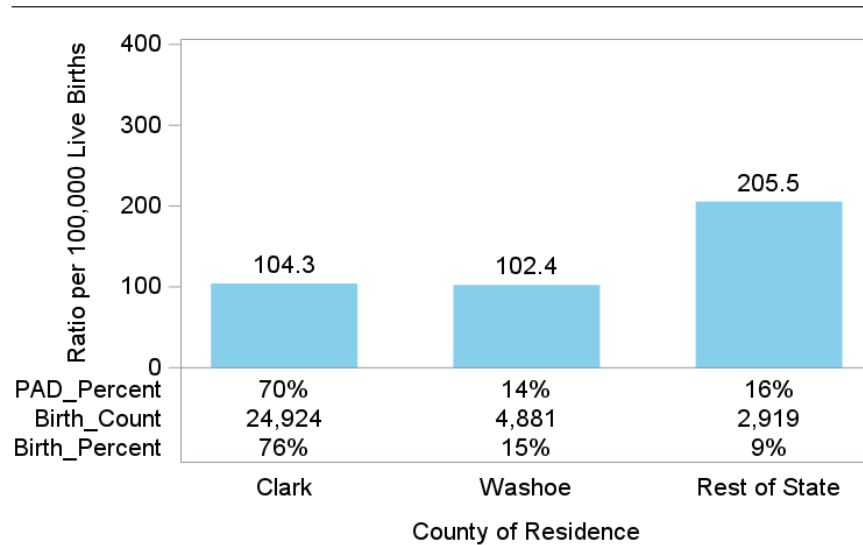


2020 data are preliminary and subject to changes.

Figure 6 shows that 70% of pregnancy-associated deaths occurred in Clark County. The Rest of State had the highest pregnancy-associated death ratio at 205.5 per 100,000 live births. Counties in the category

of Rest of State include Carson City, Churchill, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Pershing, Storey, and White Pine.

Figure 6. Pregnancy-Associated Death Ratio by County of Residence Nevada, 2020



2020 data are preliminary and subject to changes.

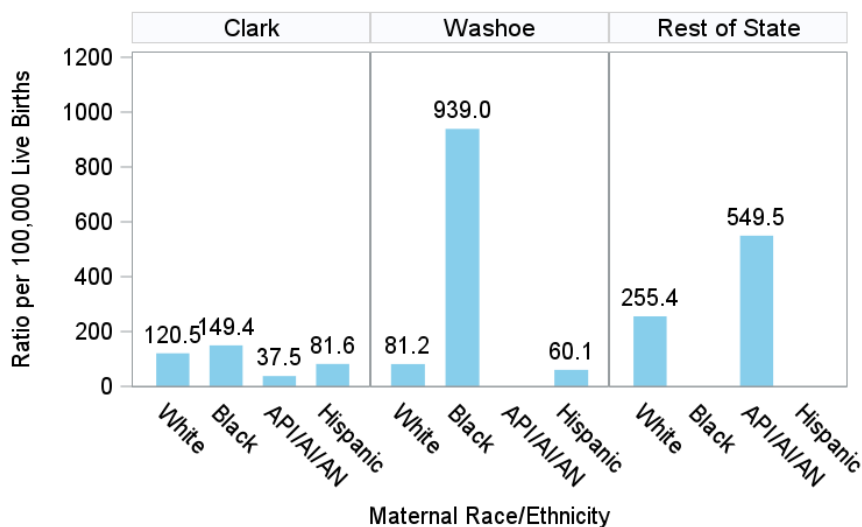
Table 1 lists counts of maternal mortalities by race and ethnicity group and resident county. Figure 7 illustrates the pregnancy-associated death ratio for each race and ethnicity group within Clark County, Washoe County, and Rest of State. In Clark County and Washoe County, Black, non-Hispanic women had the highest ratio at 149.4 per 100,000 live births and 939.0 per 100,000 live births, respectively. Please note that the disparity in the rate of Black, non-Hispanic maternal mortalities in Washoe County is due to the small population. In Rest of State, Asian/Pacific Islander/American Indian/American Native (API/AI/AN), non-Hispanic women had the highest ratio at 549.5 per 100,000 live births.

Table 1. Maternal Mortality counts by Race/Ethnicity and Resident County, Nevada, 2020*

| Maternal Race/Ethnicity | Maternal Resident County | | |
|-------------------------|--------------------------|--------|---------------|
| | Clark | Washoe | Rest of State |
| White | 9 | 2 | 5 |
| Black | 7 | 2 | 0 |
| API/AI/AN | 1 | 0 | 1 |
| Hispanic | 8 | 1 | 0 |
| Unknown | 1 | 0 | 0 |

**2020 data are preliminary and subject to changes.*

Figure 7. Pregnancy-Associated Death Ratio by Residence County and Race/Ethnicity, Nevada, 2020

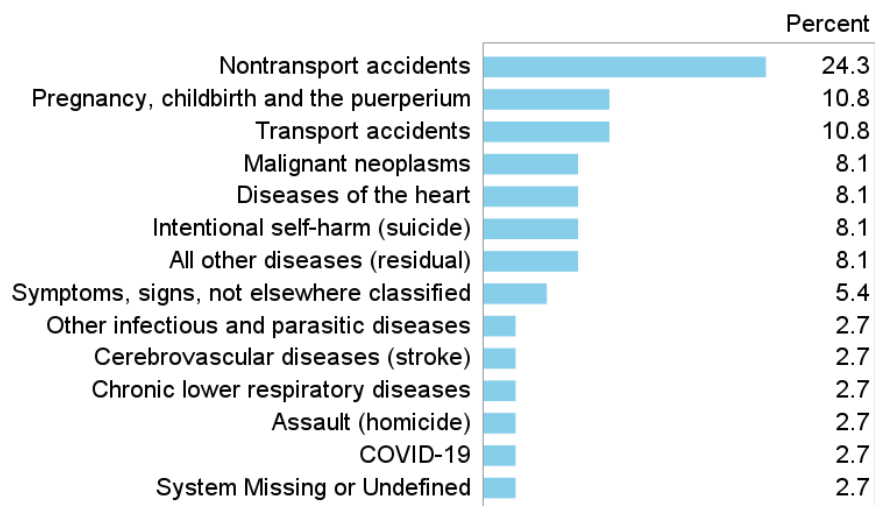


2020 data are preliminary and subject to changes.

Underlying Cause of Pregnancy-Associated Deaths

In 2020, the most common single cause of death was nontransport accidents, accounting for 24.3% of all pregnancy-associated deaths. The second most common death cause was both pregnancy, childbirth and the puerperium, and transport accidents, each accounting for 10.8% of all deaths. All nontransport accidents deaths were due to unintentional drug overdose.

Figure 8. Underlying Causes of Death of Pregnancy-Associated Deaths Nevada, 2020

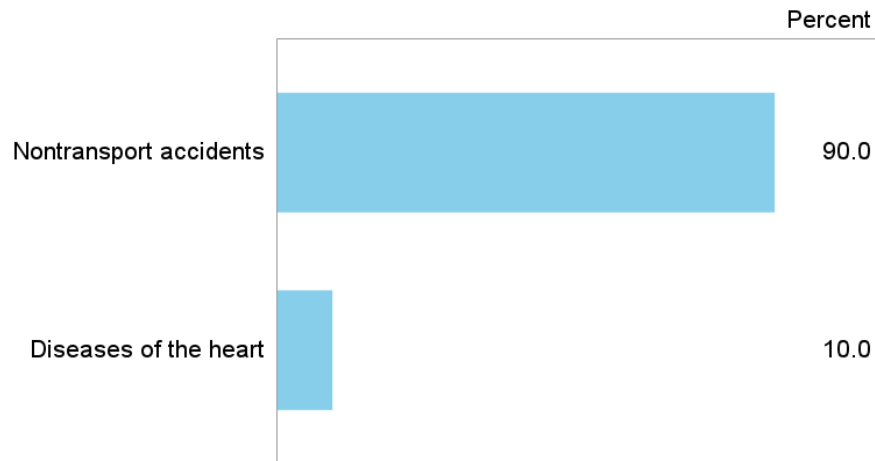


2020 data are preliminary and subject to changes.

Drug Overdose Deaths

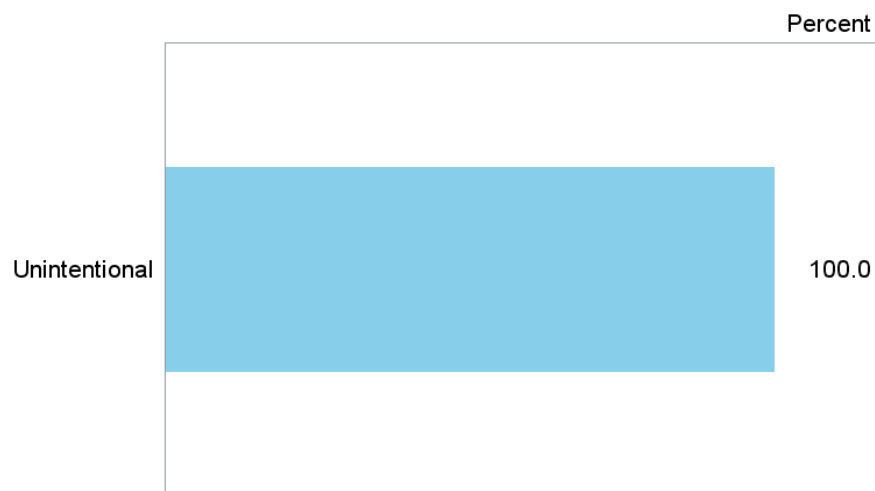
Drug overdose deaths were identified using the following underlying and contributing ICD-10 cause of death codes: X40-X44 (unintentional), X60-X64 (suicide), X85 (homicide), and Y10-Y14 (undetermined). Figure 9 shows 90.0% of drug overdose deaths had nontransport accidents as underlying death cause, and Figure 10 shows that all drug overdose deaths were unintentional deaths.

Figure 9. Drug Overdose Deaths by Underlying Cause of Death, Nevada, 2020



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). 2020 data are preliminary and subject to changes.

Figure 10. Drug Overdose Deaths by Intention, Nevada, 2020

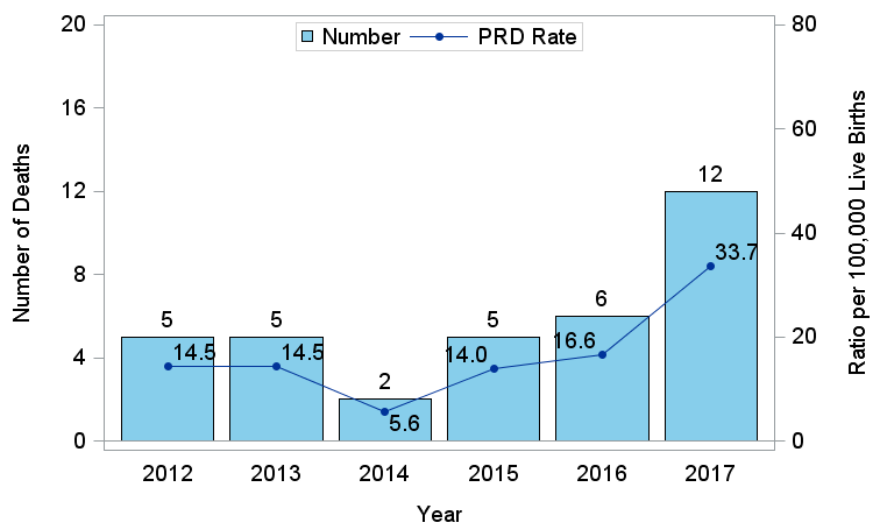


Drug overdose deaths are identified using underlying and contributing ICD-10 cause-of-death codes: X40-X44(unintentional), X60-X64(suicide), X85(homicide), and Y10-Y14(undetermined). 2020 data are preliminary and subject to changes.

Pregnancy-Related Deaths from Pregnancy Mortality Surveillance System (PMSS)

There were 35 pregnancy-related deaths for Nevada residents from 2012 to 2017, according to data from PMSS. There was no consistent increasing or decreasing trend in the pregnancy-related death ratio, with the highest ratio in 2017, at 33.7 per 100,000 live births. There were 18 pregnancy-related deaths, with a ratio of 25.1 per 100,000 live births from 2016 to 2017. The sections below explain the demographics and causes of death that are associated with pregnancy-related deaths from 2016 to 2017.

Figure 11. Pregnancy-Related Death Ratio per 100,000 Live Births and Number of Deaths, Nevada, 2012 - 2017

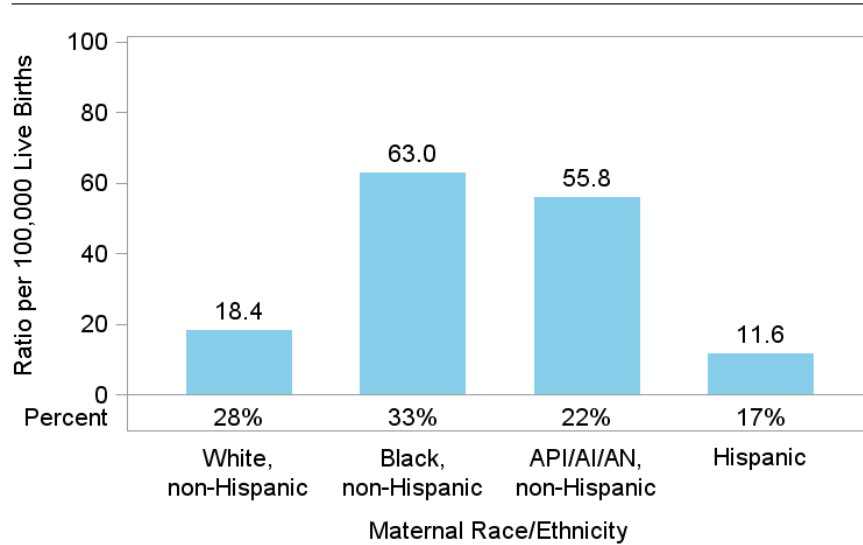


Data Source: Pregnancy Mortality Surveillance System (PMSS).

Demographics

Figure 12 shows that Black, non-Hispanic women had highest pregnancy-related death ratio at 63.0 per 100,000 live births and 33% of the pregnancy-related deaths occurred among Black, non-Hispanic women. Hispanic women had lowest death ratio at 11.6 per 100,000 live births, accounting for 17% of all deaths.

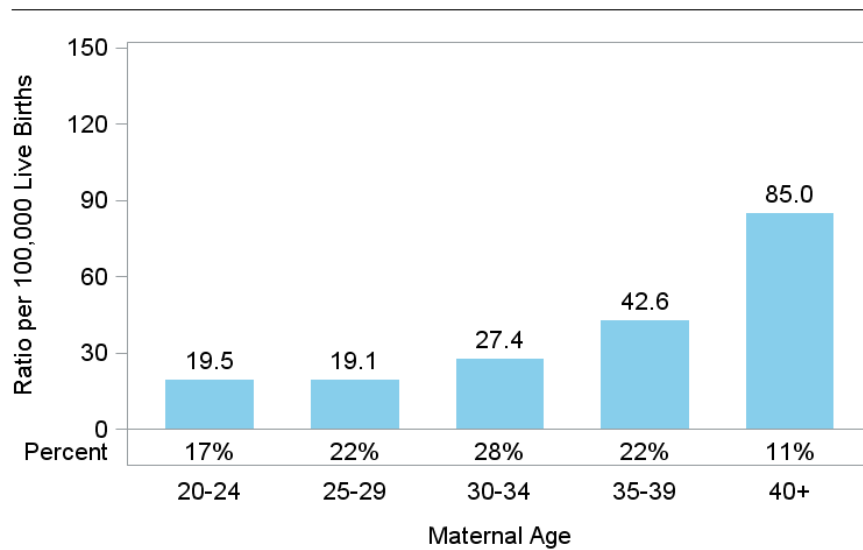
Figure 12. Pregnancy-Related Death Ratio and Percent by Race/Ethnicity Nevada, 2016 - 2017



Data Source: Pregnancy Mortality Surveillance System (PMSS).

Figure 13 illustrates women aged 40 and older had the highest pregnancy-related death ratio at 85.0 per 100,000 live births, followed by women aged 35-39 at a ratio of 42.6 per 100,000 live births. Thirty-three percent of the deaths occurred among women aged 35 and older.

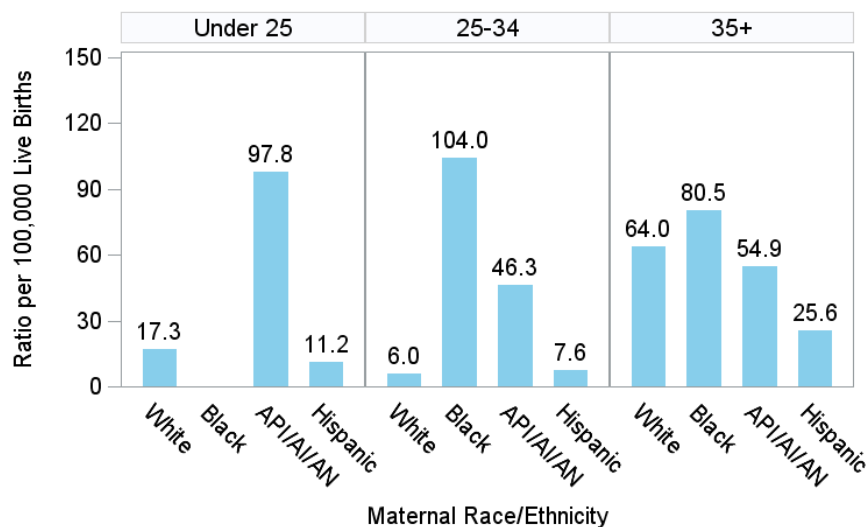
Figure 13. Pregnancy-Related Death Ratio and Percent by Maternal Age Nevada, 2016 - 2017



Data Source: Pregnancy Mortality Surveillance System (PMSS).

Figure 14 illustrates the pregnancy-related death ratio for each race and ethnicity within age groups of under 25, 25-34, and 35 and older. For women aged 25 to 34 and 35 and older, Black non-Hispanic women had the highest death ratio, at 104.0 per 100,000 live births and 80.5 per 100,000 live births, respectively. For women 25 and under, Asian/Pacific Islander/American Indian/American Native, non-Hispanic women had the highest death ratio at 97.8 per 100,000 live births.

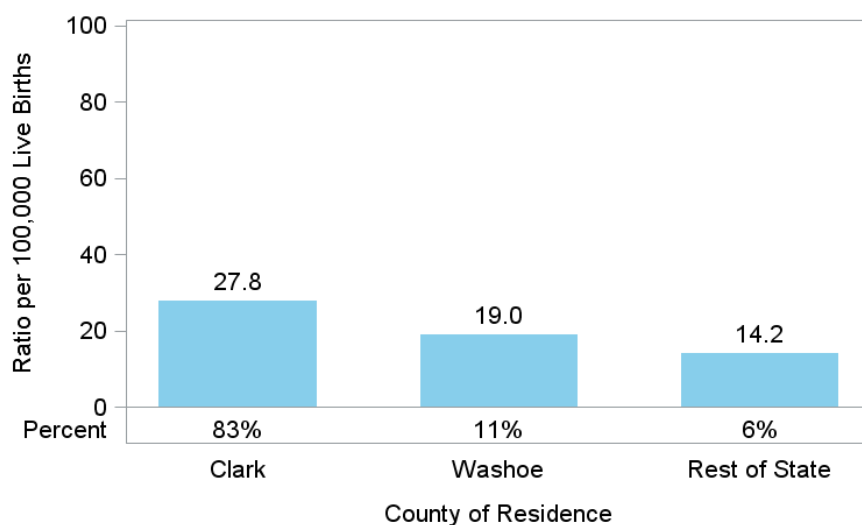
Figure 14. Pregnancy-Related Death Ratio by Maternal Age and Race/Ethnicity, Nevada, 2016 - 2017



Data Source: Pregnancy Mortality Surveillance System (PMSS).

Figure 15 shows that Clark County had the highest pregnancy-related death ratio at 27.8 per 100,000 live births, accounting for 83% of all pregnancy-related deaths.

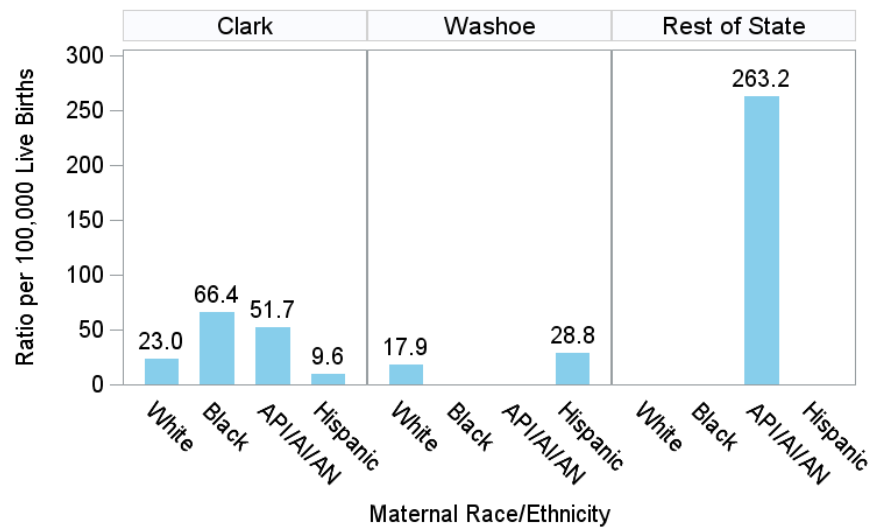
Figure 15. Pregnancy-Related Death Ratio by County of Residence Nevada, 2016 - 2017



Data Source: Pregnancy Mortality Surveillance System (PMSS).

Figure 16 illustrates pregnancy-related death ratio for each race and ethnicity group within Clark County, Washoe County and Rest of State. In Clark County Black, non-Hispanic women had the highest ratio at 66.4 per 100,000 live births. While in Washoe County Hispanic women had the highest ratio at 28.8 per 100,000 live births. In Rest of State, Asian/Pacific Islander/American Indian/American Native, non-Hispanic women had the highest ratio at 263.2 per 100,000 live births.

Figure 16. Pregnancy-Related Death Ratio by Residence County and Race/Ethnicity, Nevada, 2016 - 2017

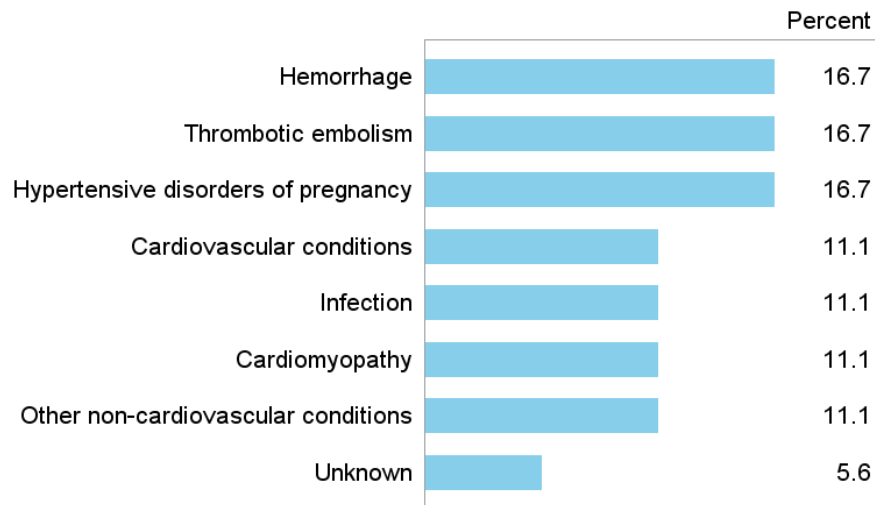


Data Source: Pregnancy Mortality Surveillance System (PMSS).

Cause of Pregnancy-Related Deaths

During 2016 and 2017, the most common death causes of pregnancy-related deaths were hemorrhage, thrombotic embolism, and hypertensive disorders of pregnancy, each accounting for 16.7% of all pregnancy-related deaths.

Figure 17. Cause of Death of Pregnancy-Related Deaths, Nevada, 2016 - 2017

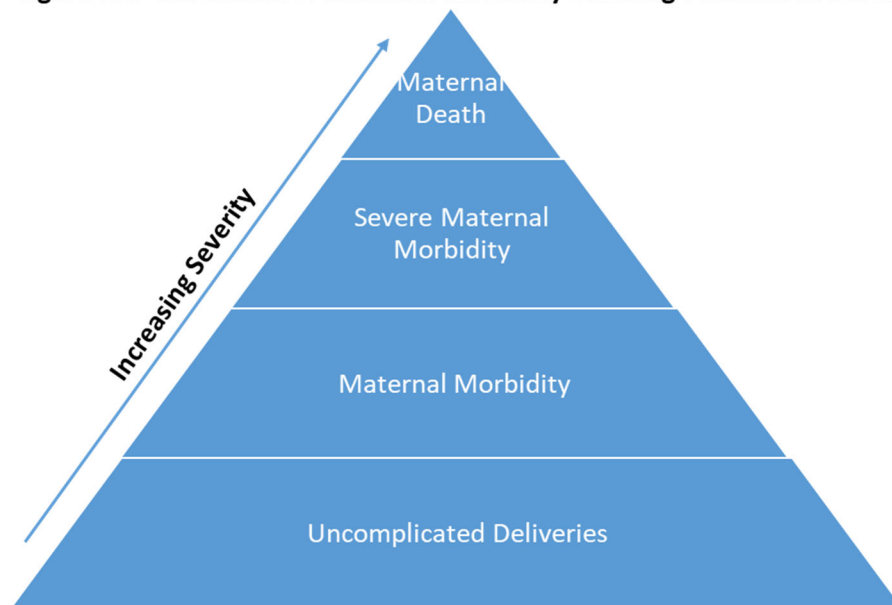


Data Source: Pregnancy Mortality Surveillance System (PMSS).

Severe Maternal Morbidity (SMM)

Figure 18 below illustrates the maternal morbidity continuum. The Health Resources Services Administration (HRSA) reports that SMM has increased by about 75% over the past decade⁴, while the Centers for Disease Control and Prevention (CDC) reports that it has been steadily increasing in recent years and affected more than 50,000 women in the United States in 2014.⁵ The overall rate of SMM per 10,000 deliveries increased almost 200% over the years, from 49.5 in 1993 to 144.0 in 2014.⁵ This increase has been mostly driven by blood transfusion.⁵ A blood transfusion in this context refers to the procedure in which women are given donated blood around their delivery hospitalization. The rate of blood transfusions per 10,000 deliveries increased from 24.5 in 1993 to 122.3 in 2014.⁵ After excluding blood transfusions, the rate of SMM per 10,000 deliveries increased by about 20% over time, from 28.6 in 1993 to 35.0 in 2014.⁵

Figure 18. Continuum of Maternal Morbidity Showing Variation in Severity



Methodology

Data Sources

Nevada Electronic Birth Registration 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 mother's age, race and education, and information about the pregnancy, such as parity and prenatal care.

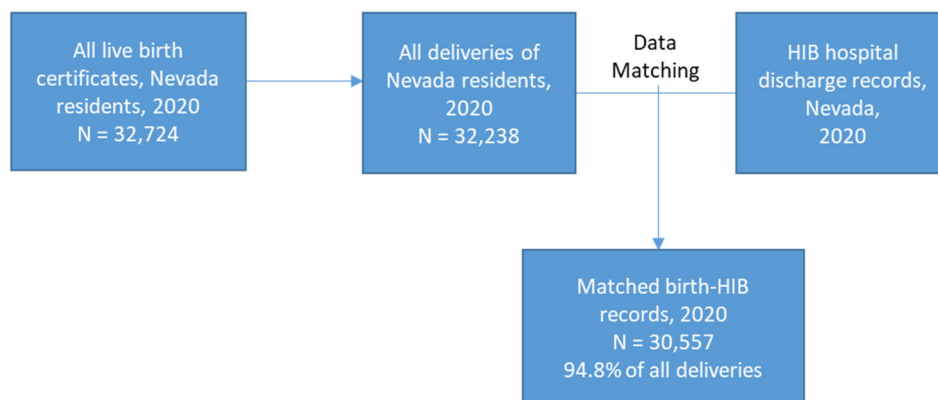
Hospital Inpatient Billing (HIB) Data: The Hospital Inpatient Billing data provides health billing data for patients discharged from Nevada's non-federal hospitals. NRS 449.485 mandates all hospitals in Nevada report information as prescribed by the director of the Department of Health and Human Services. The data are collected using a standard universal billing form. The data are for patients who were admitted

for at least 24 hours as an inpatient, but do not include patients who were discharged from the emergency room. The data includes demographics such as age, 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.

Data Matching

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 when there was a multiple birth). The total number of live births to Nevada residents was 32,724 in 2020. The total number of all live deliveries was 32,238, comprising all records from singleton births and one record per multiple births. Approximately 94.8% of all live deliveries were matched with a hospital discharge record. All analyses are based on matched data (n=30,557). Birth certificates and hospital discharge records were matched on 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 number, misspelled names, etc. Data of 2020 are preliminary and subject to changes.

Figure 19. Data Matching Process for Birth Certificates and HIB Records, Nevada, 2020



Identification of Severe Maternal Morbidity (SMM)

SMM events were identified during delivery hospitalizations using an algorithm developed by researchers at the CDC.⁶ 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 were 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.
- 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 tests and bivariate logistic regression were used to test the significance of the association between maternal characteristics and SMM. The analyses in the report includes blood transfusion in the calculation of SMM 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.

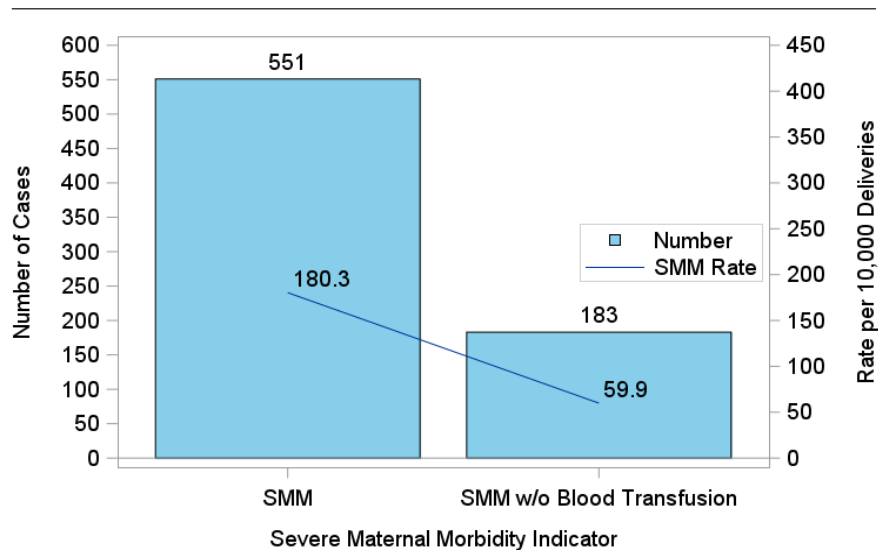
All analyses were conducted using SAS 9.4.

Findings

Leading Indicators

There were a total of 551 cases of SMM in 2020 with rate of 180.3 per 10,000 deliveries. If blood transfusion was not included in the calculation, SMM cases dropped to 183 and rate dropped to 59.9 per 10,000 deliveries.

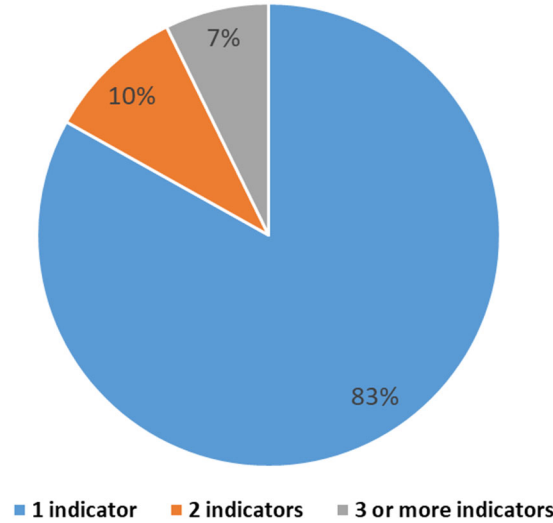
Figure 20. Severe Maternal Morbidity Rate per 10,000 Deliveries and Number of Cases, Nevada, 2020



2020 data are preliminary and subject to changes.

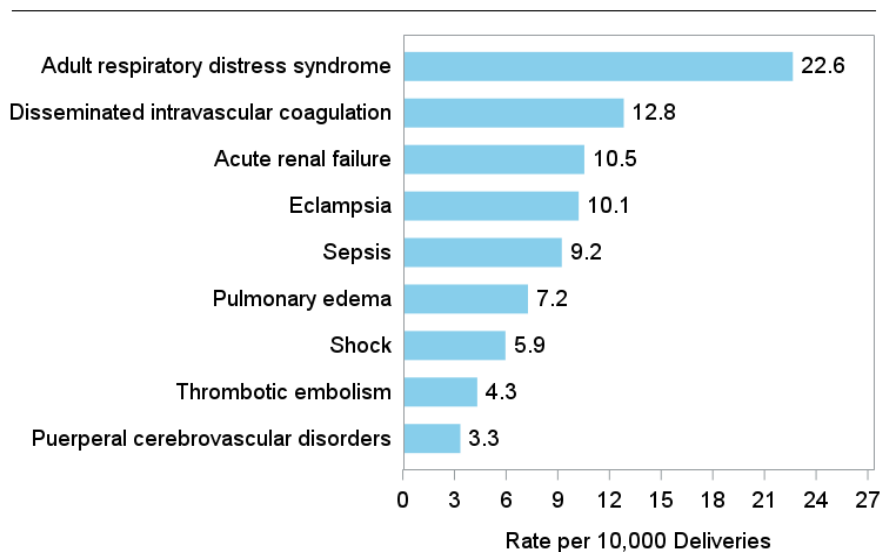
The majority of deliveries with SMM (83%) had one indicator (out of a total of 21 SMM indicators), ten percent of deliveries had two indicators and seven percent had three or more indicators present.

Figure 21. Distribution of Severe Maternal Morbidity Indicators, Nevada, 2020



The leading diagnosis-based indicators of SMM were adult respiratory distress syndrome (22.6 per 10,000 deliveries), disseminated intravascular coagulation (12.8 per 10,000 deliveries), acute renal failure (10.5 per 10,000 deliveries), eclampsia (10.1 per 10,000 deliveries), sepsis (9.2 per 10,000 deliveries), pulmonary edema (7.2 per 10,000 deliveries), and shock (5.9 per 10,000 deliveries). See Appendix A for a complete list and description of SMM indicators. Around 30% of adult respiratory distress syndrome cases were confirmed COVID-19 cases in 2020.⁷

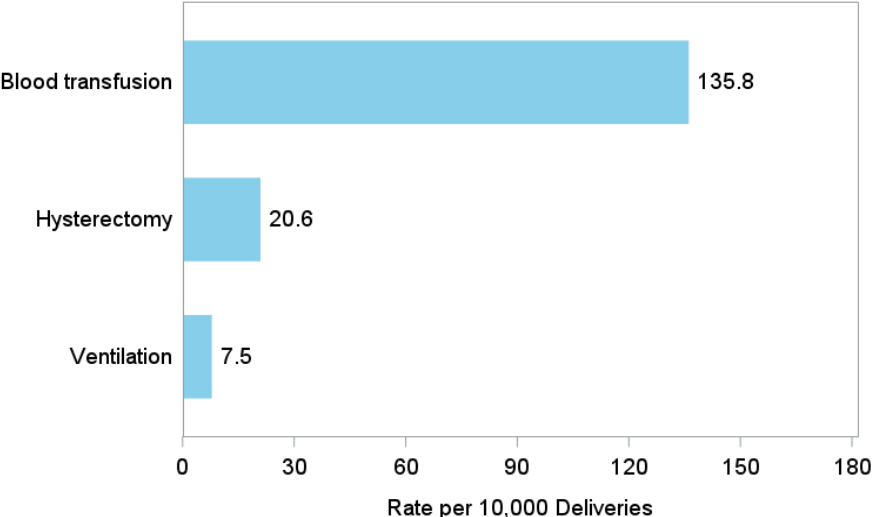
Figure 22. Leading Diagnosis-Based Indicators of Severe Maternal Morbidity, Nevada, 2020



2020 data are preliminary and subject to changes.

Leading procedure-based indicators of SMM were blood transfusion (135.8 per 10,000 deliveries), hysterectomy (20.6 per 10,000 deliveries) and ventilation (7.5 per 10,000 deliveries). See Appendix A for a complete list and description of SMM indicators.

Figure 23. Leading Procedure-Based Indicators of Severe Maternal Morbidity, Nevada, 2020



2020 data are preliminary and subject to changes.

Table 2. Rate of Severe Maternal Morbidity Indicators per 10,000 Deliveries, Nevada, 2020**

| SMM Indicator | Rate per 10,000 Deliveries |
|---|----------------------------|
| Diagnosis-based Indicators | |
| Adult respiratory distress syndrome | 22.6 |
| Disseminated intravascular coagulation | 12.8 |
| Acute renal failure | 10.5 |
| Eclampsia | 10.1 |
| Sepsis | 9.2 |
| Pulmonary edema | 7.2 |
| Shock | 5.9 |
| Thrombotic embolism | 4.3 |
| Puerperal cerebrovascular disorders | 3.3 |
| Cardiac arrest/ventricular fibrillation | 1.3 |
| Sickle cell anemia with crisis | 1.0 |
| Acute myocardial infarction | 0.7 |
| Aneurysm | 0.7 |
| Amniotic fluid embolism | - |
| Heart failure during procedure or surgery | - |
| Internal injuries of the thorax, abdomen, and pelvis* | - |
| Intracranial injuries* | - |
| Severe anesthesia complications | - |
| Procedure-based Indicators | |
| Blood transfusion | 135.8 |
| Hysterectomy | 20.6 |
| Ventilation | 7.5 |
| Conversion of cardiac rhythm | 0.7 |
| Temporary Tracheostomy | 0.3 |
| Cardio monitoring* | - |
| Operations on the heart and pericardium* | - |
| SMM Rate Overall | 180.3 |

* 4 indicators were not carried over to ICD-10-CM codes system from ICD-9-CM.

** 2020 data are preliminary and subject to changes.

Maternal Demographic Characteristics

Table 3. Severe Maternal Morbidity by Maternal Demographics, Nevada, 2020*

| Demographic | SMM Cases | Rate per 10,000 Deliveries | Total Deliveries | Percent of Total Deliveries | Percent of SMM Cases | Chi-Square P-value |
|------------------------------|-----------|----------------------------|------------------|-----------------------------|----------------------|--------------------|
| Maternal Age | | | | | | |
| <=19 | 25 | 174.8 | 1,430 | 4.7% | 4.5% | 0.0042 |
| 20-24 | 92 | 153.4 | 5,999 | 19.6% | 16.7% | |
| 25-29 | 150 | 166.4 | 9,017 | 29.5% | 27.2% | |
| 30-34 | 148 | 174.8 | 8,467 | 27.7% | 26.9% | |
| 35-39 | 104 | 229.2 | 4,538 | 14.9% | 18.9% | |
| >=40 | 32 | 289.3 | 1,106 | 3.6% | 5.8% | |
| Unknown | 0 | 0.0 | 0 | 0.0% | 0.0% | |
| Race/Ethnicity | | | | | | |
| White non-Hispanic | 160 | 148.1 | 10,801 | 35.3% | 29.0% | <.0001 |
| Black non-Hispanic | 129 | 276.4 | 4,667 | 15.3% | 23.4% | |
| AI/AN non-Hispanic | 5 | 211.9 | 236 | 0.8% | 0.9% | |
| API non-Hispanic | 55 | 186.8 | 2,945 | 9.6% | 10.0% | |
| Hispanic | 195 | 168.4 | 11,581 | 37.9% | 35.4% | |
| Other | 0 | 0.0 | 67 | 0.2% | 0.0% | |
| Unknown | 7 | 269.2 | 260 | 0.9% | 1.3% | |
| Education | | | | | | |
| Less than High School | 89 | 207.8 | 4,282 | 14.0% | 16.2% | 0.0061 |
| High School Graduate | 199 | 197.6 | 10,071 | 33.0% | 36.1% | |
| Some College | 141 | 165.2 | 8,536 | 27.9% | 25.6% | |
| College Graduate or Higher | 88 | 134.3 | 6,552 | 21.4% | 16.0% | |
| Unknown | 34 | 304.7 | 1,116 | 3.7% | 6.2% | |
| Insurance[^] | | | | | | |
| Medicaid | 274 | 199.3 | 13,751 | 45.0% | 49.7% | 0.0308 |
| Other Government | 16 | 293.0 | 546 | 1.8% | 2.9% | |
| Private | 244 | 159.9 | 15,259 | 49.9% | 44.3% | |
| Self-pay | 14 | 184.5 | 759 | 2.5% | 2.5% | |
| Other | 3 | 128.8 | 233 | 0.8% | 0.5% | |
| Unknown | 0 | 0.0 | 9 | 0.0% | 0.0% | |

[^] Health insurance status indicates the primary payer for the delivery as recorded on hospital discharge form.

*2020 data are preliminary and subject to changes.

When considering the SMM rate including blood transfusions, the SMM is significantly associated with maternal age ($p = 0.0042$) maternal race and ethnicity ($p < .0001$), education ($p = 0.0061$), and health insurance status ($p = 0.0308$).

Prenatal and Delivery Characteristics

Table 4. Severe Maternal Morbidity by Prenatal and Delivery Characteristics, Nevada, 2020**

| Indicator | SMM Cases | Rate per 10,000 Deliveries | Total Deliveries | Percent of Total Deliveries | Percent of SMM Cases | Chi-Square P-value |
|----------------------------------|-----------|----------------------------|------------------|-----------------------------|----------------------|--------------------|
| Prenatal Care Initiation | | | | | | |
| No Care | 0 | 0.0 | 0 | 0.0% | 0.0% | 0.0659 |
| First Trimester | 359 | 156.9 | 22,883 | 74.9% | 65.2% | |
| Second Trimester | 79 | 193.2 | 4,088 | 13.4% | 14.3% | |
| Third Trimester | 22 | 254.0 | 866 | 2.8% | 4.0% | |
| Unknown Start Date | 3 | 149.3 | 201 | 0.7% | 0.5% | |
| Unknown | 88 | 349.3 | 2,519 | 8.2% | 16.0% | |
| Adequacy of Prenatal Care | | | | | | |
| Inadequate | 57 | 197.2 | 2,891 | 9.5% | 13.5% | 0.0004 |
| Intermediate | 31 | 128.0 | 2,422 | 7.9% | 7.3% | |
| Adequate | 166 | 135.5 | 12,248 | 40.1% | 39.2% | |
| Adequate Plus | 205 | 200.0 | 10,249 | 33.5% | 48.5% | |
| Data Missing/Unknown | 92 | 334.9 | 2,747 | 9.0% | 21.7% | |
| Parity | | | | | | |
| 0 Previous Live Births | 216 | 183.1 | 11,799 | 38.6% | 39.2% | <.0001 |
| 1 Previous Live Births | 110 | 125.2 | 8,787 | 28.8% | 20.0% | |
| 2+ Previous Live Births | 224 | 225.4 | 9,936 | 32.5% | 40.7% | |
| Unknown | 1 | 285.7 | 35 | 0.1% | 0.2% | |
| Method of Delivery* | | | | | | |
| Repeat Cesarean | 124 | 326.5 | 3,798 | 16.6% | 22.5% | <.0001 |
| Primary Cesarean | 157 | 409.2 | 3,837 | 16.7% | 28.5% | |
| Vaginal | 142 | 92.8 | 15,307 | 66.7% | 25.8% | |
| Plurality | | | | | | |
| Singleton Birth | 515 | 171.2 | 30,076 | 98.4% | 93.5% | <.0001 |
| Multiple Birth | 36 | 748.4 | 481 | 1.6% | 6.5% | |
| Pre-Pregnancy BMI~ | | | | | | |
| Underweight (<18.5) | 21 | 206.5 | 1,017 | 3.3% | 3.8% | 0.1589 |
| Normal Weight (18.5 - 24.9) | 187 | 153.9 | 12,152 | 39.8% | 33.9% | |
| Overweight (25.0 - 29.9) | 135 | 169.7 | 7,957 | 26.0% | 24.5% | |
| Class I (30.0 - 34.9) | 93 | 196.3 | 4,737 | 15.5% | 16.9% | |
| Class II (35.0 - 39.9) | 49 | 216.0 | 2,269 | 7.4% | 8.9% | |
| Class III (>=40) | 31 | 201.4 | 1,539 | 5.0% | 5.6% | |
| Unknown | 35 | 395.0 | 886 | 2.9% | 6.4% | |
| Chronic Disease^ | | | | | | |
| No Chronic Disease | 519 | 175.3 | 29,611 | 96.9% | 94.2% | 0.0002 |
| Any Chronic Disease | 32 | 338.3 | 946 | 3.1% | 5.8% | |

* Method of delivery was identified from hospital discharge data using ICD-10 codes.

~ Pre-pregnancy BMI was calculated using formula (weight (lb.) / height (in)^2) x 703 with mother's weight and height as recorded on birth certificate.

^ Any chronic disease includes deliveries to women with chronic hypertension, pre-existing diabetes or chronic heart disease as recorded on birth certificate.

** 2020 data are preliminary and subject to changes.

When considering the SMM rate including blood transfusions, the SMM is significantly associated with adequacy of prenatal care ($p = 0.0004$), parity ($p = <.0001$), method of delivery ($p = <.0001$), plurality ($p = <0.0001$), and maternal chronic disease status ($p = 0.0002$).

Conclusions

The pregnancy-associated death ratio was 113.1 per 100,000 births in Nevada in 2020. Black, non-Hispanic women had the highest pregnancy-associated death ratio at 181.7 per 100,000 live births and 24% of the pregnancy-associated deaths. Women aged 40 and older had the highest pregnancy-associated death ratio at 508.9 per 100,000 live births. Nontransport accidents were the most common cause of pregnancy-associated deaths, accounting for 24% of deaths.

The SMM rate for Nevada was 180.3 per 10,000 deliveries in 2020. The leading indicators include blood transfusion, hysterectomy, adult respiratory distress syndrome, disseminated intravascular coagulation, acute renal failure, eclampsia, sepsis, ventilation, pulmonary edema, and shock. Mother's age, race/ethnicity, education, and health insurance status are risk factors of SMM. Prenatal and delivery characteristics such as adequacy of prenatal care, parity, method of delivery, plurality, and chronic disease are all risk factors of SMM.

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Appendix A. Complete List of SMM Indicators and Associated ICD-10-CM Code

| 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 | OUT90ZZ, OUT94ZZ, OUT97ZZ, OUT98ZZ, OUT9FZZ, OUT9OZL |
| | Temporary tracheostomy | OB110Z4, OB110F4, OB113Z4, OB113F4, OB114Z4, OB114F4 |
| | Ventilation | 5A1935Z, 5A1945Z, 5A1955Z |