

# Technical Overview for Montana Vital Statistics Annual Reports

## VITAL REGISTRATION AND DATA COLLECTION

Registration of births, deaths, fetal deaths, marriages, and divorces is a legal requirement ([MCA 50-15-108](#), [MCA 50-15-221](#), and [MCA 50-15-403](#)) that results in permanent legal documents. Birth certificates must be filed with the local registrar within ten days of the event. The attending physician, midwife, or parent must file the certificate in the county in which the birth occurred. Funeral directors or others in charge of disposition of the body are responsible for filing death or fetal death certificates. The certificates must be filed with DPHHS or the county's local registrar no later than ten days after the date of death or, if the date is unknown, ten days after the death is discovered. A fetal death certificate must be filed when the fetus weighed 350 grams or more or, if the weight was unknown, when the period of gestation was determined to be 20 completed weeks or more. Marriage and marital termination must be reported by the clerk of the district court in each county before the tenth day of the following month. The Abortion Control Act ([MCA 50-20-110](#)) makes any induced abortion occurring in Montana a reportable event. Facilities performing induced abortions are responsible for reporting to DPHHS within 30 days of the event.

Original copies of fetal death certificates, reports of induced abortion, marriage, and marital termination, birth, and death certificates are forwarded to the Office of Vital Records (OVR), which supplies electronic copies of these events to the

Epidemiology and Scientific Support Bureau (ESSB) for surveillance and further analysis. All birth, death, and fetal death certificates for events occurring in Montana are permanently filed with and maintained by OVR.

Reports of marital termination have been collected and edited by the Montana justice system and forwarded electronically to the OVR since October 1998. OVR staff check all records and reports for accuracy and completeness and, when they are not acquired electronically, code them for data entry. Those data that are not received electronically are key-entered and records of all these events, regardless of how they are acquired, are maintained in the electronic files of Montana's Vital Statistics System.

The OVR designs vital certificate and report forms to meet all legal registration and reporting requirements and to provide statistical data to federal, state, and local government agencies, as well as many private organizations, modifying these forms as information requirements change. The following statistical data on these vital events are available in electronic files for analysis for events occurring in 1989 thru the current year:

## TECHNICAL OVERVIEW

### NATALITY (birth records)

Date, hour, and place of birth.

Age, race, Hispanic origin, education, and state of birth of the parents, place of residence and marital status of the mother.

Pregnancy history, including number of prior pregnancies and their outcomes, date of last prior pregnancy, date of last normal menses and obstetric estimate of length of gestation, date at which prenatal care began and ended, and number of prenatal visits, medical risk factors of the mother during the pregnancy, tobacco and alcohol use during pregnancy, and the mother's weight gain.

Birth process (including whether the mother was transferred to another hospital), obstetric procedures, maternal risk factors for the pregnancy, method of delivery, and maternal morbidity.

Infant's sex, plurality, birth order, weight, and APGAR scores; abnormalities and congenital anomalies of the newborn, whether the infant was transferred to another hospital. Starting with data for 2008, the files also contain infections present and/or treated during the pregnancy, various characteristics of labor and delivery, maternal morbidity, payer for the birth, whether the mother was participating in the WIC program, and whether the infant was being breastfed at discharge.

### MORTALITY (death records)

Date, hour, and place of death

Decedent's age at death, sex, race, Hispanic origin, education, marital status, birthplace, and place of residence.

Underlying and multiple causes of death, whether an autopsy was performed and, if so, whether results were available when cause of death was determined, if death resulted from an external cause (accident, suicide, or homicide), the circumstances of the injury, including whether it was sustained at work. Industry and occupation of the decedent, tobacco use as a contributing cause, pregnancy at or near the time of death, and service in the armed forces. These last five items are available for data years 2003 and forward only.

### FETAL MORTALITY

Date, hour, and place of delivery.

Age, race, Hispanic origin, and education of parents, place of residence and marital status of the mother. Sex of fetus

Cause of death, weight, plurality, birth order, and any anomalies of the fetus.

Significant conditions of the mother, including number of prior pregnancies, date and result of last prior pregnancy, date of last normal menses, month in which prenatal care began, number of prenatal visits, maternal risk factors during the pregnancy—medical conditions, tobacco and alcohol use, and weight gain, clinical estimate of gestation, obstetric procedures, complications of labor and delivery, method of delivery. Starting with data for 2008, the files also contain infections present and/or treated during the pregnancy, and maternal morbidity.

### INDUCED ABORTION

Date, and place of procedure.

Age, race, Hispanic origin, education, marital status, birth date, and county of residence of patient.

Pregnancy history, including date of last normal menses, clinical estimate of gestation, and number and result of prior pregnancies.

Primary procedure that terminated pregnancy, additional procedures used, and resulting complications.

**DATA SOURCES AND LIMITATIONS**

**Geographic Allocation**

Vital events may be tabulated by place of residence or place of occurrence. For example, if a resident of Florida is killed in an accident in Montana, the death is counted as a Montana occurrence but not a Montana resident death; it is included in Florida's residence statistics. Births, deaths, and fetal deaths may be tabulated by either place of residence or occurrence. For births and fetal deaths, the place of residence of the newborn or fetus is the usual place of the mother's residence. For deaths, the place of residence is the usual place where the decedent resided. "Place" on a Vital Record is specific to the time of the event documented and does not necessarily indicate the place of exposure to disease or injury.

Residence data for births, deaths, and fetal deaths occurring outside Montana are available because of a cooperative, interstate transcript-exchange agreement. All states and Canadian provinces participate in this agreement under the auspices of the National Association for Public Health Statistics and Information Systems (NAPHSIS). Interstate data on induced abortions are available for only a few states and tables in the vital statistics annual report reflect only induced abortions provided in Montana, except those in Table S-5. The resident statistics in this table refer only to Montana residents who received abortions in Montana.

While we can identify most of the nonresidents marrying in Montana, we do not know how many Montana residents marry outside of the state, nor do we know of residency changes associated with marital terminations. No exchange agreement is in effect for records of marriages or marital terminations. Tabulations

of these events are thus only by Montana occurrence. Data on marital terminations are limited to Montana decrees involving at least one Montana resident and are tabulated as occurrences in the Montana county in which the decree was issued.

Throughout the annual report table and figure titles will indicate if statistics are for Montana occurrence or Montana residents.

**Cause of Death Certification**

The medical certification section of the Montana death certificate asks for information on the cause and sequence of events leading to death. The certifier (certifying physician, physician's assistant, or coroner) completes this section of the death certificate. It consists of two major parts, along with additional information. Part I is used for reporting the conditions leading directly to death and, for each, the interval between onset of the condition and death. Part II is for reporting any important diseases or conditions that contributed to the fatal outcome, but that were not related to the immediate cause of death. Table 1 shows an example of how Part I and Part II may be filled out.

The certifier is also asked to classify the manner of death (natural, homicide, suicide, or accident), whether tobacco use contributed to the death and, if the decedent was female, whether the

**Table 1. Example of cause of death reporting**

Part I. Death was caused by:		Duration
Immediate cause:	Due to (a) postoperative bronchial pneumonia	3 days
	Due to (b) lobectomy	1 week
	Due to (c) primary cancer of lung	1 year
Part II. Other significant conditions		
Hypertensive cardiovascular disease		

decedent was pregnant within the preceding year.

In the case of a traumatic death (homicide, suicide, accident, or legal intervention), the certifier, is also asked to complete a description of the traumatic event that led to the death, as well as date and location. If the event was a traffic accident, the decedent is to be identified as a driver, passenger, pedestrian, or other.

If the coroner cannot decide among these options within the allotted ten days, he or she has the option of filing “pending investigation” and later amending the certificate. If the investigation does not point to one of the three options, the record can be filed “could not be determined”.

The causes of death in this report represent the underlying causes derived from the information provided on Parts I and II and, if the death results from a traumatic event, the additional information discussed above. Each condition or cause reported on death certificates is classified according to the International Statistical Classification of Diseases, Injuries, and Related Health Problems, Tenth Revision, World Health Organization, Geneva, 1992 (ICD-10). Among these codes, the underlying cause is determined using ICD-10 codes and coding procedures developed for nationwide use by the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC), Public Health Services, U.S. Department of Health and Human Services. In the above example, the underlying cause would be lung cancer, ICD-10 code C34.9, “malignant neoplasm of bronchus or lung, area or lobe unspecified.”

In accordance with the rules of NCHS and ICD-

10, when the underlying cause is a traumatic injury, poisoning, or other adverse effects, this report shows tabulations of deaths according to the nature of the event that led to fatal injury, poisoning, or adverse effect rather than the nature of the event’s consequences.

Whenever possible, deaths are classified by the underlying cause reported. Exceptions occur when the underlying cause is not apparent from the certificate and clarification is not available. In these rare instances, the probable underlying cause is determined using a system of rules developed by NCHS.

The Montana Vital Statistics Annual Report analyzed cause of death using the underlying cause of death and NCHS rules for grouping ICD-10 codes into rankable causes of death. In some instances the definitions used from NCHS are different than definitions used by other public health organizations. This may cause differences in the statistics produced with these differing definitions. One such example is with the definition of motor vehicle crash deaths. NCHS includes some ICD-10 codes that are not included in the definition set by the Council for State and Territorial Epidemiologists. As such the motor vehicle crash death count maybe higher in the vital statistics report than the count reported by the injury prevention program.

### **Certification of COVID-19 Deaths**

Early in 2020, NCHS provided guidance in certifying deaths due to COVID-19. Certifiers were instructed to list COVID-19 in Part I of the death certificate when a definitive diagnosis of the disease was made. For cases in where COVID-19 complicated pre-existing medical conditions (e.g., chronic obstructive pulmonary disease or asthma), it was appropriate to report COVID-19 in Part II. Presumed or probable cases where COVID-19 was suspected or likely, were also to be

reported based on the certifiers best clinical judgement.

All tabulations of COVID-19 deaths in this report are by the underlying cause of death (e.g., COVID-19 reported in Part I), consistent with all other diseases in this report.

### **Marriage and Marital Termination**

Data on national marriage and marital termination statistics are limited by differences in data collection and data availability at or below the state level. Marriage, marital termination, and residency and other requirements are defined by the laws of each state. The minimum age for marriage, marriage license requirements, residency requirements for marital termination, acceptable grounds for such termination, and minimum period between marriage and marital termination vary from state to state. These differences can affect the comparability of data in interstate analysis.

Data aggregation is also affected by how data are collected and reported. For most states, including Montana, frequency of marriage is based on marriages performed. For some states, data represent licenses issued.

### **Induced Abortions**

Induced abortions have been reported to the Department since July 1, 1974, when the Montana Abortion Control Act was implemented. States no longer report induced abortions to NCHS, and some states have never collected this information. Few states exchange resident abortion statistics. For these reasons, national abortion rates are estimates based on survey data and incomplete reporting. Furthermore, Montana's complete resident abortion statistics are unknown. Statistics provided in this report are

for those abortions occurring in Montana, and any references to Montana residents must be viewed as incomplete.

### **Population Estimates**

All rates per 1,000 or per 100,000 population in this report are based on population data provided by the U.S. Census Bureau or NCHS. Prior to 2020, this report uses a special series of annual population estimates—U.S. Census Population Estimates with Bridged Race Categories—produced by NCHS, in collaboration with the National Cancer Institute and the Census Bureau (Table P-1). For 2020 and later, this report uses detailed race population estimates produced by the Census Bureau. Population estimates are stratified by age, race, sex, and county and are used in this report to derive statewide fertility rates, abortion rates, and age-specific and age-adjusted mortality rates. ESSB uses the latest available updates of these population estimates for such calculations.

### **Race**

Tabulation of vital events by race is imprecise for several reasons. First, it is difficult to identify a single or predominant race when persons are of mixed race or ancestry, as is the case for many U.S. citizens. A second difficulty with tabulations by race is that the category assignment is based on the opinion of the informant. As such, it may not reflect the same definitions of racial groups from one record to the next.

Hispanic ancestry is reported separately from race. Thus, it may apply to any racial category including "White" and "American Indian." The proportion of persons in Montana reported as being of Hispanic ancestry is so small however (a little less than three percent), that creating racial categories based on combined racial and Hispanic classifications for Montana is unlikely to

yield any useful information.

According to the 2020 Census, about nine out of ten Montanans (85%) considered themselves to be white alone (i.e., indicating no other racial classification). About 6% considered themselves American Indian or Alaska Native (AI) alone. Another 7% of the population considered themselves to be of two or more races. Among people reporting two or more races in Montana nearly half (46%) included American Indian or Alaska Native as one of their races. All other racial groups (alone or in combination with any other race) represent less than 1% of the Montana population each. Thus, this report only includes tabulations for the two largest racial groups, white and American Indian.

Prior to 2003, only one race value for each person was recorded on all vital event records. The recording of multiple races began with Montana death records in 2003, induced abortion and marriage records in 2007, and birth and fetal death records in 2008. Divorce records still contain only single-race items. For records recording multiple races, informants are asked to select one or more of 14 specific racial groups or some other unspecified race. Informants are encouraged to “check one or more races” to indicate to what racial group persons named on the certificate belong or belonged. They are also encouraged to identify ethnic groups or tribal affiliations that apply. The OVR examines each record received for the certificate’s national heritage, including affiliation with a known American Indian tribe, and classifies records accordingly.

Rate calculation shown in this report prior to 2020 are based on a “bridged race” category, in which four racial groups—white, black, American Indian or Alaska native (AI/AN), and

Asian and Pacific islander—are reported. Records for which only a single-race is reported are assigned a bridged category according to the race provided. NCHS “bridges” those records for which two or more races are reported; a representative race is assigned using a probabilistic model described at this [website](#). Bridged race categories are intended for use in the calculation of population-based rates, along with the bridged population estimates mentioned above. For births and fetal deaths, the race of the infant or fetus is defined as the race of the mother.

All other racial classifications shown in the annual report are based on detailed race classification, in which people are counted in each racial group they are identified as even if more than one race group is selected. This will cause some individuals to be counted in more than one race group and the sum of each race group will be more than the total Montana count.

### Limitations of Small Numbers

Rates or trends based on small numbers, perhaps less than 100, must be interpreted with caution. For this reason, small frequencies are often withheld in the annual report. Similarly, percentages or population-based rates calculated from small totals can also be misleading. For this reason, rates and percentages calculated from fewer than 16 events are not shown.

In order to prevent identification of individuals and their protected health information, this report suppresses counts of smaller than five in a table cell if the data are stratified by demographic categories other than sex.

Tabulating occurrences of an event over a period of several years may reduce the impact of chance variability in calculated rates or percentages. An example is the five-year infant

mortality rate in Table D-5. We have limited the use of multi-year rates in this report because such rates can conceal changes in trends that take place during the multi-year period.

**DATA TABULATION AND PRESENTATION**

**Geographic Tabulation**

Birth, death, fetal death, and induced abortion data are tabulated for Montana residents by place of residence and, for all vital events occurring in Montana, by place of occurrence. Births, deaths, and fetal deaths that occurred out-of-state to Montana residents are included under resident statistics. Resident statistics on induced abortions include only in-state occurrences (i.e., abortion procedures performed on Montana residents in Montana). All occurrence statistics include events that occurred in Montana to residents of other states. All marriage and divorce statistics in this report are Montana occurrences.

**Use of Rates and Ratios**

It is sometimes useful to adjust a rate or ratio for factors in the population that may affect the measurement. For instance, because risk of death generally increases with age, mortality rates may appear higher in populations with a large proportion of elderly residents even if the overall disease burden is not different. Age-adjustment allows for a fair comparison of mortality rates between populations with different age structures. Wherever such adjustments have been made in the annual report, we indicate this in the title of the table or graph.

While many graphs are adjusted for age, some reference tables in this report present rates and ratios that have not been adjusted to account for such factors. In such "crude" rates, the denominator is the estimated state or

county population, divided by 1,000 or 100,000, and the numerator is the number of events, not weighted by any factor. Examples and further explanations of both crude and age-adjusted rates are given in the DEFINITIONS section.

**DEFINITIONS**

This section provides definitions of selected demographic, statistical, and medical terms as they are used in the annual report. The terms are listed in alphabetical order. Terms discussed elsewhere in the Technical Overview Section, such as cause of death, race, and population estimates, are not included.

**Abortion** – the spontaneous or induced termination of a pregnancy, without live birth. The number of spontaneous abortions is not reported to the Department of Public Health and Human Services. This report focuses on induced abortions performed in Montana, which Montana law requires to be reported.

**Abortion Rate** – the number of induced abortions reported, divided by the number of women of reproductive age. It is calculated as follows:

$$Abortion\ rate = \frac{Number\ of\ induced\ abortions}{Number\ of\ women\ aged\ 15 - 44} \times 1,000$$

**Age** – the calculated age, usually in years, of the person(s) involved in a vital or reportable event. In this report, age was calculated based on reported date of birth and date of the event. Age in days was calculated from the reported dates, divided by 365.25, and truncated to yield age in years. Where the record of the month or day of birth were incomplete or invalid, the month was assumed to be June and the day the 15th of the month.

**Age-Adjusted Death Rate** – an index number that represents the death rate that would occur if the

observed age-specific death rates were present in a population with a proportional age distribution identical to that of a hypothetical standard population. It is derived from several observed age-specific death rates and used to compare relative mortality risks from one population to another (including comparisons of the resident populations of a single geographic region at different times). Statistically, it is a weighted average of the age-specific rates, with the weights representing the proportionate distribution of age in the hypothetical population. It is calculated in this report by the direct method, using the 2000 U.S. Standard population, as follows:

$$\text{Age-adjusted death rate} = \sum_{i=1}^{11} S_i w_i$$

where  $w_i$  = the weight of the  $i^{\text{th}}$  age group in the standard population

where  $S_i$  = the age-specific death rate for the  $i^{\text{th}}$  age group

**Age-Specific Death Rate** – the proportion of deaths in a specific age group, expressed as a number per 100,000 persons in that age group. It is calculated as follows:

$$\text{Age-Specific Death Rate} = \frac{\text{Number of Deaths in the age group}}{\text{Mid-year Population of the age group}} \times 100,000$$

**At-Risk Population** – all the persons to whom a given event could occur. The at-risk population is the denominator in a rate calculation. (See the use of "at risk" in the definition of Fertility Rate).

**Birth Rate** – the proportion of resident live births in the total population (both sexes of newborn, all ages of mother), expressed as a number per thousand persons (both males and females) in that resident population. Unless otherwise stated, the birth rate in this report is the annual crude rate, unadjusted for factors affecting the population. It is calculated as

follows:

$$\text{Crude birth rate} = \frac{\text{Number of live births}}{\text{Midyear population}} \times 1,000$$

**95% Confidence Interval (CI)**– the range of values that may be observed in a statistic 95% of the time without a change in the underlying "true" value of the statistic. Confidence intervals are often used to determine if statistics from two populations are different from each other. If the CI for the two statistics do not have any values in common then there is evidence that the underlying values are different and the differences in the statistics being compared are not just due to random variation.

**Crude Death Rate** – the proportion of resident deaths in the total population, expressed as a number per thousand population, unadjusted for factors affecting the population. It is calculated as follows:

$$\text{Crude death rate} = \frac{\text{Number of deaths}}{\text{Midyear population}} \times 1,000$$

**Direct Obstetric Death** – a death resulting from obstetric complications of the pregnant state (pregnancy, labor, and puerperium), interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above.

**Extremely Low Birth Weight** – the birth weight of an infant of less than 1,000 grams (about 2 pounds 3 ounces).

**Fertility Rate** – the total number of resident live births as a proportion of the estimated female population "at risk" of childbearing, expressed as a number per thousand females in that population. The population at risk of experiencing a birth is all fertile females, approximated as all females aged 15 to 44 years. It is calculated as follows:

$$\text{Fertility rate} = \frac{\text{Number of live births}}{\text{Midyear population of females aged 15 - 44}} \times 1,000$$



**Fetal Death** – the reported delivery of a fetus that shows no evidence of life after delivery— that is, no action of the heart, breathing, or movement of voluntary muscles. Montana law requires reporting of fetal death if the fetus weighed 350 grams or more or, if the weight is unknown, if the delivery took place after 20 weeks of completed gestation. There is no requirement in Montana law to report the delivery of a non-viable fetus not meeting these criteria.

**Fetal Mortality Ratio** – the number of fetal deaths as compared to the number of live births, expressed as a number per thousand live births. It is calculated as follows:

$$\text{Fetal mortality ratio} = \frac{\text{Number of fetal deaths}}{\text{Number of live births}} \times 1,000$$

**Frequency** – the number of occurrences of an event or observation; how often an event occurs.

**ICD** – the International Classification of Diseases code used to classify and report causes of death in vital statistics. This code is revised periodically. The current revision is called the International Statistical Classification of Diseases, Injuries, and Related Health Problems, Tenth Revision, and is published by the World Health Organization. In this report, the code is referred to as ICD-10. (For further details, see the “Cause of Death Certification” section in this report, above).

**Indirect Obstetric Death** – a death resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiologic effects of

pregnancy.

**Induced Abortion** – a medical or surgical procedure intended to terminate a pregnancy without live birth. Such events are also called “induced termination of pregnancy” (ITOP) by NCHS and are the events commonly referred to as “abortions.” These events are distinct from fetal deaths and “spontaneous abortions,” or miscarriages.

**Infant** – a baby less than 365 days (one year) old.

**Infant Mortality Rate** – the number of infant deaths compared to the number of live births in that same period, expressed as a number per thousand live births. It is calculated as follows:

$$\text{Infant mortality rate} = \frac{\text{Number of infant deaths}}{\text{Number of live births}} \times 1,000$$

**Invalid Marriage** – a marriage deemed to have not been legal; a declaration of invalid marriage was formerly called an annulment.

**Late Maternal Death** – the death of a woman from direct or indirect obstetric causes more than 42 days but less than one year after termination of pregnancy.

**Live Birth** – the birth of a child who shows evidence of life after complete birth. Evidence of life includes heart action, breathing, or movement of voluntary muscles.

**Low Birth Weight** – the birth weight for a live-born infant of less than 2,500 grams (about 5 pounds, 8 ounces).

**Marital Dissolution** – legal termination of a valid marriage; a marital dissolution was formerly called a divorce.

**Marital Termination** – the sum of marital dissolutions terminations (sometimes called divorces) and invalid marriages (sometimes called annulments).



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

**Maternal Mortality Rate** – the total number of maternal deaths as a proportion of total live births, expressed as a number per hundred thousand live births. It is calculated as follows:

$$\text{Maternal mortality rate} = \frac{\text{Number of maternal deaths}}{\text{Number of live births}} \times 100,000$$

**Mean** – the arithmetic mean, obtained by dividing the sum of individual values or scores by the number of values or scores observed. For example, the mean age for six persons aged 9, 10, 12, 13, 13, and 16 is 73 divided by 6, or 12.2 years.

**Median** – the midpoint; for our purposes, given a set with an odd number of values, the median is the middle value when sorted in numerical order. For a set with an even number of values, the median is the mean of the two “middle” values. For the example set under the definition of Mean, the median age is 12.5 years.

**Neonatal Death** – a death occurring within the first 27 days of life.

**Neoplasm** – a new, abnormal, malignant, or benign growth of tissue that is uncontrolled and progressive. All neoplasms may also be called tumors. Malignant neoplasms are commonly called cancers.

**Parity** – the parity of a current birth is the number of live children the woman has borne, including those born in the current delivery.

**Perinatal Death** – a death occurring near the time of birth. The number of perinatal deaths is the sum of registered fetal deaths and neonatal deaths.

**Perinatal Mortality Ratio** – the sum of fetal deaths and neonatal deaths as compared to the number of live births, expressed as a number per thousand live births in that population. It is calculated as follows:

$$\text{Perinatal mortality rate} = \frac{\text{Number of fetal deaths} + \text{neonatal deaths}}{\text{Number of live births}} \times 1,000$$

**Place of Occurrence** – the location where an event took place, regardless of the usual residence of the person involved.

**Place of Residence** – the usual residence of the person involved in an event, regardless of the event's place of occurrence. For births and fetal deaths, this is the mother's usual place of residence. For induced abortions, it is the usual place of residence of the patient. For deaths, it is the usual place of residence of the decedent.

**Plurality (of birth)** – the number of infants born during a particular delivery.

**Post-Neonatal Death** - during the first year of life, but after the first 27 days.

**Pregnancy-Related Death** – the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death. See definitions for the related concepts Maternal Death, Late Maternal Death, Direct Obstetric Death, Indirect Obstetric Death, and Pregnancy-Associated Death in this section.

**Pregnancy-Associated Death** – the death of a woman, from any cause, while she is pregnant or within one year of delivery or termination of the pregnancy, regardless of duration and site of the pregnancy.

**Pre-term Birth** – a live birth of less than 37 completed weeks of gestation.

**Puerperium** – the condition of a mother that immediately follows child-birth.

**Quartile** – a quarter (25%) of the distribution of a set of values. For example, the age at the first quartile for eight persons aged 9, 10, 11, 12, 13, 14, 15, and 16 is 10. The median value, which is also the second quartile, is 12.5, and the third quartile value is 14.

**Rate** – the frequency of an event in a population subject to that event, expressed as the frequency per unit—generally 1,000 or 100,000—of the at-risk or subject population. For example, the Montana resident fertility rate per 1,000 fertile females is the number of births to Montana resident women for every 1,000 women in the population.

**Ratio** – the comparison of two types of events occurring in a subject population, expressed as a frequency of occurrence per unit of one of the events. For instance, the fetal mortality ratio is the number of fetal deaths per 1,000 live births. The resident population in which both types of events occur, fertile women residing in Montana, is the same for both events, but the events are of different types and are unlikely to have happened to the same woman in a single year. Also, the total number of women is not part of the calculation; the denominator for the calculation is live births, one of the events.

**Standard Deviation** – a measure of how “spread out” a set of values is, on average, from its mean. A small standard deviation indicates that, on average, the values are tightly grouped around the mean while a large standard deviation indicates that, on average, the values are scattered widely. For the series

of values presented for the definition of MEAN, the standard deviation is 2.27. For a set of N values, it is computed as follows:

$$\text{Standard deviation} = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mu)^2}$$

where  $\mu$  = the mean of the set of N values  
 where  $x_i$  = the  $i^{\text{th}}$  value in the set of N values

**Very Low Birth Weight** – the birth weight of an infant of less than 1,500 grams (about 3 pounds 5 ounces).

**Years of Potential Life Lost (YPLL)** – a measure of the cost of premature deaths that emphasizes deaths of the young by measuring the number of years lost to death before a given age, 75 years in this report. Statistically, YPLL is the difference between a given age and the decedent’s age at death, summed for all decedents younger than the given age.

