

The Minnesota Center for Health Statistics would like to introduce a new series of brief papers to be published periodically. *Vital Signs* will provide a perspective on the most current vital statistics data available. These papers are being developed in order to track trends in mortality rates and to disseminate vital statistics data to communities, counties and various constituencies within the state. These papers are designed to supplement several other publications available through the Center for Health Statistics. It is anticipated that these papers will help educate and inform readers about current trends in vital statistics and provide uses for vital statistics in their work.

Some commonly asked questions about Minnesota Vital Statistics follow.

What data is included in vital records?

Vital records data includes births, deaths, linked births/infant deaths, abortions, and marriages/divorces occurring in Minnesota or out of state to Minnesota residents. *Vital Signs* will primarily use the last 10-15 years of birth and death records for analysis.

Birth records include a number of data elements of interest. These include demographic information, maternal lifestyle and health characteristics, medical services utilization, and infant health characteristics.

Death records also contain a number of data elements of interest including demographic information, causes of death (underlying and contributing), place of death, and method of disposition.

When is vital records data available for analysis and dissemination?

Vital records data is generally available nine to ten months after the close of the calendar year.

How are vital records collected?

Birth certificate data are collected from various sources including the mother, clinic, and hospital. Cause of death for death records is reported by the attending physician or coroner/medical examiners. Funeral directors often provide demographic information.

These data are entered directly into the Vital Records Vision (VRV 2000) system at the Minnesota Department of Health. Currently 100% of birth and death records are filed electronically.

Birth Record Selected Data Elements	
Demographic Information	<ul style="list-style-type: none"> • race/ethnicity • mother's age
Maternal Lifestyle and Health	<ul style="list-style-type: none"> • tobacco use • medical risk factors
Medical Services Utilization	<ul style="list-style-type: none"> • prenatal care • method of delivery
Infant Health Characteristics	<ul style="list-style-type: none"> • birthweight • prematurity
Death Record Selected Data Elements	
Demographic Information	<ul style="list-style-type: none"> • race/ethnicity • age
Cause of Death	<ul style="list-style-type: none"> • underlying • contributing
Other	<ul style="list-style-type: none"> • place of death • method of disposition

How good are vital records data?

Birth and death records are considered a very good source of data because collection of the data is standardized, complete, consistently collected, with a number of years of data available for review.

What are some of the limitations for vital records data?

There are some issues related to the use of birth records. For example during pregnancy some health risk behaviors (e.g. alcohol or tobacco use) may be underreported by those completing the birth certificate form. Race/ethnicity reporting may also present some inconsistencies because of the inadequacy of categories and more recently, identification of multiple races makes it difficult to compare race from previous years data. Another limitation may be inconsistency of extraction of information from medical records by medical facilities throughout the state (e.g. prenatal care).

Mortality data also has some limitations. Differences in causes of death between counties could reflect a difference in death reporting practices by local physicians, coroners, or medical examiners. Also, death records do not give adequate information on factors that contribute to the death such as the health status of an individual prior to death. Race/ethnicity reporting may also be inconsistent because it is reported by someone other than the decedent.

Yet birth and death records remain excellent sources of data to determine rates of birth, pregnancy, prenatal care, birth weigh, infant mortality and numerous other birth outcomes and causes of death.

What are some of the ways in which vital statistics data is reported?

Data in *Vital Signs* are presented in a number of different ways including percents, rates, or ratios.

Percent is the number of events per 100. To calculate a percent, you divide the total number of events by the total population at risk and multiply by 100 to get the number of events per 100. For example, the percent of preterm singleton births is the number of singleton live births who are less than 37 weeks of gestation divided by the total number of singleton live births multiplied by 100.

A rate is a common way to present data and means the number of event per population at risk. For example, to get a birth rate for teens 15-19 years, you would take the total births for this age group (event of interest) and divide it by the total population of females in this same age group (population at risk) and multiple by 1,000 (multiplier). The multiplier is usually a factor of 10 such as 1,000 or 100,000. A multiplier is chosen based on convention, usually to insure that the rate is not less than 1.0 (e.g. 1.0 per 1000 is preferable to 0.1 per 100).

Rate	:	$\frac{\text{Event of Interest}}{\text{Population at Risk}}$	x	Multiplier*
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A ratio is one number divided by another to tell us how much larger or smaller one number is compared to another. The following section provides formulas for common public health measures.

Selected Formulas for Measuring and Monitoring the Health of Minnesotans

Natality Formulas - Rates

Fertility Rate	= $\frac{\text{Number of Births Regardless of Age}}{\text{Female Population age 15-44}} \times 1,000$
Crude Birth Rate	= $\frac{\text{Number of Live Births}}{\text{Total Population}} \times 1,000$
Pregnancy Rate	= $\frac{\text{Total Births + Abortions + Fetal Deaths (Regardless of Age)}}{\text{Female Population Age 15-44}} \times 1,000$
Age-specific Birth Rate*	= $\frac{\text{Sum of Births}_{\text{age group}}}{\text{Female Population}_{\text{age group}}} \times 1,000$
Age-specific Pregnancy Rate*	= $\frac{(\text{Births + Abortions + Fetal Deaths})_{\text{age group}}}{\text{Female Population}_{\text{age group}}} \times 1,000$
Percent of Premature Births	= $\frac{\text{Live Births Less Than 37 Weeks of Gestation}}{\text{Total Live Births}^{\wedge}} \times 100$
Percent of Low Birth Weight	= $\frac{\text{Live Births Under 2,500 grams}}{\text{Total Live Births}^{\wedge}} \times 100$
Percent of Very Low Birth Weight	= $\frac{\text{Live Births Under 1,500 grams}}{\text{Total Live Births}^{\wedge}} \times 100$
Percent Receiving Prenatal Care in 1 st Trimester	= $\frac{\text{Women Receiving Care in the 1}^{\text{st}} \text{ Trimester}}{\text{Total Live Births}^{\wedge}} \times 100$
Percent Births to Unmarried Mothers	= $\frac{\text{Live Births to Women Other than Married}^{\text{a}}}{\text{Total Live Births}^{\wedge}} \times 100$

*Used when calculating teen birth and pregnancy rates

[^]Excludes missing values

^aOther than Married includes never married, divorced, separated, widowed and unknown marital status.

Selected Mortality Formulas

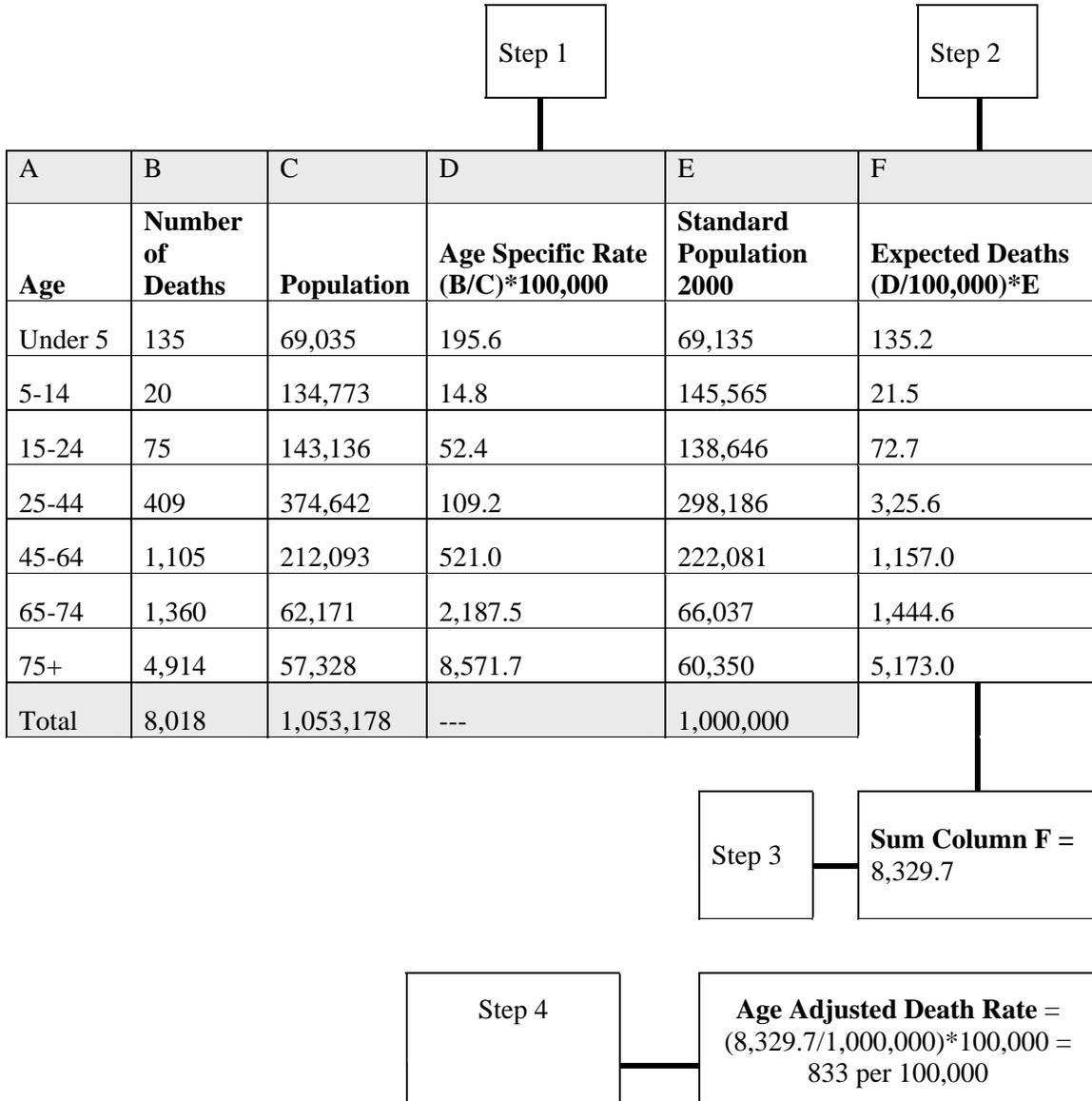
Crude Death Rate	=	$\frac{\text{Number of Deaths}}{\text{Total Population}}$	x Multiplier
Population Specific Death Rate	=	$\frac{\text{Number of Deaths for Specific Population}}{\text{Sex/Race Specific Population}}$	x Multiplier
Cause Specific Crude Death Rate	=	$\frac{\text{Number of Deaths for Specific Cause}}{\text{Total Population}}$	x Multiplier
Infant Mortality Rate	=	$\frac{\text{Number of Deaths under 1 Year of Age}}{\text{Number of Live Births}}$	x Multiplier
Neonatal Mortality Rate	=	$\frac{\text{Number of Deaths Under 28 Days of Age}}{\text{Number of Live Births}}$	x Multiplier
Postneonatal Mortality Rate	=	$\frac{\text{Number of Deaths 28 or More Days, but Less Than 1 Year of Age}}{\text{Number of Live Births}}$	x Multiplier
Perinatal Mortality Rate	=	$\frac{\text{Number of Fetal Deaths 20 Weeks or Greater Plus the Number of Hebdomadal (0-6 days) Deaths}}{\text{Number of Live Births and Fetal Deaths 20 Weeks or Greater}}$	x Multiplier

The multiplier is usually a factor of 10 such as 1,000 or 100,000. A multiplier is chosen based on convention, usually to insure that the rate is not less than 1.0 (e.g. 1.0 per 1000 is preferable to 0.1 per 100).

Age Adjusted Death Rate

$$\text{Age-Adjusted Death Rate} = \frac{\text{Number of Expected Events}}{\text{Total STANDARD Population}} \times \text{Multiplier}$$

Calculating Age Adjusted Death Rate



- Step 1:** Calculate Age Specific Death Rate
- Step 2:** Calculate Expected Number of Deaths
- Step 3:** Sum Expected Deaths
- Step 4:** Divide Sum of Expected Deaths by Total Standard Population and Multiply the result by 100,000.