AGE-SPECIFIC DEATH RATE

1. Definition:
AGE-SPECIFIC DEATH RATE is the total number of deaths to residents of a specified age or age group in a specified geographic area (country, state, county, etc.) divided by the population of the same age or age group in the same geographic area (for a specified time period, usually a calendar year) and multiplied by 100,000

2. Calculation:

$$\frac{\text{Total Deaths in Specified Age Group}}{\text{Total Population in the Same Specified Age Group}} \times 100{,}000$$

3. Example:

37 deaths among New Mexico children ages 1 through 14 during calendar year 2006.

381,910 = estimated 2006 mid-year New Mexico population aged 1-14.

(37 / 381,910) x 100,000 = 9.7 unintentional injury deaths per 100,000 population aged 1 through 14 during calendar year 2006 in New Mexico.

67.5 average annual Alzheimer's disease deaths (ICD-10: G30) among persons aged 85 and over in Salt Lake County, Utah during calendar years 2006 & 2007. 10,160 – average annual estimated 2006, 2007 Salt Lake County mid-year population, persons aged 85+. 67.5 average annual Alzheimer's disease deaths per 100,000 population age 85 and over in Salt Lake County, Utah during calendar years 2006 & 2007.

4. Technical Notes:

- Most age groupings for age-specific mortality rates (especially when calculating age-specific rates for the entire population) are 5 or 10-year groups (e.g., 0-4, 5-9, 10-14, 15-19, etc.). However, any age-grouping can be used, especially when studying special populations, such as teens (15-19) or the oldest residents (ages 65+).
- The term in the denominator is labeled "total population," but is technically known as the "person-years at risk." If the numerator uses the sum of the number of deaths across multiple years, the denominator should use the sum of the population over the same years. Alternatively, one could use the average annual deaths in the numerator and either the average annual population to represent person-years at risk, or the population in a single year in the middle of the time period.
- In less densely populated areas, annual numbers of deaths for specific ages may be small (<10 or 20) which would result in an age-specific mortality rate considered to be too unstable or unreliable for analysis. Adding additional years (three or five-year average

annual rates) and/or expanding the age-group or area to be studied should result in a larger number of deaths and more reliable rates for analysis. (see *North Carolina Statistical Primer*, Problems with Rates Based on Small Numbers; Pennsylvania: Technical Assistance – Small Area Analysis or Washington State: Guidelines for Working with Small Numbers)

- In order to determine reliability and the chance variation of an age-specific mortality rate (especially those based on smaller numbers of events) as well as to determine significant changes over time or significant differences when comparing age-specific rates (e.g. a county rate to the state rate), it is highly recommended that a standard error or confidence intervals (usually at 95%) be calculated and shown for these rates. (Please see calculating confidence intervals)
- The Division of Vital Statistics (DVS) at NCHS follows standards for use of the terms "death rate" and "mortality rate" in naming and reporting common vital statistics rates for deaths. The NAPHSIS standard measures shown here follow the DVS standards, primarily to maintain consistency with DVS for naming conventions. Please note that states/registration areas and other federal government organizations within and outside NCHS/CDC may not follow the DVS standards when naming and reporting death/mortality rates.
    - According to DVS standards, the following naming conventions are used for the common vital statistics rates for deaths:

Mortality Rates	Death Rates
Infant Mortality Rate	Crude Death Rate
Neonatal Mortality Rate	Age-Specific Death Rate
Postneonatal Mortality rate	Cause-Specific Death Rate
Perinatal Mortality Rate	Age-Adjusted Death Rate
Fetal Mortality Rate	
Maternal Mortality Rate	

- An age-specific death rate has four components:
    1. A specified measurement period.
    2. The numerator, the number of deaths among a specified age group that occurred in a specified geographic area during a given period of time, and
    3. The denominator, the total number of people in the population at risk in the same geographic area for the same period of time ("person-years at risk"). The population estimate used is typically the mid-year (July 1) population count estimate for the same year(s) and age(s) included in the numerator.
    4. A constant. The result of the fraction is usually multiplied by some factor of 10 (such as 100,000), so that the rate may be expressed as a whole number.