YEARS of POTENTIAL LIFE LOST (YPLL)

1. Definition:
The numerical difference between a predetermined end point age (usually age 75) and the age at death for a death or deaths that occurred prior to that end point age.

The potential years of life lost (YPLL) for each death (usually to residents of a geographic area for a specific time period) are summed to represent the total years of potential life lost for that area.

NOTE: The primary use of YPLLs is for summing of the data by leading causes of death and then ranking the results to show the causes with the highest numbers of years of potential life lost for a specific geographic area or specific demographic/s.

2. Calculation:

YPLL = (Predetermined end point age – Age of decedent who died prior to end point age)

Additional links to State/National websites with calculation and/or definition -
YPLL: A Summary Measure of Premature Mortality, Wisconsin Public Health Policy Institute
Measuring Premature Mortality Using Years of Potential Life Lost (YPLL), Pennsylvania Department of Health

3. Example:
75 = predetermined end point age
54 = age at death for a state resident in 2008 (who died prior to end point age)
(75-54) = **21** years of potential life lost to that resident who died at age 54 in 2008

4. Technical Notes:

- YPLL is an important measure of premature mortality. It is very useful for prioritizing public health and health services management since mortality in older age groups is less amenable to health services or public health intervention than among younger age groups. Preventing deaths among younger persons is a major public health goal.
- The primary and probably most effective use of YPLLs is for ranking of leading causes of death which will be quite different using YPLLs compared to the usual rankings by crude or age-adjusted death rates and numbers of deaths. Although most deaths occur at advanced ages, more years of potential life are lost for deaths among younger age groups, especially for certain diseases (HIV/AIDS), many external causes (accidents, suicides, homicides), and early life stage conditions, such as congenital anomalies. The impact of behavioral risks can also be evaluated using YPLLs, particularly regarding smoking, work-related illnesses, and injury (National Center for Injury Prevention and Control, WISQARS YPLL Reports). See also *Selected Causes of Death and Years of Potential Life Lost, Kansas 2006.*
- The end point age used to calculate a YPLL by the National Center for Health Statistics is 75 (Health, United States, 2008; see Table 29). Age 75 is approximate to the current average life expectancy for the United States. Some older and current CDC reports (as well as some states) use age 65 as the end point age for YPLL calculation. Age 65 was more approximate to the life expectancy for older reports and there may be a desire to maintain comparison over time by continuing to use age 65 in updated reports. Age 65 is

also the typical retirement age in the United States and is more biased toward economic impact. End point ages other than 65 or 75 could be used as the constant, such as the actual life expectancy or median age at death for a specific geographic area. It is important to document the end point age in any calculation and release of YPLLs, especially to assist with comparability analysis or to note potential for bias.

- Another method for calculating a YPLL that is used and preferred by some states/analysts is use of life expectancy remaining at the time of death for all deaths. The age at death is subtracted by the remaining life expectancy for that age or age group, in place of a predetermined end point (65 or 75) for all ages/age groups. This allows you to evaluate the impact on an entire population not just those who died younger than the end point age. However, use of a standard end point makes for easier calculations and increases sensitivity to premature mortality. When using the life expectancy method, the YPLL may significantly alter the relative rankings by cause and will more closely resemble the cause-specific death rate order. See *Years of Potential Life Lost in North Carolina*. Life expectancies can be obtained from abridged decennial life tables that are routinely published by NCHS for each state. Go to Life Tables.
- For routine publication, CDC calculates YPLL over the age range from birth to the end point age using age-specific death rates for 15 selected causes and supplementary data on causes of infant mortality, as provided by NCHS. The cause and age-specific death rate is multiplied by the estimated population in that age range to determine the number and age distribution of deaths attributable to a specific cause. The number of deaths for each age is then multiplied by the years of life lost (the difference between the designated end point age and the midpoint of the age range) to provide an age-specific YPLL. For example, in the population aged 15-24, the midpoint is 20 and the YPLL is 55 years (based on age 75 as the end point). The age-specific YPLLs are then summed to obtain a total YPLL for each cause. See *Premature Mortality in the United States: Public Health Issues in the Use of Years of Potential Life Lost*

  The formula for calculating YPLL from grouped data is:

  Σ [(number of deaths in each age group) x (end point age – midpoint of each age group)]

  Rates are sometimes computed for YPLLs since they take population differences into account; thus, offering better comparability measures when analyzing and comparing the impact of YPLLs by specific demographics such as sex or race. The most common method is to simply calculate a YPLL rate per 100,000 (or 1,000) population under age 75 (or whatever end point is being used) for each sub-group or sub-geography. See *YPLL Rates, Premature Mortality by Gender; Minnesota Vital Signs*.

  YPLL Rate = (Number of YPLLs/Population under end point age) x 100,000

- Another measure sometimes used for comparison purposes is a YPLL (age-adjusted) index which is primarily used for comparing the impact of YPLLs among populations with different age structures. The YPLL index adjusts for the different age distributions being compared by calculating expected numbers of deaths for each age group (similar to an SMR or standardized mortality ratio). The expected YPLL can then be computed. The YPLL index is the ratio of observed to expected YPLLs. See *YPLL: A Summary Measure of Premature Mortality*, Wisconsin Public Health Policy Institute or Dever GE Alan, *Epidemiology in Health Services Management*; Aspen Publishers Inc; 1984 Gaithersburg, MD (pp. 117-123) for more detailed explanations of the calculation of the YPLL index.