PREMATURE DEATH RATE

1. Definition:
PREMATURE DEATH RATE (PDR) is the number of deaths under age 75 to residents of a specific population (during a specific time period) age-adjusted (using the direct method) to a standard population distribution (currently the 2000 U.S. population) and expressed as a rate per 100,000.

2. Calculation/Example:
The calculations below are for Allegheny County, Pennsylvania for the three-year period of 2004-2006. The age group intervals used for the calculations are the same as those used for the overall age-adjusted death rate, up to age 74.

Step 1: Assemble the total number of observed (actual) deaths and population for each age group in the study population for the specified time period (in this case, 2004-06 summary data are used).

Step 2: Calculate an age-specific death rate for each age group. (Divide the number of observed deaths for each age group by the population for each age group. Do not use a multiplier such as 1,000 or 100,000.)

Step 3: Assemble the standard million population distribution for each age group. The 2000 U.S. standard million population distribution as shown here is currently in use.

Step 4: Multiply each age-specific rate by the corresponding standard population to obtain the number of expected deaths for the study population.

Step 5: Sum the standard population and expected deaths.

Step 6: Divide the total number of expected deaths by the total standard population and multiple the result by 100,000 to obtain the 2004-2006 PDR for Allegheny County.

Age Groups	Observed Deaths 2004-06	Study Population 2004-06	Age-Specific Rates	Std. Population	Expected Deaths 2004-06
<1	294	38,713	0.0076	13,818	104.9
1-4	44	161,039	0.0003	55,317	15.1
5-14	59	442,149	0.0001	145,565	19.4
15-24	385	505,121	0.0008	138,647	105.7
25-34	481	426,961	0.0011	135,573	152.7
35-44	1,067	516,469	0.0021	162,613	336.0
45-54	2,640	558,476	0.0047	134,834	637.4
55-64	3,937	416,442	0.0095	87,247	824.8
65-74	6,415	310,068	0.0207	66,037	1,366.2
			Total	**939,651**	**3,562.3**

2004-06 Premature Death Rate Allegheny County, PA				
3562.3	/	939,651	=	0.00379
			x	100,000
			=	**379.1**

Additional links to State websites with calculation and/or definition -
Massachusetts Department of Public Health
Pennsylvania Department of Health

3. Technical Notes:

- Age 75 is usually the standard cut-off age for this calculation since that age is approximate to average life expectancy in the United States. However, age 65 is sometimes used as the cut-off age since it has more economic significance as the usual retirement age in the United States. Special study or interest may also dictate use of a different age cut-off. It is highly recommended that any analysis/dissemination of a PDR clearly indicate what age cut-off is used for documentation and comparison purposes.
- The PDR is considered a sound summary measure that evaluates the overall mortality experience of a population/community. It is an excellent primary tool for community health assessment and planning. The PDR may also demonstrate the effect of multiple risk factors and socioeconomic status in communities.
- Disadvantages associated with the PDR include its inability to define specific reasons for higher death rates and to take into account subpopulation differences as well as its focus on mortality which may not be an important public health issue for a specific community (e.g., high socioeconomic suburban areas). Years of Potential Life Lost (YPLL) by age, sex, race or cause of death is a more useful measure to evaluate specific premature mortality experiences within a community/population.
- For PDRs to be comparable, they must be calculated using the exact same age-adjustment methods, standard population and age cut-off. Some states or local governments/organizations may use variations of the standard PDR calculation; therefore, it is important to document or ascertain the methodology used whenever utilizing or comparing PDRs, especially from different sources.
- In less densely populated areas, annual numbers of deaths for specific ages used in the age-adjustment series may be small (<10 or 20) which would result in an age-specific death rate considered to be too unstable or unreliable for analysis. Adding additional years (three or five-year average annual rates as was done in the example above) and/or expanding the 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)
- 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.

Additional References:

1. Eyles J, Birch S. “A population needs-based approach to health care resource allocation and planning in Ontario: A link between policy goals and practice.” *Canada Journal Public Health* 1993; 84(2): 112-117.
2. Carstairs V., Morris R. *Deprivation and Health in Scotland*. Aberdeen Scotland: Aberdeen University Press, 1991.