Appendix II. Glossary

Age-adjusted mortality rates (AAMR) are used to compare relative mortality risk across groups and over time. They are not actual measures of mortality risk but rather an index of risk. They are weighted statistical averages of the age-specific death rates, in which the weights represent the fixed population proportions by age (Murphy 2000). The age-adjusted rates in this report were computed by the direct method. Calculation of AAMRs was based on Fleiss's (1981) formula and calculation of the standard error of AAMRs was based on that of Keyfitz (1966).

The 1940 and 2000 U.S. standard million population distributions are shown below:

Age group	1940	2000
0-4	80,057	69,136
5-9	81,151	72,533
10-14	89,209	73,032
15-19	93,665	72,169
20-24	88,002	66,477
25-29	84,280	64,529
30-34	77,787	71,044
35-39	72,501	80,762
40-44	66,744	81,851
45-49	62,696	72,118
50-54	55,116	62,716
55-59	44,559	48,454
60-64	36,129	38,793
65-69	28,519	34,264
70-74	19,519	31,773
75-79	11,423	26,999
80-84	5,878	17,842
85+	2,765	15,508
Total	1,000,000	1,000,000

An example of the use of age-adjustment in calculating mortality is described in Appendix IV.

Age-specific mortality rates can reveal age-related differences that are hidden in overall age-adjusted rates. These rates are informative when the frequency of mortality varies with age. Such detailed information is valuable when there is substantial variation by age group and intervention can then be targeted appropriately. For this report, the age-specific mortality rate was calculated based on the number of deaths among individuals within a specific age group and calendar year, divided by the mid-year population of all residents in that same age group and then multiplied by 100,000.

Age standardization is a technique that allows for the comparison of death rates in two or more populations. The National Center for Health Statistics (NCHS) has used the 1940 standard million population in reporting national mortality statistics for over 50 years. Implementation of the new year 2000 population standard will begin with deaths occurring in 1999. Age-adjustment based on the year 2000 standard often results in age-adjusted death rates that are larger than those based on the 1940 standard. The new standard will affect trends in age-adjusted death rates for certain causes of death and will decrease race and ethnicity differentials in age-adjusted death rates (Anderson and Rosenberg 1998). See Appendix IV for a discussion of the impact of changing the standard reference population from 1940 to 2000.

Cause-of-death classification Mortality statistics for this report were compiled in accordance with the World Health Organization (WHO) regulations, which specify that member nations classify causes of death by the current Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, which is the Ninth Revision of the International Classification of Diseases [ICD-9] (World Health Organization 1977).

Tabulations of cause-of-death statistics in this report are based solely on the underlying cause of death unless otherwise stated. The "underlying" cause of death is the disease or injury that initiated the series of events leading directly to death, or the circumstances of the event that resulted in the fatal injury. If more than one cause or condition of death is entered, the underlying cause is then determined by the sequence of conditions on the death certificate and selection rules of the ICD (Murphy 2000).

Examination of the combination of all listed causes can shed additional light on factors related to mortality. Therefore, for selected diseases, "related" causes of death including both underlying and non-underlying (or "contributing") causes, are discussed in this report. Appendix I contains the causes of deaths included in this report with their ICD-9 codes.

Cause-of-death rankings are based on the National Center for Health Statistics List of 72 Selected Causes of Death, HIV infection, and Alzheimer's disease (Murphy 2000). Ranks are based on the total number of deaths occurring during a specific time period. This report ranks number of deaths by age group, gender, race and ethnicity for the periods 1989-91 and 1996-98.

Contributing cause of death See cause-of-death classification.

Crude mortality rates represent total deaths per 100,000 population for a specified period; that is, the average chance of dying during a specified period for persons in the entire population.

Excess deaths refer to those deaths that would not have occurred if one population subgroup (e.g., black or male) had the same death rate as another population subgroup (white or female). Excess deaths are calculated as follows:

Excess deaths = Number of cases x [1 – (1 / relative risk)]

The estimated excess death figures provided in this report use the overall age-adjusted rates as the basis for assessing the relative risk in each race/ethnicity or gender group. The potential exists for differences in age-specific rates and differences in the age distribution for certain subgroups to combine, producing substantial differences in the number of estimated excess deaths when comparing age-adjusted and unadjusted estimates. Preliminary analyses of all-cause mortality data indicate that this pattern holds for the black population. This fact underscores the importance of examining age-specific death patterns when attempting to describe disparities in deaths for blacks, and other subgroups in the population.

Healthy People 2000 is part of a national strategy addressing the prevention of major chronic illnesses, injuries, and infectious diseases. It is the product of an effort, involving expert working groups, a consortium of national organizations, all state health departments, and the Institute of Medicine of the National Academy of Sciences to set health objectives for the nation. After extensive national and regional hearings were conducted with a period of public review and comment, the health objectives were published as *Healthy People 2000—National Health Promotion and Disease Prevention Objectives*.

Healthy Connecticut 2000 is the effort of a consortium of groups in Connecticut, modeled on the national Healthy People initiative, to set public health priorities for the state. *Healthy Connecticut 2000 Baseline Assessment Report* (Connecticut Department of Public Health and Addiction Services 1997) set health status and risk reduction objectives to be achieved by the year 2000. A second document *Looking Toward 2000 – An Assessment of Health Status and Health Services* (Connecticut Department of Public Health 1999) was produced after extensive public review and comment and hearings in local communities. This report presents 25 public health priorities for Connecticut residents to be achieved by the year 2000.

Hispanic origin refers to people whose origins are from Spain, the Spanish-speaking countries of Central America, South America, and the Caribbean, or persons of Hispanic origin identifying themselves as Spanish, Spanish-American, Hispanic, Hispano, or

Latino. Since 1988, the Connecticut death certificate has had a separate line item for Hispanic ethnicity. Individuals identified as "Hispanic" can be of any race, and are also counted in the race breakdown as either "white," "black," "Asian or Pacific Islander," "American Indian," or other.

Quality of Hispanic Origin data: In 1988, the Connecticut death certificate was revised to include a question regarding the Hispanic origin of the decedent and the change was implemented in 1989.   There was an extensive amount of incomplete Hispanic origin information for the 1989 deaths with only 32.8% of 1989 Connecticut resident death certificates reporting Hispanic-origin status (Mueller, Cavacas, Amadeo et al. 1989). Although accuracy of Hispanic origin data improved during the decade, reporting is still incomplete. An analysis of the 1996-1998 Connecticut resident death certificates showed that Hispanic ethnicity was unknown for 3,074 decedents, or 3.5% of all death certificates for those years.

Reliability of Hispanic origin data nationwide was assessed by the National Center for Health Statistics (NCHS). Death rates for the Hispanic-origin population are affected by biases in the numerator (underreporting of deaths) and the denominator (underestimates of the population).   Taking both sources of bias into account it was estimated that Hispanics death rates are understated by 2 percent in official mortality statistics of the U.S. produced by NCHS (Rosenberg, Maurer, Sorlie, et al. 1999).

International Classification of Diseases (ICD-9, ICD-10) has been the internationally accepted coding system for determining cause of death since the early 1900s. It is periodically revised. This report employs the ninth revision (ICD-9) that has been in use since 1975. The tenth revision (ICD-10) is being used beginning with 1999 deaths.

Preliminary estimates of the comparability of ICD-9 to ICD-10 have been published and indicate that the discontinuity in trends from 1998 to 1999 for some leading causes of death (septiciemia, influenza and pneumonia, Alzheimer's disease, nephritis, Nephrotic syndrome, and nephrosis) is substantial (Anderson, Minino, Hoyert, et al. 2001).

Multiple cause of death *See* Cause-of-death classification.

Population bases for computing rates are taken from the U.S. Census Bureau *Estimates of the population of states by age, sex, race, and Hispanic origin*. These data are estimates of the population of Connecticut by 5-year age groups (age 0 to 4, 5 to 9,…85 and over), sex (male, female), modified race (white; black; Native American including Alaska Natives; Asian and Pacific Islander) and Hispanic origin (Hispanic, non-Hispanic) for each year, July 1, 1989 through July 1, 1998. Population estimates for 1989 are taken from the series *1981 to 1989*; estimates for 1990 through 1997 are taken from the series *1990 to 1997* released on September 4, 1998; and estimates for 1998 are taken from the series *1990 to 1998* released on September 15, 1999.

Population rates in this report are on an annual basis and are per 100,000 estimated population in a specified group.

Race refers to a population of individuals identified from a common history, nationality, or geographical place. Race is widely considered a valid scientific category, but not a valid biological or genetic category (Lewontin 1995; Gould 1981). Available scientific evidence indicates that racial and ethnic classifications do not capture biological distinctiveness, and that there is more genetic variation within racial groups than there is between racial groups (Williams, Lavizzo-Mourey, and Warren 1994; American Anthropological Association 1998). Contemporary race divisions result from historical events and circumstances and reflect current social realities. Thus, racial categories may be viewed more accurately as proxies for social and economic conditions that put individuals at higher risk for certain disease conditions.

Mortality data are reported for four racial groups in Connecticut: white, black, Asian and Pacific Islander, and American Indian and Alaska Native (or Native American). Individuals identified as either 'white,' black,' Asian and Pacific Islander, American Indian or 'other' race can be of any ethnic group, including Hispanic. Conversely, individuals identified as "Hispanic" can be of any race, and are also counted in the race breakdown as either "white," "black," "Asian or Pacific Islander," "American Indian," or other.

Quality of race data—Several studies have examined the reliability of racial status reported on the death certificate by comparing race on the death certificate with that reported on another data source, such as the census or a survey. Differences occur as a result of differences in who provides race information on the two records. Race information on the death certificate is reported by the funeral director as provided by a next of kin or on the basis of observation. Race on the census or on the Current Population Survey (CPS) is obtained by self-report of the individual or by another household member. As such, racial information reported on the census and CPS are considered more valid than death certificate information. High levels of agreement between the death certificate and the census or survey report are indicative of unbiased death rates by race (Hoyert, Kochanek, and Murphy 1999).

Several studies show that persons self-reported as American Indian or Asian on census or survey records are sometimes reported as white on the death certificate. The net effect of such misclassification is an underestimate of deaths and death rates for races other than white and black. In addition, undercoverage of minority groups in the census and resultant population estimates introduces biases into death rates by race (Hoyert, Kochanek, and Murphy 1999). It is estimated that the net effect of the combined bias due to race misclassification on death certificates and undernumeration on the 1990 census has resulted in an overstatement of death rates for whites and blacks by about one and five percent, respectively in official U.S. publications. Mortality rates are understated in

official U.S. publications for American Indians and Asian or Pacific Islander, by about 21 percent and 11 percent, respectively (Rosenberg, Maurer, Sorlie, et al. 1999).

Random variation The mortality data in this report represent all Connecticut resident deaths and are, therefore, not subject to sampling error. Mortality data, however, may be affected by random variation. When the number of events is small (less than 100) and the probability of such an event is small, random variation may be relatively large, and thus considerable caution must be used in interpreting the data. Random variation is typically measured in terms of variance or standard error. The following formulas were used in calculating the standard error in this report:

A. *standard error of the age-adjusted mortality rate:*

$$\sqrt{\sum_{i=1}^{18} d_i \left(\frac{std_i}{n_i}\right)^2}$$

where

- Index *i* represents 18 age groups in five year increments ranging from ages 0 to 85 and older;

- d_i is the total number of deaths for age group *i*;

- std_i is the standard population for age group *i*, and

- n_i is the population for age group *i*.

B. *standard error of the age-adjusted years of potential life lost:*

$$\frac{\sqrt{\sum_{i=1}^{15} d_i \left(\frac{std_i}{n_i} YPLL_i\right)^2}}{\sum_{i=1}^{15} std_i}$$

where d_i, std_i, and p_i are the same as indicated in the standard error formula. $YPLL_i$ is the years of potential life lost for a given endpoint (age 75 in this report) within each age group *i*. The weighting factors are as follows: 74.5 for age group 1 (ages 0-4), 67.5 for age group 2 (ages 4-9), 62.5 for age group 2 (ages 10-15), etc. $YPLL_i$ is zero for age groups 75 and older.

- related cause of death *See* Cause-of-death classification.

Risk factor can refer to an inherited characteristic of an individual, an environmental exposure, or some aspect of personal behavior or social status that, based on epidemiologic evidence, is known to be associated with some disease condition or health outcome considered preventable. The term "risk factor" is used rather loosely and can mean any of the following: 1) *A causal determinant*, that is, an attribute or exposure that increases the likelihood of the occurrence of disease or other outcome; 2) *A modifiable risk factor*, that is, a characteristic that can be modified by intervention, thus reducing the likelihood of disease occurrence of other specified outcome; 3) *A risk marker*, that is, an attribute or exposure that is associated with an increased likelihood of disease occurrence or other outcome but is not necessarily a causal factor (Last 1988).

Standard error calculation *See* Random variation.

Years of potential life lost (YPLL) represents the number of years of potential life lost by each death before a predetermined end point (e.g., 65 or 75 years of age).

Whereas the crude and adjusted death rates are heavily influenced by the large number of deaths among the elderly, the YPLL measure provides a picture of premature mortality by weighting deaths that occur at younger ages more heavily than those occurring at older ages. It thereby emphasizes different causes of death. Age-adjusted YPLLs are calculated using the methodology Romeder and McWhinnie (1977). An example of the use of age-adjustment in calculating years of potential life lost is described in Appendix IV.

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