TECHNICAL APPENDIX FROM

VITAL STATISTICS OF UNITED STATES

1999

MORTALITY

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

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A copy of the technical appendix may be obtained by contacting the National Center for Health Statistics, Mortality Statistics Branch at 301-458-4666.

VITAL STATISTICS OF THE UNITED STATES: MORTALITY, 1999
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Sources of data

Mortality statistics

Mortality statistics for 1999 are, as for all previous years except 1972, based on information from records of all deaths occurring in the United States.

The death-registration system of the United States encompasses the 50 States, the District of Columbia, New York City (which is independent of New York State for the purpose of death registration), Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands (Northern Marianas). In statistical tabulations, United States refers only to the aggregate of the 50 States (including New York City) and the District of Columbia. Data for Guam, Puerto Rico, Virgin Islands, American Samoa, and Northern Marianas are presented separately from data for the United States.

The Virgin Islands was admitted to the registration area for deaths in 1924; Puerto Rico, in 1932; and Guam, in 1970. Tabulations of death statistics for Puerto Rico and the Virgin Islands were regularly shown in *Vital Statistics of the United States* from the year of their admission through 1971 except for the years 1967-69, and tabulations for Guam were included for 1970 and 1971. Death statistics for Puerto Rico, the Virgin Islands, and Guam were not included in *Vital Statistics of the United States* for 1972 but have been included each year since 1973. Information for 1972 for these three areas was published in the respective annual vital statistics reports of the Department of Health of the Commonwealth of Puerto Rico, the Department of Health of the Virgin Islands, and the Department of Public Health and Social Services of the Government of Guam. Death statistics are available for American Samoa beginning with data year 1997 and for Northern Marianas beginning with data year 1998.

Procedures used by NCHS to collect death statistics have changed over the years. Before 1971 tabulations of deaths were based solely on information obtained by NCHS from copies of the original certificates. The information from these copies was edited, coded, and tabulated. For 1960-70 all mortality information taken from these records was transferred by NCHS to magnetic tape for computer processing.

Beginning with 1971 an increasing number of States have provided NCHS, via the Vital Statistics Cooperative Program (VSCP), with electronic files of data coded according to NCHS specifications. The year in which State-coded demographic data were first transmitted in electronic data files to NCHS is shown below for each of the States, New York City, the District of Columbia, Puerto Rico, and the Virgin Islands, all of which now furnish demographic or nonmedical data in electronic data files.

1971	1972	1973
Florida	Maine	Colorado
	Missouri	Michigan
	New Hampshire	New York (except New York
	Rhode Island	City)
	Vermont	

1974	1975	1976
Illinois	Louisiana	Alabama
Iowa	Maryland	Kentucky
Kansas	North Carolina	Minnesota
Montana	Oklahoma	Nevada
Nebraska	Tennessee	Texas
Oregon	Virginia	West Virginia
South Carolina	Wisconsin	

1977	1978	1979
Alaska	Indiana	Connecticut
Idaho	Utah	Hawaii
Massachusetts	Washington	Mississippi
New York City		New Jersey
Ohio		Pennsylvania
Puerto Rico		Wyoming

1980	1982	1985
Arkansas	North Dakota	Arizona
New Mexico		California
South Dakota		Delaware
		Georgia
		District of Columbia

1994
Virgin Islands

For Guam, American Samoa, and Northern Marianas, mortality statistics are based on information obtained directly by NCHS from copies of the original certificates received from the registration office of each respective territory.

In 1974 States began coding medical (cause-of-death) data in electronic data files according to NCHS specifications. The year in which State-coded medical data were first transmitted to NCHS is shown below for the 43 States now furnishing such data. In 1999 Maine and Montana contracted with a private company to provide precoded medical data to NCHS. The remaining 7 VSCP States, New York City, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa, and Northern Marianas submitted copies of the original certificates from which NCHS coded the medical data.

1974	1975	1980
Iowa	Louisiana	Colorado
Michigan	Nebraska	Kansas
	North Carolina	Massachusetts
	Virginia	Mississippi
	Wisconsin	New Hampshire
		Pennsylvania
		South Carolina

1981	1983	1984
Maine	Minnesota	Maryland
		New York (except New York City)
		Vermont

1986	1988	1989
California	Alaska	Georgia
Florida	Delaware	Indiana
Texas	Idaho	Washington
	North Dakota	
	Wyoming	

1991	1992	1993
Arkansas	Montana	Alabama
		Connecticut
		Hawaii
		Nevada
		Oregon
		South Dakota

1994	1995	1996
Oklahoma	New Mexico	Utah
Rhode Island		

1998
Tennessee

For 1999 and previous years except 1972, NCHS coded the medical information from copies of the original certificates received from the registration offices for all deaths occurring in those States that were not furnishing NCHS with medical data coded according to NCHS specifications. For 1981 and 1982, these procedures were modified because of a coding and processing backlog resulting from personnel and budgetary restrictions. To produce the mortality files on a timely basis with reduced resources, NCHS used State-coded underlying cause-of-death information supplied by 19 States for 50 percent of the records; for the other 50 percent of the records for these States as well as for 100 percent of the records for the remaining 21 registration areas, NCHS coded the medical information. Mortality statistics for 1972 were based on information obtained from a 50-percent sample of death records instead of from all records as in other years. The sample resulted from personnel and budgetary restrictions. Sampling variation associated with the 50-percent sample is described in "Estimates of errors arising from 50-percent sample for 1972" under "Quality control procedures."

Standard certificate

For many years, the U.S. Standard Certificate of Death, issued by the Department of Health and Human Services, has been used as the principal means to attain uniformity in the contents of documents used to collect information on these events. It has been modified by each State to the extent required by the particular needs of the State or by special provisions of State vital statistics laws. However, the certificates of most States conform closely in content and arrangement to the standards.

The first issue of the U.S. Standard Certificate of Death appeared in 1900. Since then, it has been revised periodically by NCHS and its predecessors through consultation with State health officers and registrars; Federal agencies concerned with vital statistics; national, State, and county medical societies; and others working in such fields as public health, social welfare, demography, and insurance. This revision procedure has ensured careful evaluation of each item in terms of its current and future usefulness for legal, medical and health, demographic, and research purposes. New items have been added when necessary, and old items have been modified to ensure better reporting; or in some cases, items have been dropped when their usefulness appeared to be limited.

The current version of the U.S. Standard Certificate of Death was recommended for State use beginning on January 1, 1989. The U.S. Standard Certificate of Death is shown in figure 1 on page 44 (1).

History

The first death statistics published by the Federal Government concerned events in 1850 and were based on statistics collected during the decennial census of that year. In 1880 a national "registration area" was created for deaths. Originally, this area consisted of Massachusetts, New Jersey, the District of Columbia, and several large cities that had efficient systems for death registration. The death-registration area continued to expand until 1933, when it included for the first time the entire United States. Tables showing data for death-registration States include the District of Columbia for all years; registration cities in nonregistration States are not included. For more details on the

history of the death-registration area, see *U.S. Vital Statistics System: Major Activities and Developments, 1950-95* (2).

Classification of data

Vital statistics data is presented in terms of both frequencies and rates which are classified according to demographic variables such as geographic area, age, sex, and race. Since the calculation of rates requires population data, both vital statistics and population data must be classified and tabulated in comparable groups. The general rules used in the classification of geographic and personal items for deaths for 1999 are set forth in the NCHS instruction manual, Part 4 (3). A discussion of the classification of certain important items is presented below.

Classification by occurrence and residence

Tabulations for the United States and specified geographic areas are classified by place of residence unless stated as by place of occurrence. Before 1970 resident mortality statistics for the United States included all deaths occurring in the States and the District of Columbia, with deaths of nonresidents assigned to place of death. Then beginning in 1970, deaths of nonresidents of the United States were excluded from resident mortality data for the United States.

For 1999, deaths of nonresidents for the United States (50 States and the District of Columbia) refers to deaths that occur in the 50 States and the District of Columbia of nonresident aliens; nationals residing abroad; and residents of Puerto Rico, the Virgin Islands, Guam, American Samoa, Northern Marianas, and other territories of the United States. Similarly, for Puerto Rico, Virgin Islands, American Samoa, and Northern Marianas, deaths of nonresidents refers to deaths that occurred to a resident of any place other than Puerto Rico, Virgin Islands, American Samoa, and Northern Marianas, respectively. For Guam, however, deaths of nonresidents refers to deaths that occurred to a resident of any place other than Guam or the United States. Beginning with 1970, deaths of nonresidents are not included in tables by place of residence. If place of residence is not stated or unknown on the death certificate, then place of residence is assigned to the place where the death occurred.

Deaths by place of occurrence, on the other hand, include deaths of both residents and nonresidents of the United States. Consequently, for each year beginning with 1970, the total number of deaths in the United States by place of occurrence was somewhat greater than the total by place of residence. For 1999 this difference amounted to 3,472 deaths.

Before 1970, except for 1964 and 1965, deaths of nonresidents of the United States occurring in the United States were treated as deaths of residents of the exact place of occurrence, which in most instances was an urban area. In 1964 and 1965, deaths of nonresidents of the United States occurring in the United States were allocated as deaths of residents of the balance of the county in which they occurred.

Residence error--Results of a 1960 study showed that the classification of residence information on the death certificates corresponded closely to the residence classification of the census records for the decedents whose records were matched (4).

A recent review of infant mortality rates for major urban areas suggests that the problem of residence error persists in vital statistics data despite the presence of an item on the U.S. Standard certificates of birth and death that asks whether residence was inside or outside city limits. Full resolution of this problem may require the application of automated systems for assigning addresses to geopolitical units.

Geographic classification

The rules followed in the classification of geographic areas for deaths are contained in NCHS instruction manual, Part 4 (3). The geographic codes assigned by NCHS on birth and death records are given in NCHS instruction manual Part 8 (5). Beginning with 1994 data, the geographic codes were modified to reflect results of the 1990 census. For 1982-93 codes are based on the results of the 1980 census and for 1970-81 on the 1970 census.

Metropolitan statistical areas--The Metropolitan statistical areas (MSA's) and Primary metropolitan statistical areas (PMSA's) are those established by the U.S. Office of Management and Budget as of April 1, 1990, and used by the U.S. Bureau of the Census (6), except in the New England States.

Outside the New England States, an MSA has either a city with a population of at least 50,000 or a U.S. Bureau of the Census urbanized area of at least 50,000 and a total MSA population of at least 100,000. A PMSA consists of a

large urbanized county or cluster of counties that demonstrate very strong internal economic and social links and has a population over one million. When PMSA's are defined, the larger area of which they are component parts is designated a Consolidated Metropolitan Statistical Area (CMSA) (7).

In the New England States, the U.S. Office of Management and Budget uses towns and cities rather than counties as geographic components of MSA's and PMSA's. However, NCHS cannot use this classification for these States because its data are not coded to identify all towns. Instead, NCHS uses New England County Metropolitan Areas (NECMA's). Made up of county units, these areas are established by the U.S. Office of Management and Budget (8).

Metropolitan and nonmetropolitan counties--Independent cities and counties included in MSA's and PMSA's or in NECMA's are included in data for metropolitan counties; all other counties are classified as nonmetropolitan.

Population-size groups--Beginning with the 1994 data year, vital statistics data for cities and certain other urban places were classified according to the population enumerated in the 1990 Census of Population. Data are available for individual cities and other urban places of 10,000 or more population. As a result of changes in the enumerated population between 1980 and 1990, some urban places are no longer identified separately and other urban places have been added. Data for the remaining areas not separately identified appear under the heading “balance of area” or “balance of county.” For the years 1982-93 classification of areas was determined by the population enumerated in the 1980 Census of Population and for the years 1970-81 in the 1970 Census of Population.

Urban places other than incorporated cities include the following:

- Each town in New England, New York, and Wisconsin and each township in Michigan, New Jersey, and Pennsylvania that had no incorporated municipality as a subdivision and had either 25,000 inhabitants or more, or a population of 10,000 to 25,000 and a density of 1,000 persons or more per square mile.
- Each county in States other than those indicated above that had no incorporated municipality within its boundary and had a density of 1,000 persons or more per square mile. (Arlington County, Virginia, is the only county classified as urban under this rule.)
- Each place in Hawaii with a population of 10,000 or more. (There are no incorporated cities in the State.)

Before 1964 places were classified as “urban” or “rural.” Technical appendixes for earlier years discuss the previous classification system.

State or country of birth

Mortality statistics by State or country of birth became available beginning with 1979. State or country of birth of a decedent is assigned to 1 of the 50 States or the District of Columbia; or to Puerto Rico, the Virgin Islands, Guam, American Samoa, or Northern Marianas--if specified on the death certificate. The place of birth is also tabulated for Canada, Cuba, Mexico, and for the remainder of the world. Deaths for which information on State or country of birth was unknown, not stated, or not classifiable accounted for a small proportion of all deaths in 1999, about 0.6 percent.

Early mortality reports published by the U.S. Bureau of the Census contained tables showing nativity of parents as well as nativity of decedent. Publication of these tables was discontinued in 1933. Mortality data showing nativity of decedent were again published in annual reports for 1939-41 and for 1950.

Age

The age recorded on the death certificate is the age at last birthday, the same as the age classification used by the U.S. Bureau of the Census. For 1999 data, 356 resident death records (0.01 percent) contained not-stated age. For computation of age-specific and age-adjusted death rates, deaths with age not stated are excluded. For life table computation, deaths with age not stated are distributed proportionately among age categories.

Race

For vital statistics in the United States in 1999, deaths are classified by race--white, black, American Indian, Chinese, Hawaiian, Japanese, Filipino, and Other Asian or Pacific Islander. Beginning with 1992 data, an expanded code structure was used for seven States--California, Hawaii, Illinois, New Jersey, New York, Texas, and Washington--showing five additional Asian or Pacific Islander groups. These groups are Asian Indian, Korean, Samoan, Vietnamese, and Guamanian. In 1990, at least two-thirds of the U.S. population of each of these groups lived

in this seven-State reporting area: Asian Indian, Korean, and Vietnamese, 63-66 percent; Guamanian, 74 percent; and Samoan, 84 percent (9). Minnesota was added to the list of States reporting expanded race codes in 1995, and Missouri and West Virginia were added in 1999. This additional race detail is available on the mortality public-use data set (10). Beginning with 1992 data, all records coded to "Other races" (0.02 percent of the total deaths in 1999) were assigned to the specified race of the previous record rather than to a separate category called "Other races." Mortality data for Filipino and Other Asian or Pacific Islander were shown for the first time in 1979.

The white category includes, in addition to persons reported as white, those reported in the race item on the death certificate as Hispanic, Mexican, Puerto Rican, Cuban, and all other Caucasians. The American Indian category includes North, Central, and South American Indian, Eskimo, and Aleut. If the racial entry on the death certificate indicates a mixture of Hawaiian and any other race, the entry is coded to Hawaiian. If a mixture of races is given (except Hawaiian), the entry is coded to the first race listed. This procedure has been used since 1990. From 1969 through 1989, if the race was given as a mixture of white and any other race, the entry was coded to the appropriate nonwhite race. If a mixture of races other than white was given (except Hawaiian), the entry was coded to the first race listed. Before 1969 if the entry for race was a mixture of black and any other race except Hawaiian, the entry was coded to black.

Multi-racial--Death certificates for some States have a checkbox for multi-racial. Some States are mandated by law to code multi-racial as a separate category. For these States, death records with an entry of multi-racial but without a specified racial entry or entries were assigned to the specified race of the previous record. States not mandated to code multi-racial may code multi-racial in the same way as mandated States or may code multi-racial to "Other entries." For death records where race is coded to "Other entries", if origin is Hispanic and the place of birth is Puerto Rico, Cuba or Mexico, the race is assigned as White. Otherwise, except for Puerto Rico, death records with race coded to "Other entries" were assigned to the specified race of the previous record with known race. For Puerto Rico, if race is coded to "Other entries", race is assigned to "Other races."

Race not stated--For 1999 the number of death records for which race was unknown, not stated, or not classifiable was 2,818 or 0.1 percent of the total deaths. Beginning in 1992 death records with race not stated were assigned to the specified race of the previous record with known race. From 1965 to 1991 death records with race entry not stated were assigned to a racial designation as follows: If the preceding record was coded white, the code assignment was made to white; if the code was other than white, the assignment was made to black. Before 1964 all records with race not stated were assigned to white except records of residents of New Jersey for 1962-64.

New Jersey, 1962-64--New Jersey omitted the race item from its certificates of live birth and death in the beginning of 1962. The item was restored during the latter part of 1962. However, the certificate revision without the race item was used for most of 1962 as well as 1963. Therefore, figures by race for 1962 and 1963 exclude New Jersey. For 1964, 6.8 percent of the death records used for residents of New Jersey did not contain the race item.

Adjustments made in vital statistics to account for the omission of the race item in New Jersey for part of the certificates filed during 1962-64 are described in the Technical Appendix of *Vital Statistics of the United States* for each of those data years.

Quality of race data--A number of studies have been conducted on the reliability of race reported on the death certificate. These studies compare race reported on the death certificate with that reported on another data collection instrument such as the census or a survey. Race information on the death certificate is reported by the funeral director as provided by an informant, often the surviving next of kin, or, in the absence of an informant, on the basis of observation. In contrast, race on the census or the Current Population Survey (CPS) is obtained while the individual is still alive and is self-reported or reported by a member of the household familiar with the individual and, therefore, may be considered more valid. A high level of agreement between the death certificate and the census or survey report is essential to ensure unbiased death rates by race.

In one study a sample of approximately 340,000 death certificates was compared with census records for a 4-month period in 1960 (11). Percent agreement was 99.8 percent for white decedents, and 98.2 percent for black decedents; but less for the smaller minority groups (table A); the net difference in the number of deaths between the census records and death certificates can be expressed as a ratio of the census to the death certificate. A ratio of 1.00 for both white and black decedents (table A) indicates that the number of deaths for these race groups was essentially the same for these two sources.

In another study, the National Longitudinal Mortality Study (NLMS), a total of 59,000 death certificates were compared with responses to the race questions from a total of 9 CPS's conducted by the U.S. Bureau of the Census for the years 1979-89 (12). The NLMS ratio of CPS deaths to death certificate deaths for white and black decedents was 1.00 as in the earlier study; however, the ratio for American Indian was 1.37 indicating that 37 percent more

decedents were identified as American Indian in the CPS as compared to the death certificate. The ratio for Asians was 1.13 (table A).

Problems of validity and reliability of race-reporting can also arise from errors in population counts and estimates that comprise the denominator of death rates. Based on the 1990 Post-Enumeration Survey (13), net census undercount ratios may be computed. The census undercount ratio is based on the ratio of the 1990 resident census-level population to the resident population adjusted for the census undercount. A ratio of less than 1.00 indicates a net census undercount. The undercount ratios for non-Hispanic white and Other was 0.99; for the black population, 0.95; for the Asian or Pacific Islander population, 0.98; and the American Indian population, 0.88 (12).

Generally, misclassification in the numerator data (deaths), taken alone, results in death rates that are too small. In contrast, the undercoverage problem in the denominator data (population) tends to have the opposite effect: it biases rates upward. Thus biases from misclassification of race in the numerator and denominator work in opposite directions, one tending to deflate rates, the other to inflate them. Consequently, a comprehensive estimate of death rates by race should take into account the offsetting reporting biases in the numerator and denominator. The approximate effects of reporting bias and undercoverage for the race groups may be estimated by multiplying the NLMS ratio by the census undercount ratio forming a "combined ratio." The approximate "combined ratio" for the white population was 0.99 (1.00 x 0.99); for the black population, 0.95 (1.00 x 0.95); for the American Indian population, 1.21 (1.37 x 0.88); and for the Asian or Pacific Islander population, 1.11 (1.13 x 0.98). Multiplying a death rate by the "combined ratio" produces an estimated rate that takes into account both reporting bias and undercoverage (table B) (12).

In 1986 the National Mortality Followback Survey, conducted by NCHS, listed a question about the race of decedents 25 years old and over. The total sample was 18,733 decedents (14). The rates of agreement were similar to those observed in the other studies.

All of these studies show that persons self-reported as American Indian or Asian on census and survey records (and by informants in the Followback Survey) were sometimes reported as white on the death certificate. The net effect of misclassification is an underestimation of deaths and death rates for races other than white and black.

Hispanic deaths

Mortality statistics for the Hispanic population are based on information for the entire United States. Data year 1997 was the first year that mortality data for the Hispanic population were available for all 50 States and the District of Columbia.

Hispanic mortality data were collected from reporting States and published by NCHS for the first time in 1984. The number of reporting States increased over time as did the quality of reporting. The number of States whose Hispanic data was considered of sufficient quality for analysis and publication by NCHS is shown by year from 1984-1999 in table C. Also shown in table C is the estimated percent of the Hispanic population in the United States accounted for by the reporting States for each year from 1984 to 1999. Table D shows the years in which Hispanic origin information was first collected from a State and the year the data was considered to be of sufficiently good quality for analysis and publication. From 1984-1991, Hispanic origin data was considered to be of good quality for use in analysis if it was sufficiently comparable across States and was at least 90 percent complete on a place-of-occurrence basis. In 1992, the criterion was changed to 80 percent complete on a place-of-occurrence basis. In 1984, the percent of deaths for which Hispanic origin was missing or unknown varied widely among reporting States, ranging from less than one percent in Hawaii to 34.8 percent in Tennessee. Over time the completeness of mortality data by Hispanic origin has increased dramatically. In 1999, the percent varied little by State, and was low for all States, the District of Columbia, and New York City, ranging from zero percent in seven States (Idaho, Iowa, Maryland, Oklahoma, South Dakota, West Virginia, and Wisconsin) to 3.0 percent in North Dakota and 3.5 percent in New York City.

Generally, reporting States have used items similar to one of two basic formats recommended by NCHS. The first format is directed specifically toward the Hispanic population and appears on the U.S. Standard Certificate of Death as follows:

- WAS DECEDENT OF HISPANIC ORIGIN?
  (Specify No or Yes--If Yes, specify Cuban, Mexican, Puerto Rican, etc.)
  No ___ Yes
  Specify:

The second format is a more general ancestry item and appears as follows:

- ANCESTRY--Mexican, Puerto Rican, Cuban, African, English, Irish, German, Hmong, etc., (*specify*)

Death rates --Death rates for the total Hispanic population and race for non-Hispanic origin utilize demographically-derived population estimates produced by the Bureau of the Census (15). These estimates are based on 1990 census level counts; however, revised populations for 1999 that are consistent with the 2000 census levels are available on the NCHS website at http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

Population estimates for Mexicans, Puerto Ricans, Cubans, and Other Hispanics are based in part on the Current Population Survey and have not been revised (16). Rates using the Current Population Survey are subject to sampling variation as well as random variation (see "Random variation and sampling errors").

In 1990 and 1991, data for New York City were excluded because of the large proportion of deaths (in excess of 10 percent) occurring in New York City for which Hispanic origin was not stated or was unknown. Because New York City accounts for about a third of the deaths to Puerto Ricans, the resulting mortality data was not comparable with previous years. In 1994 New York City instituted the use of a revised death certificate where the race and ethnic items were to be completed by the funeral director. Previously these items were completed by the physician or medical examiner. From 1994-99, only 3-4 percent of the deaths occurring annually in New York City were coded to Unknown origin; whereas 23 percent were coded to Unknown origin in 1993. Between 1993 and 1994 the number of deaths occurring in New York City decreased 69 percent for Other and unknown Hispanic and 83 percent for Unknown origin. As a result of increased specificity in reporting ethnic origin, the number of deaths increased substantially in 1994 for Non-Hispanic and for each of the specified Hispanic subgroups.

Quality of data on Hispanic deaths--The NLMS examined the reliability of Hispanic origin reported on 43,520 death certificates with that reported on a total of 12 CPS's conducted by the U.S. Bureau of the Census for the years 1979-85 (17). The NLMS ratio of deaths for CPS's divided by deaths for death certificate was 1.07 indicating net underreporting of Hispanic origin on death certificates as compared with self-reports on the surveys of 7 percent (table A). The NLMS ratios for specified Hispanic groups are shown in table A.

Problems of validity and reliability of Hispanic origin-reporting can also arise from errors in population counts and estimates that comprise the denominator of death rates. Based on the 1990 Post-Enumeration Survey, the undercount ratio for the total Hispanic population was 0.95 (13).

As was the case for race-reporting, a comprehensive estimate of death rates by Hispanic origin should take into account the offsetting reporting biases in the numerator and denominator. The approximate effects of reporting bias and undercoverage for the total Hispanic population may be estimated by multiplying the NLMS ratio by the census undercount ratio forming a "combined ratio." The approximate "combined ratio" for the total Hispanic population was 1.02 (1.07 x 0.95). Multiplying a death rate by the "combined ratio" produces an estimated rate that takes into account both reporting bias and undercoverage (table B) (12).

Marital status

Mortality statistics by marital status have been published annually since 1979. They were previously published in *Vital Statistics of the United States* for 1949-51 and 1959-61. Mortality data by marital status is generally of high quality. A study of death certificate data using the 1986 National Mortality Followback Survey showed a high level of consistency in reporting marital status (14). Several earlier reports analyzing mortality by marital status have also been published, including the special study based on 1959-61 data (18). Reference to other earlier reports is given in the appendix of part B of the 1959-61 special study.

Mortality statistics by marital status are tabulated separately for never married, married, widowed, and divorced. Deaths for which the marriage is specified as being annulled are classified as never married. Marital status specified

as separated or common-law marriage is classified as married. Of the 2,350,262 resident deaths 15 years of age and over in 1999, 9463 certificates (0.4 percent) had marital status not stated.

Death rates -- Death rates for marital status use population estimates produced by the Bureau of the Census based on the Current Population Survey (16). Because these population estimates are subject to sampling variation, death rates based on them are subject to both sampling variation as well as random variation (see "Random variation and sampling errors").

Educational attainment

Deaths by educational attainment have been included on the public use data sets since 1989. These data were obtained from information reported on the death certificate using the following item:

- DECEDENT'S EDUCATION *(Specify only highest grade completed)*
  Elementary/Secondary (0-12)
  College (1-4 or 5+)

It is recommended for 1999 that analyses of educational attainment data include deaths to residents of 46 States and the District of Columbia whose data were approximately 80 percent or more complete on a place-of-occurrence basis. Although data for Kentucky are included on the data set, they would be excluded from analyses because more than 20 percent of their death certificates were classified to "unknown educational attainment." Data for Georgia, Rhode Island, and South Dakota are excluded from the data set because their death certificates did not include an educational attainment item.

Death rates for educational attainment are based on population estimates derived from the U.S. Bureau of the Census' Current Population Survey (CPS) and adjusted to resident population control totals. As a result, the rates are subject to the variability of the denominator as well as the numerator. For a discussion concerning computing the relative standard errors, 95-percent confidence intervals, and statistical tests, refer to the Technical notes of the National Vital Statistics Reports (19).

Death rates for educational attainment may be biased for the following reasons: 1) inconsistencies in reporting between the death certificates and the CPS for decedents; 2) changes in the basic item used to collect data about education in the CPS; and 3) possible under-enumeration of the population estimates by educational attainment (there have been no studies evaluating this potential bias).

In the National Longitudinal Mortality Survey (NLMS) a total of 9,257 death certificates were compared with responses to educational attainment questions from a total of 12 CPS's conducted by the U.S. Bureau of the Census for data year 1989 (20). Based on the results of this study and after proportionally allocating the "unknown education" on the death certificate, the ratio of CPS deaths having reported less than a high school education (grades 0-11) to death certificate deaths having reported less than high school education was about 1.37. This indicates that the number of deaths and death rates for decedents having less than high school education are biased downward in the vital statistics data by about 37 percent. Similarly, the corresponding ratios for having completed high school (grade 12) and having completed more than high school (grades 13 and more) are 0.70 and 0.87 respectively.

In the CPS, the item used to collect education information was changed in 1992 from:

> 23a) What is the highest grade or year of regular school ... has ever attended?;
>
> 23b) Did ... complete that grade (year?); Yes, No

to:

> 23) What is the highest level of school ... has completed or the highest degree ... has received?

Based on a Bureau of the Census study (21), the ratio of population estimates derived from the "old" educational attainment definition for less than a high school education (grades 0-11) to population estimates derived from the "new" definition for less than high school education was about 0.99. This indicates that the death rates for decedents having less than high school education are biased upward in the vital statistics data by about 1 percent. Similarly, the

corresponding ratios for having completed high school (grade 12) and having completed more than high school (grades 13 and more) were 1.15 and 0.93 respectively.

Accounting for both the inconsistency in reporting between the death certificates and the CPS for decedents and the change in the definition of education population estimates may be accomplished simultaneously by combining the above ratios. The combined ratio for less than high school is about 1.36 (1.37 x .99), for high school about 0.81 (0.70 x 1.15), and for more than high school about 0.81 (0.87 x .93). These ratios may vary by age, sex, race/Hispanic origin, cause of death, and geographic area.

Injury at work

Deaths for "Injury at work" were included on the 1993 public-use data sets for the first time. These data were obtained from the following item that appears on the U.S. Standard Certificate of Death:

- INJURY AT WORK?
  (Yes or no)

All States have this item on their death certificates.

Occupation and industry

Deaths by occupation and industry are included on the 1999 public-use data sets and CD-ROM. These data have been included since 1985 and were obtained from the following items that appear on the U.S. Standard Certificate of Death:

- DECEDENT'S USUAL OCCUPATION
  (Give kind of work done during most of working life.
  Do not use retired.)

- KIND OF BUSINESS/INDUSTRY

For 1999, the occupation and industry mortality data were included for the following 18 reporting States:

Colorado	New Jersey
Georgia	New Mexico
Hawaii	North Carolina
Idaho	Rhode Island
Kansas	South Carolina
Kentucky	Utah
Nebraska	Vermont
Nevada	West Virginia
New Hampshire	Wisconsin

Data for 1993-99 were coded using the revised NCHS Part 19 instruction manual (22) and the Bureau of the Census 1990 occupation and industry titles and three-digit codes, which are shown in the 1990 Census of Population and Housing (23).

Occupation and industry mortality data for 1984-92 were based on the 1980 Bureau of the Census occupation and industry classifications. For a listing of the changes between the 1980 and the 1990 classification systems, see Appendix D of the NCHS Part 19 instruction manual (22).

In addition to the codes shown in the Bureau of the Census publication (23), the following special codes were created:

Occupation	Industry
913 Retired	961 Own Home/At Home
914 Housewife/ Homemaker	970 Retired
915 Student	990 Blank, Unknown, NA
916 Volunteer	
917 Unemployed, never worked, disabled, child, infant	
999 Blank, Unknown, NA	

Place of death and status of decedent

Mortality statistics by type of place of death have been shown annually in *Vital Statistics of the United States* since 1979. Before that year they were published in 1958 (tables 1-30--1-32). In addition, mortality data also were available for the first time in 1979 for the status of decedent when death occurred in a hospital or medical center. The 1999 data were obtained from the following two items appearing on the revised U.S. Standard Certificate of Death (1):

- PLACE OF DEATH *(check only one)*

  HOSPITAL: ☐ Inpatient ☐ ER/Outpatient ☐ DOA

  OTHER: ☐ Nursing Home ☐ Residence ☐ Other *(specify)*

- FACILITY NAME *(If not institution, give street and number)*

Before the 1989 revision of the Standard Certificate of Death, information on place of death and status of decedent could be determined if hospital or institution indicated Inpatient, Outpatient, ER, or DOA, and if the name of the hospital or institution, which was used to determine the kind of facility, appeared on the certificate. The change to a checkbox format in many States for this item may affect the comparability of data for 1989 and subsequent years with data for years before 1989.

All of the States (including New York City) and the District of Columbia have this item (or its equivalent) on their certificates. For all reporting States and the District of Columbia in the VSCP, NCHS accepts the State definition, classification, or code for hospitals, medical centers, nursing homes, or other institutions.

Effective with data for 1980, the coding of place of death and status of decedent was modified. A new coding category was added: "Dead on arrival--hospital, clinic, or medical center." Had the 1979 coding categories been used, these deaths would have been coded to "Place unknown."

California--For the first 5 months of data year 1989, California coded "Place of death" to "other" rather than "residence".

Mortality by month and date of death

Deaths by month have been tabulated regularly and are available for each year since 1900. Deaths from selected causes by date of death have been published each year since 1972 and are available for 1962.

Numbers of deaths by date of death are produced for the total number of deaths and for the numbers of deaths for the following causes, for which the greatest interest in date of occurrence of death has been expressed: Motor vehicle accidents, Intentional self-harm (suicide), Assault (homicide), Influenza and pneumonia, Pedestrian involved in collision with motor vehicle, and Falls. (See NCHS websites http://www.cdc.gov/nchs/products/pubs/pubd/vsus/vsus.htm and http://www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm#general.)

These data show the frequency distribution of deaths for selected causes by day of week. They also make it possible to identify holidays with peak numbers of deaths from specified causes.

Report of autopsy

Beginning with the 1995 data year, mortality data on autopsy are no longer collected due to budgetary constraints.

Cause of death

Cause-of-death classification--Since 1949 cause-of-death statistics have been based on the underlying cause of death, which is defined as "(a) the disease or injury which initiated the train of events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury" (24).

For each death the underlying cause is selected from an array of conditions reported in the medical certification section on the death certificate. This section provides a format for entering the cause of death sequentially. The conditions are translated into medical codes through use of the classification structure and the selection and modification rules contained in the applicable revision of the *International Classification of Diseases* (ICD), published by the World Health Organization (WHO). Selection rules provide guidance for systematically identifying the underlying cause of death. Modification rules are intended to improve the usefulness of mortality statistics by giving preference to certain classification categories over others and/or to consolidate two conditions or more on the certificate into one classification category.

As a statistical datum, underlying cause of death is a simple, one-dimensional statistic; it is conceptually easy to understand and a well-accepted measure of mortality. It identifies the initiating cause of death and is therefore most useful to public health officials in developing measures to prevent the onset of the chain of events leading to death. The rules for selecting the underlying cause of death are included in ICD as a means of standardizing classification, which contributes toward comparability and uniformity in mortality medical statistics among countries.

Tabulation lists--Beginning with data year 1999, the cause-of-death statistics published by NCHS are classified according to the Tenth Revision of the *International Classification of Diseases* (ICD-10) (24).

Eight lists of causes have been developed by NCHS from ICD-10 for tabulation and publication of mortality data--the Each-Cause List, List of 358 Selected Causes of Death, List of 113 Selected Causes of Death, List of 130 Selected Causes of Infant Death, List of 39 Selected Causes of Death, List of 124 Selected Causes of Fetal Death, List of Motor Vehicle Accident Deaths, and List of Injury, Poisoning and Certain Other Consequences of External Causes. Seven of the lists are used for both underlying and multiple causes of death, and one for multiple causes of death only. These lists were designed to be as comparable as possible with the NCHS lists used under the Ninth Revision of the *International Classification of Diseases* (ICD-9) (25). The lists were developed to separately identify causes of death specified by the WHO in its recommended mortality tabulation lists; to the extent possible, to maintain continuity with past lists for historic continuity and to facilitate trend analysis; and to separately identify causes of death that are of public health and medical importance. With the exception of the Each-Cause List, these lists are published in the NCHS Instruction Manual, Part 9, ICD-10 Cause-of-Death Lists for Tabulating Mortality Statistics, Effective 1999 (26). The Each-Cause List is available in electronic form on the Internet at http://www.cdc.gov/nchs/about/major/dvs/icd10des.htm or upon request from NCHS.

The Each-Cause List is made up of each four-character alphanumeric code in ICD-10 that is to be used for underlying cause-of-death classification. This list is used for the tabulation of data for the entire United States, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas.

The List of 358 Selected Causes of Death contains, either directly or by combining titles, the 103 categories in the WHO Mortality Tabulation List 1 and the 80 categories in the WHO Mortality Tabulation List 2 (24). The List of 358 Selected Causes of Death is comparable to the List of 282 Selected Causes of Death in ICD-9.

The List of 113 Selected Causes of Death was, in part, constructed by combining titles in the List of 358 Selected Causes of Death. It is used for the general analysis of mortality and for ranking leading causes of death excluding infants (see "Cause-of-death ranking"). It is comparable to the List of 72 Selected Causes of Death in ICD-9. The figure in the name of the list refers to the number of mutually exclusive categories in the list. The 113-cause list contains a total of 135 cause-of-death categories, 113 of which are mutually exclusive.

The List of 130 Selected Causes of Infant Death shows more detailed titles for Certain conditions originating in the perinatal period and Congenital malformation, deformation and chromosomal abnormalities than any other list except the Each-Cause List. It is used for the analysis of infant mortality and for ranking leading causes of infant

death (see "Cause-of-death ranking"). It is comparable to the List of 61 Selected Causes of Death in ICD-9. The 130-cause list contains a total of 158 cause-of-death categories, 130 of which are mutually exclusive.

The List of 39 Selected Causes of Death was created by combining titles in the List of 113 Selected Causes of Death. This list is used for tabulating data by detailed geographic area. It is comparable to the List of 34 Selected Causes of Death in ICD-9.

The newly-introduced List of 124 Selected Causes of Fetal Death is used to tabulate causes of fetal death. The structure of the list parallels that of the List of 130 Selected Causes of Infant Death.

A special List of Motor Vehicle Accident Deaths was developed out of necessity because the ICD-10 categories for motor vehicle accidents differ substantially from those in ICD-9. In ICD-9 the focus of the motor vehicle accident section was on the nature of the accident, whereas in ICD-10, the focus is on the victim and the type of vehicle involved in the accident. This list is designed to maximize comparability with ICD-9 lists for trend comparison.

The List of Injury, Poisoning and Certain Other Consequences of External Causes is used for tabulating the ICD-9 equivalent of Nature-of-Injury codes. It is derived from Chapter XIX of ICD-10, *Injury, Poisoning and Certain Other Consequences of External Causes*. These categories are used for tabulating multiple causes of death, NOT underlying cause of death. For Chapters I to XVIII and Chapter XX of ICD-10, the same tabulation lists are used for both underlying and multiple causes of death.

Effect of ICD revisions --The International Classification of Diseases (ICD), used in the United States since 1900, has been revised approximately every 10 years, with the exception of the Ninth Revision which was used for 20 years, so that disease classifications may be consistent with advances in medical science and with changes in diagnostic practice. Each revision of the ICD has produced some break in comparability of cause-of-death statistics. However, revisions are essential to stay current with advances in medical science and to ensure the international comparability of health statistics. For the first five revisions the continuity in the mortality trends is not considered a problem of great concern. Van Buren described some of the major shifts in the cause-of-death statistics up to the Fifth Revision (1938) due to changes in the classification of causes of death (27). Dunn and Shackley measured the change in mortality statistics by cause due to the Fifth Revision (28). This was done by coding mortality records for 1940 by the 1929 and 1938 revisions. The results of the study have been useful in evaluating the effects of the Fifth Revision and changes in the joint-cause selection procedure.

Comparability--Studies of the comparability between revisions of the ICD have been carried out and published at least since the Fifth Revision. Comparability studies -- also called bridge-coding studies -- involve dual classification of a single year of mortality data, i.e., classifying the underlying cause of death on mortality records by both the new revision and the previous revision (29). The key element of a comparability study is the comparability ratio, which is derived from the dual classification. It is calculated by dividing the number of deaths for a selected cause of death classified by the new revision by the number of deaths classified to the most nearly comparable cause of death by the previous revision. The resulting ratio represents the net effect of the new revision on statistics for this cause and can be used as a factor to adjust mortality statistics for causes of death classified by a previous revision to be comparable to those for the same cause classified by the new revision.

Sixth Revision--The Sixth Revision of the International Lists of Diseases and Causes of Death was adopted by the World Health Organization in July 1948 and used for mortality data in the United States from 1949 through 1957. This revision represented a more sweeping change than any previous revision. The classification scheme was expanded considerably to provide specific categories for nonfatal diseases and injuries to provide a classification which could be used for coding morbidity as well as mortality records.

In addition to the expanded scope of the Sixth Revision of the International Classification, there was a major change in the method of selection of the cause of death for primary tabulation. A large proportion of death certificates filed annually in the United States reports two or more diseases or conditions as causes of death. General statistical practice requires that cases involving more than one cause of death be assigned to a single cause, making it necessary to select the one cause to which the death will be assigned. The method of selection has an important effect upon the resulting statistics.

In 1948 the World Health Assembly adopted, along with the Sixth Revision of the International Lists, a form of medical certification and rules for classification of the underlying cause of death for international use. The form of medical certification in the Standard Certificate of Death was designed to facilitate the selection of the underlying cause of death when two or more causes were recorded. In general, if the certification was completed properly, the underlying cause of death entered by the physician was the cause to be tabulated. This procedure, used in the United

States beginning with deaths in 1949, differed markedly from that used in previous years. Formerly, definite priority relationships were set up for combinations of causes reported on the death certificate. The single cause to be tabulated was chosen according to these fixed rules.

Comparability between the Sixth and Fifth Revision--To maintain a time series of mortality rates for comparable causes, the International Conference for the Sixth Revision of the International Lists recommended that deaths for a country as a whole in 1949 and 1950 be coded according to both the Sixth and Fifth Revisions. In the United States, 1950 mortality data were used for the dual coding. The differences resulting from the use of the two revisions are expressed by a factor termed the comparability ratio. This is the number of deaths assigned to a particular cause under the Sixth Revision divided by the number of deaths assigned to that cause using the Fifth Revision. Results of the comparability study and comparability ratios are published in *Comparability of mortality statistics for the Fifth and Sixth Revisions, United States, 1950*, and *Comparability ratios based on mortality statistics for the Fifth and Sixth Revisions, United States, 1950* (30,31).

Seventh Revision--Changes in the Seventh Revision were held to a minimum because of the relatively short experience with the Sixth Revision. In compliance with a recommendation of the Expert Committee on Health Statistics, the changes were limited to essential ones and amendments of errors and inconsistencies. Provisions previously contained in an addendum (32) were integrated into the manual (33). Since these provisions had been used with the Sixth Revision, they did not represent classification changes. The only change made in three-digit categories consisted of rewording a few titles. In a few cases the rewording included redefining morbid conditions classifiable to these categories and transferring certain terms from one category to another. The three-digit categories which were affected are listed in section 1, volume I, of *Vital Statistics of the United States,* 1958. There were also a number of changes in four-digit subcategories, consisting mostly of the addition of subdivisions to provide more detailed classification of malignant neoplasms of specified sites. The three-digit categories for which there were additions, deletions, or changes in the four-digit subcategories are also listed in section 1 of the 1958 report.

The international rules for selecting the cause of death for primary mortality classification were recast for use with the Seventh Revision to simplify them and to organize them from the viewpoint of the coder making the cause-of-death assignment. The intent of the rules remains the same, that is, to code the cause which the medical certifier judged to be the underlying cause starting the train of events leading directly to death. In recasting the rules, some interpretations were modified-mainly those involving selection of the underlying cause for improperly completed certifications. In adapting coding procedures to reporting practices in the United States, some additional changes in interpretations were made.

In the majority of cases, application of the rules for the Sixth and Seventh Revisions resulted in the same code assignment. There were some differences in individual assignments affecting a number of categories. Many of these individual assignments were compensatory and resulted in no detectable discontinuity of trends for various causes of death; the comparability of a number of categories was affected to a limited extent.

Comparability between the Seventh and Sixth Revisions--To estimate the magnitude of the effect of the Seventh Revision upon the comparability of mortality trends for various causes, a 10-percent sample of deaths in 1958 was classified using both the Sixth and Seventh Revisions. The comparability ratios for selected causes and a discussion of the results of this study are published in “Comparability of Mortality Statistics for the Sixth and Seventh Revisions, United States, 1958" (34).

Eighth Revision--During the data years 1968-78 the cause-of-death statistics published by the National Center for Health Statistics were classified in accordance with the *Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA) (35) which was based on the 1965 Revision of the International Classification of Diseases (ICD) (36). The ICDA gave greater detail and specificity in some categories than was provided by the Eighth Revision of the ICD. Complete correspondence between these two classifications was maintained at the three-digit level, but new four-digit subdivisions were created in various parts of the ICDA. Where necessary, existing four-digit subdivisions were renumbered to accommodate the additional subcategories in logical sequence. In the ICDA, subdivisions which did not correspond exactly with the ICD were identified by asterisks. In *Vital Statistics of the United States* for each of the years 1968-78 those four-digit subcategory numbers which differed from those in the ICD were also shown with asterisks.

The Eighth Revision contained major modifications in several sections of the mortality tabulation lists. Also, the international rules for selecting the underlying cause were simplified. In addition, changes were introduced in the special rules and decisions which adapted the coding procedures to reporting practices in the United States. The

important changes are summarized for each of these sections in the introduction to the ICDA, pages xxiv-xxviii. Following are some of the many changes made:

Infective and parasitic diseases--In the Seventh Revision, list titles for diarrheal conditions were scattered over several sections of the classification. In the Eighth Revision all the Seventh Revision subdivisions for these conditions, including those for infants, were brought together under one category, Diarrheal disease (009).

Diseases of the nervous system and sense organs--Vascular lesions affecting central nervous system (330-334) in the Seventh Revision were transferred in the Eighth Revision to "section VII, Diseases of the circulatory system," where they appeared as Cerebrovascular diseases (430-438).

Certain causes of perinatal morbidity and mortality--This section represented an integration of "Section XV, Certain diseases of early infancy" and Classification of causes of stillbirth (Y30-Y39) in the Seventh Revision. The age qualifications used in previous revisions to classify the same conditions in or outside this section were deleted. For example, Pneumonia of newborn (763) of the Seventh Revision was no longer in this section. Instead, it was included in the Eighth Revision with Pneumonia (480-486), to which pneumonias are assigned without regard to age.

Accidents, poisonings, and violence--A new subsection (E980-E989) was introduced for the classification of deaths where it was not possible for the certifier to determine whether the injuries were accidentally or purposely inflicted.

Comparability between the Eighth and Seventh Revisions--To measure the degree of discontinuity in cause-of-death statistics resulting from the introduction of the Eighth Revision, provisional estimates of selected comparability ratios based on dual coding of a stratified sample of 1966 death certificates by the Seventh and Eighth Revisions of the International Classification of Diseases were computed. These ratios appeared in the *Monthly Vital Statistics Report* of the National Center for Health Statistics, Volume 17, Number 8, Supplement; and in Comparability of Mortality Statistics for the Seventh and Eighth Revisions of the International Classification of Diseases, United States, *Vital and Health Statistics,* Series 2, No. 66, DHEW Pub. No. (HRA) 76-1340.

Significant coding changes during the Eighth Revision--Beginning with 1969 a special four-digit subcategory, Chronic obstructive lung disease (*519.3), was added to obtain the number of certificates on which medical certifiers had entered this more general term rather than a more specific diagnosis of chronic bronchitis, emphysema, or asthma. The number of certificates assigned to (*519.3) increased from 2,704 for 1969 to 28,613 for 1978. It is necessary to add together the number of deaths assigned to this new four-digit category and the number of deaths assigned to Bronchitis, emphysema, and asthma (ICDA Nos. 490-493) to obtain a measure of mortality from all chronic obstructive lung diseases.

To provide that deaths would not be assigned to Chronic obstructive lung disease (*519.3) if a more specific diagnosis such as chronic bronchitis, emphysema, or asthma also appeared on the death certificate, the coding procedures were updated for 1971 and 1972 data years in accordance with the following linkages:

*519.3 Chronic obstructive lung disease without mention of asthma, bronchitis, or emphysema

Excludes conditions in *519.3 *with* conditions in:

490 Bronchitis (491) (Chronic bronchitis)
491 (Chronic bronchitis) (491)
492 (Emphysema) (492)
493 (Asthma) (493)

But the limitation imposed by these linkage provisions did not alter the upward trend in the number of deaths assigned to Chronic obstructive lung disease without mention of asthma, bronchitis, or emphysema (*519.3). The number of deaths assigned to (*519.3) increased from 6,321 for 1971 to 8,210 for 1972.

Under the Eighth Revision of the ICDA, deaths assigned to chronic obstructive lung disease or chronic obstructive pulmonary disease were assigned to Other diseases of lung (ICDA No. 519.2). Despite the transfer of these deaths from this category to the new category Chronic obstructive lung disease (No.*519.3), the number of

deaths assigned to Other diseases of lung (ICDA No. 519.2) also continued to increase--from 1,306 deaths for 1969 to 2,318 for 1978.

Also beginning with 1971 a special four-digit subcategory (*E854.8) was added to identify Acute narcotism, not otherwise specified, whether or not the circumstances were undetermined. Also, a preference was given to Drug dependence (ICDA No. 304) when a statement of drug dependence or a synonymous term appeared on the certificate with mention of poisoning by certain addictive drugs.

In addition, beginning with 1971 the term "cerebral sclerosis (general)" was classified to Generalized ischemic cerebrovascular disease (ICDA No. 437) rather than to Other demyelinating diseases of central nervous system (ICDA No. 341). As a result of this transfer, the number of deaths assigned to this latter category decreased from 569 for 1970 to 96 for 1971.

For 1973 the significant coding changes were concerned with the sudden infant death syndrome (SIDS). NCHS modified the ICDA and the procedures for classifying information recorded on the death certificate to facilitate the identification and analysis of data related to known and suspected cases of SIDS. Three fourth-digit subdivisions were created under ICDA category 795 (Sudden death). These subdivisions together with the inclusion terms are as follows:

*795.0 Sudden infant death syndrome, under 1 year of age

Acute fatal infant syndrome
Cause unknown
Cot or crib death
Died without sign of disease, so stated
Found dead (in bed, cot, cradle, crib, etc.) (infant)
Infant found in bed
Other unknown and unspecified causes, so stated
SDII, SID, SIDS, SUDI, SUID
Sudden death (in infancy) (infant) (syndrome) (unattended) (unexpected) (unexplained)
Undetermined (cause) (in infancy) (infant)
Unexpected death (in infancy) (infant)
Unexplained death (in infancy) (infant)
Unknown (cause)

*795.1 Sudden death syndrome, 1 year of age
The same terms under *795.0 when age is 1 year

*795.2 All other sudden deaths, age 2 years and over

Died suddenly	Fell dead
Dropped dead	Sudden death

Ninth Revision--From 1979-98 cause of death statistics were classified by NCHS in accordance with the Ninth Revision (25). The Classification in the Ninth Revision, as in the Eighth Revision, was arranged in 17 main sections or chapters. The first chapter dealt with diseases caused by well-defined infectious and parasitic agents. The next two chapters dealt with categories for Neoplasms and for Endocrine, nutritional and metabolic diseases and immunity disorders. Most of the remaining chapters were arranged according to the principal anatomical sites of diseases with special chapters for Mental disorders; Complications of pregnancy, childbirth, and the puerperium; Congenital anomalies; Certain conditions originating in the perinatal period; and a chapter for Symptoms, signs, and ill-defined conditions.

The last chapter (XVII), Injury and poisoning, represented a decided departure from the corresponding chapter in previous revisions. The role of the E code for external causes was changed. In the Sixth, Seventh, and Eighth Revisions, chapter XVII-Accidents, poisonings, and violence-consisted of two alternative classifications, one according to the nature of the injury (the N code), and the other according to the external cause (the E code). In the Ninth Revision, chapter XVII consists only of titles for nature of injury as part of the main classification. The N prefix that was used before the category numbers for these titles in the Eighth Revision was dropped. In the Ninth Revision the E code was a supplementary classification. For underlying cause of death, where both an E code and another code were applicable, the E code was still used when the other code was from chapter XVII. When the other code was from chapters I-XVI, that code and not the E code was used.

In many ways, the Ninth and the Eighth Revisions are similar. The essential basis of the Eighth Revision was retained as much as possible (37). Thus, overall blocks of classification numbers previously allocated to each chapter were retained. The Ninth Revision is, however, more specific. Thus, many Eighth Revision category numbers were split into more fourth-digit subcategories. In addition, categories and subcategories not found in the Eighth Revision were added to the Ninth Revision.

Following are some of the major changes between the Eighth and Ninth Revisions, applicable to underlying cause coding in the United States. They are arranged according to the chapters in the Ninth Revision of the ICD.

I. *Infectious and parasitic diseases*--Under the Ninth Revision, colitis, diarrhea, enteritis, and gastroenteritis, without further specification, were assumed to be of noninfectious origin and are classified to chapter IX, Diseases of the digestive system. In the Eighth Revision, unless stated to be noninfectious or due to a noninfectious condition, they were assumed to be of infectious origin and were coded to chapter I, Infective and parasitic diseases. This change transferred deaths that were assigned by the Eighth Revision to Diarrheal diseases (ICDA No. 009) to the Ninth Revision title Other noninfective gastroenteritis and colitis (ICD No. 558).

A section pulling together all late effects of infectious and parasitic diseases was added to chapter I in the Ninth Revision. In the Eighth Revision a few conditions had special late effects codes; for certain other conditions late effects were coded to the resulting chronic condition; for the remaining conditions in chapter I, late effects were coded to the regular code for the infectious or parasitic disease.

II. *Neoplasms*--A new section, Neoplasms of uncertain behavior (ICD Nos. 235-238), was added to this chapter.

III. *Endocrine, nutritional, and metabolic diseases and immunity disorders*--A separate category for Alzheimer's disease (ICD No.331.0)--was added to this chapter.

VII. *Diseases of the circulatory system*--According to the Ninth Revision, Cardiovascular disease, unspecified (ICD No. 429.2) was separated from Ischemic heart disease (ICD Nos. 410-414).

The Ninth Revision transferred Heart failure, unspecified (ICD No. 428.9) to this chapter--Diseases of the circulatory system--from the Eighth Revision chapter XVI, Symptoms and ill-defined conditions (ICDA Nos. 780-796), where it appeared as Acute heart failure, undefined (ICDA No. 782.4).

VIII. *Diseases of the respiratory system*--New titles were added for respiratory conditions including Pneumonitis due to solids and liquids (ICD No. 507); and Chronic airways obstruction, not elsewhere classified (ICD No. 496).

The deaths assigned by the Eighth Revision to Chronic obstructive lung disease without mention of asthma, bronchitis, or emphysema (*519.3), a subtitle first introduced by NCHS for deaths occurring in 1969, were transferred to the Ninth Revision title Chronic airways obstruction, not elsewhere classified (ICD No. 496).

XV. *Certain conditions originating in the perinatal period*--This chapter was extensively revised, including the change in title.

XVI. *Symptoms, signs, and ill-defined conditions*--Many inclusion terms for this chapter were transferred to chapters I-XV.

Comparability between the Ninth and Eighth Revisions--As between the Eighth and the Seventh Revisions, a dual coding study was undertaken between the Ninth and the Eighth Revisions to measure the extent of discontinuity in cause-of-death statistics resulting from introducing the new Revision. An initial study was published for the list of 72 causes and the list of 10 infant causes, both of which appear in the *Monthly Vital Statistics Report* (38).

Significant coding changes under the Ninth Revision--Following the implementation of ICD-9 in data year in 1979, several coding changes were introduced that are described in detail in *Vital Statistics of the United States* for the years in which they were introduced (see NCHS website http://www.cdc.gov/nchs/datawh/statab/pubd/ta.htm). The more important changes were: In early 1983 a change that affected data from 1981 to 1986 was made in the coding of Acquired immunodeficiency syndrome and HIV infection. Also effective with data year 1981 was a coding change for Poliomyelitis. For data year 1982, the definition of child was changed (which affects the classification of deaths to a number of categories, including Child battering and other maltreatment), and guidelines for coding deaths to the category Child battering and other maltreatment (ICD-9 No. E967) were changed also. During the calendar year 1985, detailed instructions for coding Motor vehicle accidents involving all-terrain vehicles were implemented to

ensure consistency in coding these accidents. Effective with data year 1986, "Primary" and "Invasive" tumors, unspecified, were classified as "Malignant"; these neoplasms had been classified to Neoplasms of unspecified nature (ICD-9 No. 239).

Beginning with data for 1987, NCHS introduced new category numbers *042-*044 for classifying and coding HIV infection, formerly referred to as Human T-cell lymphotropic virus-III/lymphadenopathy associated virus (HTLV-III/LAV) infection. The asterisks appearing before the categories indicated that the codes were not part of ICD-9. Also changed effective with data year 1987 were coding rules for the conditions "dehydration" and "disseminated intravascular coagulopathy." Effective with data year 1988, minor content changes were made to the classification for HIV infection. Detailed discussion of these changes may be found in the Technical Appendix from Vital Statistics of the United States, 1988.

Tenth Revision-- Cause-of-death statistics beginning with 1999 are classified by NCHS in accordance with the Tenth Revision (24). The Tenth Revision has many changes from the Ninth Revision, including considerably greater detail, shifts of inclusion terms and titles from one category, section, or chapter to another; regroupings of diseases; new titles and sections; and modifications in coding rules.

The Tenth Revision uses a four-character alphanumeric coding scheme compared with the four-digit numeric codes used in the Ninth Revision. Each of the 21 chapters of the Tenth Revision is classified to a letter or letters of the alphabet (29). The four-character alphanumeric coding scheme used with the Tenth Revision allows a larger number of codes than the four-digit numeric scheme used with Ninth Revision. Chapters of the ICD have been added and rearranged. Diseases of the nervous system and sense organs in chapter VI of the Ninth Revision was divided into three chapters in the Tenth Revision: chapter VI, Diseases of the nervous system; chapter VII, Diseases of the eye and adnexa; and chapter VIII, Diseases of the ear and mastoid process. Also, External causes of morbidity and mortality and Factors influencing health status and contact with health services, which were supplementary classifications in the Ninth Revision, have been assigned as chapters XX and XXI, respectively, in the Tenth Revision. Chapters III (Endocrine, nutritional and metabolic diseases and immunity disorders) and IV (Diseases of the blood and bloodforming organs) in the Ninth Revision are exchanged in the Tenth Revision. Chapter IV now contains the endocrine, nutritional and metabolic diseases, and chapter III contains the diseases of blood and blood-forming organs. Immune disorders remain in chapter III. Diseases of the genitourinary system (previously chapter X) and Complications of pregnancy, childbirth, and the puerperium (previously chapter XI) have become chapters XIV and XV, respectively, in the Tenth Revision. Cause-of-death titles have been changed and regrouped. Examples of title changes include the title Chronic obstructive pulmonary diseases and allied conditions in the Ninth Revision which became Chronic lower respiratory diseases in the Tenth Revision. Suicide in the Ninth Revision became Intentional self-harm, and Homicide became Assault in the Tenth Revision.

Notable regroupings include some cerebrovascular disorders, specifically transient cerebral ischemic attacks, which have been moved from Diseases of the circulatory system (ICD–9 code 435) to Diseases of the nervous system (ICD–10 codes G45.8 and G45.9). Septic shock, classified in the Ninth Revision as Shock without mention of trauma (785.5) in Symptoms, signs, and ill-defined conditions, is classified in the Tenth Revision as Unspecified septicemia (A41.9) in chapter I (Certain infectious and parasitic diseases). Respiratory failure (799.1) was moved from Symptoms, signs, and ill-defined conditions to Diseases of the respiratory system (J96). Myelodysplastic syndromes were moved from Diseases of the blood and blood-forming organs (289.8) to Neoplasms of uncertain behavior (D46). End stage renal disease, classified under Other disorders of kidney and ureter in ICD–9 (593.9), has been reclassified in the Tenth Revision as Renal failure (N18.0). Transport accidents have been regrouped by the characteristics of the injured person (e.g., pedestrian, pedal cyclist, motorcycle rider, car occupant). In ICD–9, transport accidents were grouped by the type of vehicle involved in the accident.

Comparability between the Tenth and Ninth Revisions-- Discontinuities between the Ninth and Tenth Revisions of the ICD for selected causes of death are measured using comparability ratios. Comparability ratios for the List of 113 Selected Causes of Death and the List of 130 Selected Causes of Infant Death are shown in tables E and F, respectively. Interpretation of comparability ratios is problematic for some causes because the ratio does not accurately account for differences in the coding and classification system and thus does not adequately reflect the degree of discontinuity. Causes of death from the List of 113 Selected Causes of Death and the List of 130 Selected Causes of Infant Death that have been determined to have problematic comparability issues include Alzheimer's disease, Nephritis, nephrotic syndrome and nephrosis and Renal failure, Pregnancy, childbirth and the puerperium, Motor vehicle accidents and Other land transport accidents, Diarrhea and gastroenteritis of infectious origin, Birth trauma, Atelectasis, and Sudden infant death syndrome. For a detailed explanation of the problems in applying

comparability ratios to selected causes, refer to *Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates* (29) and *Deaths: Final data for 1999* (19).

Medical certification--The use of a standard classification list, although essential for State, regional, and international comparison, does not ensure strict comparability of the tabulated figures. A high degree of comparability among areas could be attained only if all records of cause of death were reported with equal accuracy and completeness. The medical certification of cause of death can be made only by a qualified person, usually a physician, a medical examiner, or a coroner. Therefore, the reliability and accuracy of cause-of-death statistics are, to a large extent, governed by the ability of the certifier to make the proper diagnosis and by the care with which he or she records this information on the death certificate.

A number of studies have been undertaken on the quality of medical certification on the death certificate. In general, these have been for relatively small samples and for limited geographic areas. A bibliography prepared by NCHS (39), covering 128 references over 23 years, indicates no definitive conclusions have been reached about the quality of medical certification on the death certificate. No country has a well-defined program for systematically assessing the quality of medical certifications reported on death certificates or for measuring the error effects on the levels and trends of cause-of-death statistics.

One index of the quality of reporting causes of death is the proportion of death certificates coded to the Tenth Revision, Chapter XVIII, Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (ICD-10 codes R00-R99). Although some deaths occur for which it is impossible to determine the underlying cause, this proportion generally indicates the care and consideration given to the certification by the medical certifier. This proportion also may be used as a rough measure of the specificity of the medical diagnoses made by the certifier in various areas. In 1999, 1.12 percent of all reported deaths in the United States were assigned to this category. The percent of deaths assigned to the comparable ICD-9 category was fairly stable from 1990 through 1999, between 1.08 and 1.18 percent; but was higher in earlier years, 1.25 percent in 1989 and between 1.43 and 1.51 percent from 1979 to 1988.

Automated selection of underlying cause of death--Before data for 1968, mortality medical data were based on manual coding of an underlying cause of death for each certificate in accordance with WHO rules. Effective with data year 1968, NCHS converted to computerized coding of the underlying cause and manual coding of all causes (multiple causes) on the death certificate. In this system, called Automated Classification of Medical Entities (ACME) (40), the multiple cause codes serve as inputs to the computer software that employs WHO rules to select the underlying cause. The ACME system applies the same rules for selecting the underlying cause as would be applied manually by a nosologist; however, under this system, the computer consistently applies the same criteria, thus eliminating inter-coder variation in this step of the process.

The ACME computer program requires the coding of all conditions shown on the medical certification. These codes are matched automatically against decision tables that select the underlying cause of death for each record according to the international rules. The decision tables provide the comprehensive relationships among the conditions classified by ICD when applying the rules of selection and modification.

The decision tables were developed by NCHS staff on the basis of their experience in coding underlying causes of death under the earlier manual coding system and as a result of periodic independent validations. These tables periodically are updated to reflect additional new information on the relationship among medical conditions. For data year 1988, these tables were amended to incorporate minor changes to the previously mentioned classification for HIV infection (*042-*044) that originally had been implemented with data year 1987. Coding procedures for selecting the underlying cause of death by using the ACME computer program, as well as by using the ACME decision tables, are documented in NCHS instruction manuals (41-43).

Beginning with data year 1990, another computer system was implemented for automating cause-of-death coding. This system, called Mortality Medical Indexing, Classification, and Retrieval (MICAR) (44,45), automates coding multiple causes of death. Because MICAR automates multiple-cause coding rules, errors in recognizing terms, applying coding rules, and using the ICD index are eliminated. The use of the MICAR system ensures consistent application of multiple-cause coding rules, which is especially important for rules that are complex and infrequently applied. In addition, MICAR can provide more detailed information on the conditions reported on death certificates than is available through the ICD category structure (46). At the same time MICAR was developed, a complementary data entry system was also developed, referred to as PC-MICAR. In the first year of implementation, only about 5 percent of the Nation's death records were coded using PC-MICAR and MICAR with subsequent processing of all records through ACME. The percentage of death records coded using MICAR and PC-MICAR increased to 26 percent in 1991 and to 35 percent in 1992.

Beginning with data year 1993, another computer system was implemented for automating cause-of-death coding. This system, called Super-MICAR, is an enhancement of the PC-MICAR data entry system, which allows for total literal entry of the multiple cause-of-death text as reported by the certifier. This information is automatically coded by the MICAR and ACME computer systems. In the first year of implementation, about 9 percent of the Nation's death records were coded using Super-MICAR and 59 percent were coded using PC-MICAR, all with subsequent processing through MICAR and ACME. These percentages increased to 12 and 72 percent, respectively, in 1994; to 14 and 74 percent in 1995; and to 27 and 73 percent in 1996. Thus by 1996, 100 percent of the nation's records were coded using MICAR programs with subsequent processing through ACME. In each of the following years, the percentage of records coded using Super-MICAR increased, while the percentage of records coded using PC-MICAR decreased. Super-MICAR was used to code 29 percent of the records in 1997, 36 percent in 1998, and 52 percent in 1999. PC-MICAR was used to code 71 percent of the records in 1997, 64 percent in 1998, and 48 percent in 1999.

States whose data were coded by PC-MICAR in 1999 included Arizona, District of Columbia, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Missouri, Nebraska, New Jersey, New York (excluding New York City), New York City, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Texas, Vermont, Washington, and West Virginia. For these States, MICAR processed about 88 percent of the mortality records with an average system error rate of 0.23 on an underlying cause basis and 0.46 on a multiple-cause basis. Records that MICAR was unable to process were coded manually and then processed using ACME.

States using Super-MICAR in 1999 included Alabama, Alaska, Arkansas, California, Colorado, Connecticut, Delaware, Hawaii, Idaho, Iowa, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nevada, New Hampshire, New Mexico, Oklahoma, Oregon, Rhode Island, Tennessee, Utah, Virginia, Wisconsin, and Wyoming. For these States, Super-MICAR processed about 75 percent of the mortality records with an average system error rate of 0.37 on an underlying cause basis and 0.74 on a multiple-cause basis. Records that Super-MICAR was unable to process were coded manually and then processed using ACME.

Codes for firearm deaths

Causes of death attributable to firearm mortality include ICD-10 codes W32-W34, Accidental discharge of firearms; X72-X74, Intentional self-harm (suicide) by discharge of firearms; X93-X95, Assault (homicide) by discharge of firearms; Y22-Y24, Discharge of firearms, undetermined intent; and Y35.0, Legal intervention involving firearm discharge. Deaths from injury by firearms exclude deaths due to explosives and other causes indirectly related to firearms.

Codes for drug-induced deaths

Causes of death attributable to drug-induced mortality include selected codes from the ICD-10 title Mental and behavioral disorders due to psychoactive substance use, specifically, ICD-10 codes F11.0-F11.5, F11.7-F11.9, F12.0-F12.5, F12.7-F12.9, F13.0-F13.5, F13.7-F13.9, F14.0-F14.5, F14.7-F14.9, F15.0-F15.5, F15.7-F15.9, F16.0-F16.5, F16.7-F16.9, F17.0, F17.3-F17.5, F17.7-F17.9, F18.0-F18.5, F18.7-F18.9, F19.0-F19.5, and F19.7-F19.9; Accidental poisoning by and exposure to drugs, medicaments and biological substances, X40-X44; Intentional self-poisoning (suicide) by and exposure to drugs, medicaments and biological substances, X60-X64; Assault (homicide) by drugs, medicaments and biological substances, X85; and Poisoning by and exposure to drugs, medicaments and biological substances, undetermined intent, Y10-Y14. Drug-induced causes exclude accidents, homicides, and other causes indirectly related to drug use. Also excluded are newborn deaths associated with mother's drug use.

Codes for alcohol-induced deaths

Causes of death attributable to alcohol-induced mortality include ICD-10 codes F10, Mental and behavioral disorders due to alcohol use; G31.2, Degeneration of nervous system due to alcohol; G62.1, Alcoholic polyneuropathy; I42.6, Alcoholic cardiomyopathy; K29.2, Alcoholic gastritis; K70, Alcoholic liver disease; R78.0, Finding of alcohol in blood; X45, Accidental poisoning by and exposure to alcohol; X65, Intentional self-poisoning by and exposure to alcohol; and Y15, Poisoning by and exposure to alcohol, undetermined intent. Alcohol-induced causes exclude accidents, homicides, and other causes indirectly related to alcohol use. This category also excludes newborn deaths associated with maternal alcohol use.

Maternal deaths

Maternal deaths are those for which the certifying physician has designated a maternal condition as the underlying cause of death. Maternal conditions are those assigned to Complications of pregnancy, childbirth, and the puerperium (ICD-10 codes O00-O95, O98-O99, and A34).

"Maternal deaths" are defined by the World Health Organization as "the death of a women while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes" (24).

Maternal mortality rates are computed on the basis of the number of live births. The maternal mortality rate indicates the likelihood of a pregnant woman dying of maternal causes. The number of live births used in the denominator is an approximation of the population of pregnant women who are at risk of a maternal death.

Changes were made in the classification and coding of maternal deaths between ICD-9 and ICD-10, effective with mortality data for 1999. Some State death certificates include a separate question regarding pregnancy status. A positive response to the question is interpreted as "pregnant" being reported in Part II of the cause-of-death section of the death certificate. If a specified length of time is not provided by the medical certifier, it is assumed that the pregnancy terminated 42 days or less prior to death. Further, if only indirect maternal causes of death (i.e. a previously existing disease or a disease that developed during pregnancy which was not due to direct obstetric causes but was aggravated by physiologic effects of pregnancy) are reported in Part I and pregnancy is reported in either Part I or Part II, ICD-10 classifies this as a maternal death. ICD-9 only classified the death as maternal if pregnancy was reported in Part I.

Under the Eighth Revision, maternal deaths were assigned to the category "Complications of pregnancy, childbirth, and the puerperium" (*Eighth Revision International Classification of Diseases, Adapted for Use in the United States* (ICDA-8) Nos. 630-678). Although WHO did not define maternal mortality, an NCHS classification rule existed that limited the definition of a maternal death to a death that occurred within a year after termination of pregnancy from any "maternal cause," that is, any cause within the range of ICDA-8 Nos. 630-678. This rule applied only if a duration was given for the condition. If no duration was specified and the underlying cause of death was a maternal condition, the duration was assumed to be within a year and the death was coded by NCHS as a maternal death. The change from an under-1-year limitation for duration used in the Eighth Revision to an under-42-days limitation used in the Ninth Revision did not have much effect on the comparability of maternal mortality statistics. However, comparability was affected by the following classification change: Under the Ninth Revision, maternal causes of death were expanded to include Indirect obstetric causes (ICD-9 Nos. 647-648). These causes included Infective and parasitic conditions as well as other conditions present in the mother and classifiable elsewhere but that complicate pregnancy, childbirth, and the puerperium, such as Syphilis, Tuberculosis, Diabetes mellitus, Drug dependence, and Congenital cardiovascular disorders.

Race--Beginning with the 1989 data year, NCHS changed the method of tabulating live birth data by race from race of child, which was determined from the race of the parents, to race of mother. This resulted in a discontinuity in maternal mortality rates by race between 1989 to present and previous years; see "Change in tabulation of race data for live births," under "Infant deaths" in the Technical Appendix from *Vital Statistics of the United States*, 1990, or the series report, "Effect on Mortality Rates of the 1989 Change in Tabulating Race" (47).

Infant deaths

Age--Infant death is defined as a death under 1 year of age. The term excludes fetal deaths. Infant deaths usually are divided into two categories according to age, neonatal and postneonatal. Neonatal deaths are those that occur during the first 27 days of life; postneonatal deaths are those that occur between 28 days and 1 year of age. Generally,

it has been believed that different factors influencing the child's survival predominate in these two periods: Factors associated with prenatal development, heredity, and the birth process were considered dominant in the neonatal period; environmental factors, such as nutrition, hygiene, and accidents, were considered more important in the postneonatal period. Recently, however, the distinction between these two periods has blurred due in part to advances in neonatology, which have enabled more very small premature infants to survive the neonatal period.

Rates--Infant mortality rates are the most commonly-used indices for measuring the risk of dying during the first year of life; they are calculated by dividing the number of infant deaths in a calendar year by the number of live births registered for the same period and are presented as rates per 1,000 or per 100,000 live births. Infant mortality rates use the number of live births in the denominator to approximate the population at risk of dying before the first birthday. This measure is an approximation because some live births will not have been exposed to a full year's risk of dying and some of the infants who die during a year will have been born in the previous year. The error introduced in the infant mortality rate by this inexactness is usually small, especially when the birth rate is relatively constant from year to year (48,49). Other sources of error in the infant mortality rate have been attributed to differences in applying the definitions for infant death and fetal death when registering the event (50-52).

In contrast to infant mortality rates based on live births, infant death rates are based on the estimated population under 1 year of age. Infant death rates, which appear in tabulations of age-specific death rates, are calculated by dividing the number of infant deaths in a calendar year by the estimated midyear population of persons under 1 year of age and are presented as rates per 100,000 population in this age group. Patterns and trends in the infant death rate may differ somewhat from those of the more commonly used “infant mortality rate,” mainly because of differences in the nature of the denominator and in the time reference. Whereas the population denominator for the infant death rate is estimated using data on births, infant deaths, and migration for the 12-month period of July-June, the denominator for the infant mortality rate is a count of births occurring during the 12 months of January-December. The difference in the time reference can result in different trends between the two indices during periods when birth rates are moving up or down markedly.

The infant death rate also is subject to greater imprecision than is the infant mortality rate because of problems of enumerating and estimating the population under 1 year of age (51).

Change in tabulation of race data for live births--Beginning with the 1989 data year, NCHS changed the method of tabulating live-birth data by race from race of child, which was determined from the race of the parents, to race of mother. As in previous years, race for infant and maternal deaths (the numerator of the rate) is tabulated by the race of the decedent. Because live births comprise the denominator of infant and maternal mortality rates, this change resulted in a discontinuity in rates between 1989 to present, and those for previous years. For additional information, see the Technical Appendix from *Vital Statistics of the United States*, 1990, or the series report, “Effect on Mortality Rates of the 1989 Change in Tabulating Race” (47).

Comparison of race data from birth and death certificates--Regardless of whether vital events are tabulated by race of mother or by race of parents, studies in which race on the birth and death certificates for the same infant were compared find inconsistencies in reporting race between birth and death certificates (53).

These reporting inconsistencies can result in systematic biases in infant mortality rates by specified race, in particular, underestimates for specified races other than white or black. In the computation of race-specific infant mortality rates, the race item for the numerator comes from the death certificate, and for the denominator, from the birth certificate. Biases in the rates may arise because of possible inconsistencies in reporting race on these two vital records. Race of the mother and father is reported on the birth certificate by the mother at the time of delivery; whereas race of the deceased infant is reported on the death certificate by the funeral director based on observation or on information supplied by an informant, such as a parent. Previous studies have noted the race for an infant who died and was of a smaller minority race group is sometimes reported as white on the death certificate but is reported as the minority race group on the birth certificate, resulting, in the aggregate, in understatement of infant mortality for smaller race groups, for example, American Indian (12).

Estimates can be made of the degree of bias in race-specific infant mortality rates by comparing rates for which race is based on the death certificate of the infant with rates in which race is based on race of mother from the birth certificate. In table G these comparisons are made for the years 1995 and 1996 combined. A measure of reliability is the ratio of race reported on the linked file (race of mother from the birth certificate) to the race of the child reported on the death certificate. The ratio for white infants is 1.00; for black 0.97 indicating a good net correspondence in race from the two sources. However, for American Indians the ratio is 1.14 indicating that rates where race is based on the birth certificate are 14 percent higher than those based on the death certificate. Ratios among specific populations groups of Asian Americans varied greatly. Understatement was greatest for Japanese infants with a ratio of 2.04, indicating that infant mortality rates based on birth certificate information are over twice as high as those based on

death certificates. The ratios for Filipinos were 1.68, and for Chinese, 1.21. The ratio for Hawaiians was 0.85, indicating a higher rate based on death certificates, possibly because on death records on which Hawaiian was reported in combination with another race, coding procedures always give preference to Hawaiian (12).

Hispanic origin—For 1999, infant mortality rates for the Hispanic-origin population are based on numbers of resident infant deaths reported to be of Hispanic origin (see "Hispanic origin") and numbers of resident live births by Hispanic origin of mother for the 50 States and the District of Columbia. In computing infant mortality rates, deaths and live births of unknown origin are not distributed among the specified Hispanic and non-Hispanic groups. Because the percent of infant deaths of unknown origin for 1999 was 1.7 percent and the percent of live births of unknown origin was 1.2 percent, infant mortality rates by specified Hispanic origin and race for non-Hispanic origin may be slightly underestimated.

Small numbers of infant deaths for specific Hispanic-origin groups can result in infant mortality rates subject to relatively large random variation (see "Random variation and sampling errors").

Table H shows comparisons for infant mortality rates for Hispanic origin where Hispanic origin is based on death certificate identification of the infant or on birth certificate information on the Hispanic origin of the mother (the linked file) for 1996. For total Hispanic origin infants, the ratio was 1.05 indicating that rates are about 5 percent higher using the race of mother from the birth certificate (linked file). For Mexican and Cuban, the rates were about the same (ratios of 1.00 and 1.02, respectively), but rates for Puerto Rican infants were 12 percent higher when Hispanic origin was based on the birth certificate (12).

Tabulation list--Causes of death for infants are tabulated according to a list of causes that is different from the list of causes for the population of all ages, except for the Each Cause List. (See "Cause-of-death classification" under "Cause of death.")

Quality of data

Completeness of registration

All States have adopted laws requiring the registration of births and deaths. It is believed that more than 99 percent of the births and deaths occurring in this country are registered.

Massachusetts data--The 1964 statistics for deaths exclude approximately 6,000 deaths registered in Massachusetts, primarily to residents of that State. Microfilm copies of these records were not received by NCHS. Figures for the United States and the New England Division are affected also.

Quality control procedures

Demographic items on the death certificate--As previously indicated, for 1999 the mortality data for these items were obtained from two sources--photocopies of the original certificates furnished by Guam, American Samoa, and Northern Marianas, and electronic data records furnished by the 50 States, the District of Columbia, New York City, Puerto Rico, and the Virgin Islands. For Guam, American Samoa, and Northern Marianas, which sent only copies of the original certificates, the demographic items were coded for 100 percent of the death certificates. The demographic coding for each of these certificates was independently verified.

For areas sending electronic data records, a sample of 50 - 100 records per month for each registration area is used to monitor quality of coding. Under this procedure, each sample record is independently coded by NCHS staff and compared to the State code assignments. NCHS/State differences are adjudicated to ascertain the source of the error and need for corrective action. The estimated average outgoing error rate for all demographic items in 1999 was 0.25 percent. The error rate is a combined measure of State coding, key entry and processing errors made in the process of preparing the statistical file. These types of errors are not necessarily randomly distributed in the file and may therefore escape detection through sample verification. To reduce some systematic errors other NCHS procedures such as detailed computer edits, tabular evaluation, and procedure review are used.

Medical items on the death certificate--The same procedures used for demographic data are used for the medical items except that a larger sample, 100 – 175 records per month, is used to monitor the quality of coding medical items. For Arizona, Illinois, Kentucky, Missouri, New Jersey, Ohio, West Virginia, District of Columbia, New York City, Puerto Rico, Virgin Islands, Guam, American Samoa, and the Northern Marianas, which sent only copies of the

original certificates, the medical data were coded for 100 percent of the death certificates using either PC-MICAR or Super-MICAR. The death entry is independently verified for 10 percent of the file using a three-way comparison. For the 43 registration areas sending electronic files and for the files entered at NCHS, the average outgoing error rate in 1999 was estimated at 2.50 percent for underlying cause data, and 4.70 percent for multiple cause-of-death data.

Rare causes of death--Selected causes of death considered to be of public health concern are routinely confirmed by the States according to agreed upon procedures between the State vital statistics programs and the National Center for Health Statistics. These causes, termed "Infrequent and Rare Causes of Death," are listed in the NCHS instruction manuals Parts 2a, 11, and 20 (41,54,55).

As a consequence of the major effort involved in implementing a new revision of the ICD, a number of States did not provide complete confirmation of deaths from Infrequent and rare causes for 1999. These States include the following: California, Florida, Illinois, Indiana, Kentucky, Maine, Michigan, Missouri, New Jersey, New York City, North Carolina, Ohio, Pennsylvania, Rhode Island, Washington, and West Virginia.

Other control procedures--After coding and data entry are completed, record counts are balanced against control totals for each shipment of records from a registration area. Editing procedures ensure that records with inconsistent or impossible codes are modified. Inconsistent codes are those, for example, indicating a contradiction between cause of death and age or sex of the decedent. Records so identified during the computer editing process are either corrected by reference to the source record or adjusted by arbitrary code assignment (54). All subsequent operations in tabulating and in preparing tables are verified during the computer processing or by statistical clerks.

Estimates of errors arising from 50-percent sample for 1972--Death statistics for 1972 are based on a 50-percent sample of all deaths occurring in the 50 States and the District of Columbia. A description of the sample design and a table of the percent errors of the estimated numbers of deaths by size of estimate and total deaths in the area are shown in the Technical Appendix from *Vital Statistics of the United States*, 1972.

Computation of rates and other measures

Population bases

Population bases from which death rates are computed are prepared by the U.S. Bureau of the Census. Rates for 1940, 1950, 1960, 1970, 1980, and 1990 are based on the population enumerated as of April 1 in the censuses for those years. Rates for all other years use the estimated midyear (July 1) population. Death rates for the United States, individual States, and metropolitan areas are based on the total resident populations of the respective areas. Except as noted, these populations exclude the Armed Forces abroad but include the Armed Forces stationed in each area.

The resident populations of the birth- and death-registration States for 1900-32, and of the United States for 1900-99 are shown in table I. In addition, the population including Armed Forces abroad is shown for the United States. Table J lists the sources for these populations.

Populations for 1999--Population estimates of the United States by age, race, and sex for 1999 are shown in table K (15). Population estimates for each State by age for 1999 are shown in table L (56). The population estimates shown in tables I and J are based on the 1990 census and are consistent with those for 1990-98. Since these population estimates are based on demographic analysis, they are not subject to sampling variability.

In addition the following estimates are shown:

- Estimated population by 5-year age groups, specified Hispanic origin, race for non-Hispanic origin, and sex: United States, 1999 (see table M) (15,16)
- Estimated population for ages 15 years and over by 5-year age groups, marital status, race, and sex: United States, 1999 (see table N) (16)
- Estimated population for ages 15 years and over, by 5-year age groups, marital status, Hispanic origin, race for non-Hispanic origin, and sex: United States, 1999 (see table O) (16)
- Estimated population for ages 25-64 years, by 10-year age groups, educational attainment and sex: Total of 46 States and the District of Columbia, 1999 (see table P) (16)

Population estimates by specified Hispanic origin, marital status, and educational attainment are based on the Bureau of the Census' Current Population Survey (a sample-based survey) adjusted to control totals. As a result, these estimates are subject to sampling variation (see "Random variation and sampling errors").

Revised populations estimates for 1999 that are consistent with the 2000 census levels are available for the United States and each State on the NCHS website at http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm. Population estimates based on the CPS are consistent with 1990 census levels and have not been revised.

Population for 1990--In the 1980 and 1990 censuses, a substantial number of persons did not specify a racial group that could be classified as any of the white, black, American Indian, Eskimo, Aleut, Asian, or Pacific Islander categories on the census form (57). In 1980 the number of persons of "Other" race was 6,758,319; in 1990, it was 9,804,847. In both censuses the large majority of these persons were of Hispanic origin (based on responses to a separate question on the form), and many wrote in their Hispanic origin (for example, Mexican and Puerto Rican) as their race. In 1980 and 1990 persons of unspecified race were allocated to one of the four tabulated racial groups (white, black, American Indian, Asian or Pacific Islander) based on their response to the Hispanic origin question. These four race categories conform with OMB Directive 15 (the standards for recordkeeping, collection, and presentation of data on race and ethnicity in Federal statistical activities and program administrative reporting) (58) and are more consistent with the race categories in vital statistics.

In 1980 the allocation of unspecified race was determined using cross-tabulations of age, sex, race, specified Hispanic origin, and county of residence. Persons of Hispanic origin and unspecified race were allocated to either white or black based on their specific Hispanic origin. Persons of "Other" race and Mexican origin were categorically assumed to be white, while persons in other Hispanic categories were distributed to white and black pro rata within the county-age-sex group. For "Other race-not-specified" persons who were not Hispanic, race was allocated to white, black, or Asian or Pacific Islander based on proportions gleaned from sample data. The 20-percent sample (respondents who were enumerated on the longer census form) provided a highly detailed coding of race, which allowed identification of otherwise unidentifiable responses with a specified race category. Thus, allocation proportions were established at the State level and were used to distribute the non-Hispanic persons of "Other" race in the 100-percent tabulations.

In 1990 the race modification procedure was implemented using individual census records. Persons whose race could not be specified were assigned to a racial category using a pool of "race donors" that consisted of persons of specified race who had the identical responses to the Hispanic origin question and who were within the auspices of the same census district office. As in the 1980 census, it appeared that the underlying assumption made in the 1990 census was that the Hispanic origin response was the major criterion for allocating race. Unlike those responding to the 1980 census who could be assigned only to the racial group white or black, persons of Hispanic origin, including Mexicans, responding to the 1990 census could be assigned to any racial group. Also, in the 1990 census, the non-Hispanic component of "Other" race was allocated primarily on the basis of geography (district office), rather than detailed characteristic.

The means by which respondent's age was determined were fundamentally different for the two censuses; therefore, the problems that necessitated the modification were different. In 1980 respondents reported year of birth and quarter of birth (within year) on the census form. When census results were tabulated, persons born in the first quarter of the year (before April 1) had age equal to 1980 minus year of birth, while persons born in the last three quarters had age equal to 1979 minus year of birth.

In 1990 quarter year of birth was not reported on the census form, so direct determination of age from year of birth was not possible. In 1990 census publications, age is based on respondents' direct reports of age at last birthday. This definition proved inadequate for postcensal estimates as it was apparent that many respondents had reported their age at time of either completion of the census form or interview by an enumerator that could occur several months after the April 1 reference date. As a result, age was biased upward. For most respondents, modification was based on a respecification of age, by year of birth, with allocation to first quarter (persons aged 1990 minus year of birth) and last three quarters (aged 1989 minus year of birth) based on a historical series of registered births by month. This process partially restored the 1980 logic for assignment of age. It was not considered necessary to correct for age overstatement and heaping in 1990, because the availability of age and year of birth on the census form had provided for the elimination of spurious year-of-birth reports in the census data before modification occurred.

Population estimates for 1981-89--Death rates for 1981-89 are based on revised populations that are consistent with the 1990 census level (57). They are, therefore, not comparable with death rates published in *Vital Statistics of*

the United States for 1981-89, and in other NCHS publications for those years. The 1990 census counted approximately 1.5 million fewer persons than had been estimated earlier for April 1, 1990.

Populations for 1980--Death rates for 1980 are based on the population enumerated as of April 1 in the 1980 census (59). The figures by race have been modified as described.

Population estimates for 1971-79--Death rates for 1971-79 used revised population estimates that are consistent with the 1980 census levels. The 1980 census enumerated approximately 5.5 million more persons than had been estimated for April 1, 1980 (60). These revised estimates for the United States by age, race, and sex are published by the U.S. Bureau of the Census in *Current Population Reports*, Series P-25, Number 917. Unpublished revised estimates for States were obtained from the U.S. Bureau of the Census. For Puerto Rico, the Virgin Islands, and Guam, revised estimates are published in *Current Population Reports*, Series P-25, Number 919.

Population estimates for 1961-69--Death rates for 1961-69 are based on revised estimates of the population and thus may differ slightly from rates published before 1976. Rates, life table values, and population estimates for each year during 1961-69 have been revised to reflect modified population bases as published in the U.S. Bureau of the Census, *Current Population Reports*, Series P-25, Number 519.

New Jersey--As previously indicated, data by race are not available for New Jersey for 1962 and 1963. Therefore, for 1962 and 1963, NCHS estimated a population by age, race, and sex that excluded New Jersey for rates shown by race. The methodology used to estimate the revised population excluding New Jersey is discussed in the Technical Appendixes of the 1962 and 1963 volumes.

Rates and ratios based on live births--Infant and maternal mortality rates are computed on the basis of the number of live births. Counts of live births are published annually in *Vital Statistics of the United States*.

Net census undercount

Errors can be introduced into the annual rates as a result of underenumeration of deaths and the misreporting of demographic characteristics. Errors in rates can also result from enumeration errors in the latest decennial census. This is because annual population estimates for the postcensal interval, which are used in the denominator for calculating death rates, are computed using the decennial census count as a base (57). Net census undercount results from the miscounting and misreporting of demographic characteristics such as age. Age-specific death rates are affected by the net census undercount and the misreporting of age on the death certificate (61). To the extent that the net undercount is substantial and that it varies among subgroups and geographic areas, it may have important consequences for vital statistics measures.

Because death rates based on a population adjusted for net census undercount may be more accurate than rates based on an unadjusted population, the possible impact of net census undercount on death rates must be considered. This can be done on a national basis using results of studies conducted by the U.S. Bureau of the Census on the completeness of coverage of the U.S. population (including underenumeration and misstatement of age, race, and sex). Such studies were conducted in the last five decennial censuses--1950, 1960, 1970, 1980, and 1990. From this work have come estimates of the national population that were not counted by age, race, and sex (62-65). The reports for 1990 (unpublished data from the U.S. Bureau of the Census) include estimates of net underenumeration and overenumeration for age, sex, and racial subgroups of the national population modified for race consistency with previous population counts as described in the section "Population bases." These studies indicate that, although coverage was improved over previous censuses, there was differential coverage among the population subgroups; that is, some age, race, and sex groups were more completely counted than others.

Because estimates of net census undercount are not available by age, race, and sex for individual States and counties, it is not feasible to adjust for net census undercount when presenting rates in routine tabulations. Nevertheless, it is important to be aware that net census undercounts can affect levels of observed vital rates.

Age, race, and sex--If adjustments were made for net census undercount, the size of denominators of the death rates generally would increase and the rates, therefore, would decrease. The adjusted rates for 1999 can be computed by multiplying the reported rates by ratios of the census-level resident population to the resident population adjusted for the estimated net census undercount (table Q). A ratio of less than 1.0 indicates a net census undercount and, when applied, results in a corresponding decrease in the death rate. A ratio greater than 1.0--indicating a net census overcount--when multiplied by the reported rate results in an increase in the death rate.

Coverage ratios for all ages show that, in general, females were more completely enumerated than males and the white population more completely enumerated than the black population in the 1990 Census of Population. Underenumeration varied by age group for the total population, with the greatest differences found for persons aged 85 years and over. All other age groups were overcounted or undercounted by less than 4.0 percent. Among the

age-sex-race groups, underenumeration was highest (13.3 percent) for black males aged 25-34 years. In contrast, white females in this age group were underenumerated by 2.5 percent.

If vital statistics measures were calculated with adjustments for net census undercounts for each population subgroup, the resulting rates would be differentially reduced from their original levels; that is, rates for those groups with the greatest estimated undercounts would show the greatest relative reductions due to these adjustments. Similar effects would be evident in the opposite direction for groups with overcounts. Consequently, the ratio of mortality between the rates for males and females and between the rates for the white population and the black population usually would be reduced.

Similarly, the differences between the death rates among subgroups of the population by cause of death would be affected by adjustments for net census undercounts. For example, in 1990 for the age group 35-39 years, the ratio of the unadjusted death rate for Homicide and legal intervention for black males to that for white males is 7.54, whereas the ratio of the death rates adjusted for net census undercount is 6.92. For Ischemic heart disease for males aged 40-44 years, the ratio of the death rate for the black population to that for the white population is 1.38 using the unadjusted rates, but it is 1.26 when adjusted for estimated underenumeration.

Summary measures--The effect of net census undercount on age-adjusted death rates and life table values depends on the underenumeration of each age group and on the distribution of deaths by age. Thus, the age-adjusted death rate in 1990 for All causes would decrease from 520.2 to 512.7 per 100,000 population if the age-specific death rates were corrected for net census undercount (table R). For Diseases of heart, the age-adjusted death rate for white males would decrease from 202.0 to 198.2 per 100,000 population, a decline of 2.0 percent. For black males, the change from an unadjusted rate of 275.9 to an adjusted rate of 256.7 would amount to a decrease of 7.0 percent. For HIV infection, the rate for black males would decrease from 44.2 to 39.0 and for white males from 15.0 to 14.4.

If death rates by age were adjusted, the corresponding life expectancy at birth computed from these rates would change. When calculating life expectancy, the impact of an undercount or overcount is greatest at the younger ages. In general, the effect of correcting the death rates is to increase the estimate of life expectancy at birth. For example, adjustment for net census undercount would increase life expectancy in 1990 by an estimated 0.2 years, from 75.4 years to 75.6 years for the total U.S. population.

Adjustment for differential underenumeration among race-sex groups would lead to greater changes in life expectancy for some groups than for others. For males and females, increases would be 0.3 and 0.1 years, respectively; for the black population and white population, 0.6 and 0.2 years, respectively. The largest increase would be for black males, 1.2 years, followed by white males (0.3 years), black females (0.2 years), and white females (0.2 years).

Age-adjusted death rates

Age-adjusted death rates are used to control for differences and changes in age composition and thus, compare relative mortality risk across groups and over time. However, they should be viewed as constructs or indexes rather than as direct or actual measures of mortality risk. Statistically, they are weighted averages of the age-specific death rates, where the weights represent the fixed population proportions by age (66). Age-adjusted death rates were computed by the direct method, that is, by applying age-specific death rates for a given cause of death to the U.S. standard population. It is important not to compare age-adjusted death rates with crude rates.

Beginning with the 1999 data year, a new population standard was adopted by NCHS for use in age-adjusting death rates. Based on the projected year 2000 population of the United States, the new standard replaces the 1940 standard population that had been used for over 50 years. The new population standard affects levels of mortality and to some extent trends and group comparisons. Of particular note are the effects on race comparison of mortality. For detailed discussion see *Age Standardization of Death Rates: Implementation of the Year 2000 Standard* (67).

The year 2000 standard population and corresponding weights (w_i), used beginning with data year 1999, for computing age-adjusted rates and relative standard errors (RSE), excluding those by marital status, education, injury at work, and the U.S. territories, are shown in the following table:

Age	Number	Weights (w_i)
All ages	1,000,000	1.000000
Under 1 year	13,818	0.013818
1-4 years	55,317	0.055317
5-14 years	145,565	0.145565
15-24 years	138,646	0.138646
25-34 years	135,573	0.135573
35-44 years	162,613	0.162613
45-54 years	134,834	0.134834
55-64 years	87,247	0.087247
65-74 years	66,037	0.066037
75-84 years	44,842	0.044842
85 years and over	15,508	0.015508

The 1940 standard population and corresponding weights (w_i), used prior to data year 1999, for computing age-adjusted rates and relative standard errors (RSE), excluding those by marital status, education, injury at work, and the U.S. territories, are shown in the following table:

Age	Number	Weights (w_i)
All ages	1,000,000	1.000000
Under 1 year	15,343	0.015343
1-4 years	64,718	0.064718
5-14 years	170,355	0.170355
15-24 years	181,677	0.181677
25-34 years	162,066	0.162066
35-44 years	139,237	0.139237
45-54 years	117,811	0.117811
55-64 years	80,294	0.080294
65-74 years	48,426	0.048426
75-84 years	17,303	0.017303
85 years and over	2,770	0.002770

Age-adjusted death rates by marital status are computed using the age groups 25 years and over. Therefore, based on the year 2000 standard population, the United States standard population aged 25 years and over and corresponding weights (w_i) are as follows:

Age	Number	Weights (w_i)
25 years and over	646,654	1.000000
25-34 years	135,573	0.209653
35-44 years	162,613	0.251468
45-54 years	134,834	0.208510
55-64 years	87,247	0.134921
65-74 years	66,037	0.102121
75 years and over	60,350	0.093327

Age-adjusted death rates by educational attainment are computed using the age groups 25-64 years. Therefore, based on the year 2000 standard population, the United States standard population aged 25-64 years and corresponding weights (w_i) are as follows:

Age	Number	Weights (w_i)
25-64 years	520,267	1.000000
25-34 years	135,573	0.260584
35-44 years	162,613	0.312557
45-54 years	134,834	0.259163
55-64 years	87,247	0.167697

Age-adjusted death rates for injury at work are computed using the age groups 15 years and over. Therefore, based on the year 2000 standard population, the United States standard population aged 15 years over and corresponding weights (w_i) are as follows:

Age	Number	Weights (w_i)
15 years and over	785,300	1.000000
15-24 years	138,646	0.176552
25-34 years	135,573	0.172638
35-44 years	162,613	0.207071
45-54 years	134,834	0.171697
55-64 years	87,247	0.111100
65-74 years	126,387	0.160941

Age-adjusted death rates for Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas are computed using the age groups 75 years and over. Therefore, based on the year 2000 standard population, the United States standard population aged 75 years and over and corresponding weights (w_i) are as follows:

Age	Number	Weights (w_i)
All ages	1,000,000	1.000000
Under 1 year	13,818	0.013818
1-4 years	55,317	0.055317
5-14 years	145,565	0.145565
15-24 years	138,646	0.138646
25-34 years	135,573	0.135573
35-44 years	162,613	0.162613
45-54 years	134,834	0.134834
55-64 years	87,247	0.087247
65-74 years	66,037	0.066037
75 years and over	60,350	0.060350

Life tables

The current or period life table provides a comprehensive measure of the effect of current mortality on life expectancy. It is composed of sets of values showing the mortality experience of a hypothetical group of infants born at the same time and subject throughout their lifetime to the age-specific death rates of a particular time period, usually a given year. Beginning with final data reported for 1997, the life table methodology was changed from previous annual reports. Previously, U.S. life tables were abridged and constructed by reference to a standard table (68). In addition, the age range for these life tables was limited to 5-year age groups ending with the age group 85 years and over.

Beginning with 1997 mortality data, a revised life table methodology was used to construct complete life tables by single years of age that extend to age 100 (69) using a methodology similar to that of the decennial life tables (70). The advantages of the new over the previous methodology are its comparability with decennial life table methodology, greater accuracy, and greater age detail. A comparison of the two methods shows small differences in resulting values for life expectancy (69). To calculate the probability of dying at each age, the revised methodology uses vital statistics death rates for ages under 85 years and mortality data from the Medicare program for ages over 85 years. Medicare data were used to model the probability of dying at ages 85 and over because the data are shown to be significantly more reliable than vital statistics data at the oldest ages (71).

Life tables for the decennial period 1979-81 are used as the standard life tables in constructing the 1980-96 abridged life tables. Life table values for 1981-89 are based on revised intercensal estimates of the populations for those years. Therefore, these life table values may differ from life table values of those years published previously.

Life tables for the decennial period 1969-71 are used as the standard life tables in constructing the 1970-79 abridged life tables. Life table values for 1970-73 were first revised in *Vital Statistics of the United States*, 1977; before 1977, life table values for 1970-73 were constructed using the 1959-61 decennial life tables. In addition, life table values for 1951-59, 1961-69, and 1971-79 are based on revised intercensal estimates of the populations for those years. As such, these life table values may differ from life table values previously published.

The annual abridged life table series was initiated for selected race-sex groups in 1945. Because of the increased interest in the average length of life ($^{o}e_{o}$) for years prior to 1945, estimates were prepared for the following race and sex groups and data years (72).

Years	*Race and sex groups*
1900-45	Total
1900-47	Male
1900-47	Female
1900-50	White
1900-44	White, male
1900-44	White, female
1900-50	All other
1900-44	All other, male
1900-44	All other, female

The geographic areas covered in life tables before 1929-31 were limited to the death-registration areas. Life tables for 1900-02 and 1909-11 were constructed using mortality data from the 1900 death-registration States--10 States and the District of Columbia, and for 1919-21, from the 1920 death-registration States--34 States and the District of Columbia. The tables for 1929-31 through 1958 cover the conterminous United States. Decennial life table values for the 3-year period 1959-61 were derived from data that include Alaska and Hawaii for each year. Data for each year include Alaska beginning in 1959 and Hawaii beginning in 1960. It is believed that the inclusion of these two States does not materially affect life table values.

Causes of death contributing to changes in life expectancy

Causes of death contributing to changes in life expectancy were estimated using a life table partitioning technique. The method partitions changes into component additive parts. This method identifies the causes of death having the greatest influence, positive or negative, on changes in life expectancy (73,74).

Random variation and sampling errors

Deaths--The number of deaths reported for an area represent complete counts of such events (except for 1972 when the data were based on a 50-percent sample because of resource constraints). As such, they are not subject to sampling error, although they are subject to non-sampling errors in the registration process. However, when the figures are used for analytical purposes, such as the comparison of rates over time or for different areas, the number of events that actually occurred may be considered as one of a large series of possible results that could have arisen under the same circumstances (75). The probable range of values may be estimated from the actual figures according to certain statistical assumptions.

In general, distributions of vital events, because they are relatively infrequent, may be assumed to follow a Poisson distribution. As a result, the numbers of deaths, death rates, and mortality rates are subject to random variation. Estimates of relative standard errors (RSE)--a measure of variability--95-percent confidence intervals, and tests of statistical significance under this assumption are shown below. When the number of events is large, the relative standard error is usually small. When the number of events is small (perhaps less than 100) and the probability of such an event is small, considerable caution must be observed in interpreting the data.

Populations-Population estimates of the United States and for each State by age, race, total Hispanic origin, and sex for 1999 are based on demographic methods and, therefore, are not subject to sampling variability. However, population estimates by specified Hispanic origin (Mexicans, Puerto Ricans, Cubans, and Other Hispanics), by specified marital status groups (never married, married, widowed, and divorced), and by specified educational attainment groups (under 12 years, 12 years, and 13 or more years) are based on the Bureau of the Census' Current Population Survey (CPS) adjusted to control totals and, therefore, are subject to sampling variation. As a result, death rates based on the CPS-based population estimates are subject to both random variation of the deaths and sampling error of the population estimates. Estimates of relative standard errors, 95-percent confidence intervals, and tests of statistical significance under these assumptions are shown below. All population estimates may also be subject to non-sampling errors.

Computation of population-based death rates--Death rates for a single calendar year are computed by dividing the number of deaths for a class for that year by the population of a similarly-defined class for the same year and multiplying that result by 100,000 (or 1,000). Rates thus computed are per 100,000 (or 1,000) estimated population residing in selected areas of the United States. The 3-year average death rates are computed by dividing the total number of deaths for a class for a three-year period by the sum of the population estimates of a similarly defined class for the same period and multiplying that result by 100,000 (or 1,000).

Computation of live birth-based mortality rates--Maternal mortality rates and infant mortality rates are computed by dividing the number of deaths for a class for a specified year by the number of live births of a similarly defined class for that year and multiplying that result by 100,000 (or 1,000). Rates thus computed are per 100,000 (or 1,000) live births residing in selected areas of the United States.

Relative Standard Errors and 95% Confidence Intervals--Formulas for computing approximate RSE's and confidence intervals (CI's) for crude, age-specific death rates, age-adjusted death rates, and infant and maternal mortality rates are shown below.

Beginning with 1989 data, an asterisk has been shown in place of a rate based on fewer than 20 deaths, which is the equivalent of an RSE of 22.94 percent or more. An RSE of this magnitude is considered statistically unreliable. That procedure has been used for mortality data except death rates based on CPS-based population estimates, for which sampling variation must be considered in addition to random variation. Formulas for computing RSE's for CPS population-based rates are presented below and an asterisk is shown in place of a rate when the RSE is 22.94 percent or more. RSE's for CPS population-based rates were introduced beginning with specified Hispanic-origin data for 1994 and subsequently for rates by marital status and educational attainment.

The formulas below are shown separately for rates based on demographically estimated populations, sample-based populations, and rates based on live births. Further, separate discussions are provided for rates based on less than 100 events, and rates based on 100 events or more. Specific examples are given to illustrate the use of the formulas.

*The following formulas are used for demographically-estimated population-based death rates for all races, white, black, American Indian, Asian or Pacific Islander, all origins, total Hispanic, total non-Hispanic, non-Hispanic white, and non-Hispanic black for **all** marital status groups combined*:

Age-specific and crude death rates--

$$RSE(R) = RSE(D) = 100\sqrt{\frac{1}{D}}$$

Approximate 95% Confidence Interval: 100 or more deaths
Lower: R - 1.96 * S(R)
Upper: R + 1.96 * S(R)

Approximate 95% Confidence Interval: 1-99 deaths
Lower: R * L(1- α =.95,D)
Upper: R * U(1- α =.95,D)

where

R = rate (deaths per 100,000 population)
D = total number of deaths upon which rate is based

$$S(R) = R * \frac{RSE(R)}{100} = standard\ error\ of\ rate$$

L(1- α =.95,D) and U(1- α =.95,D) are lower and upper 95% confidence limit factors and are shown in table S

Age-adjusted death rates--

$$RSE(R'') = 100\,\frac{\sqrt{\Sigma\left\{ w_i^2\, R_i^2 \left(\frac{1}{D_i} \right) \right\}}}{R''}$$

Approximate 95% Confidence Interval: 100 or more deaths
Lower: R'' - 1.96 * S(R'')
Upper: R'' + 1.96 * S(R'')

Approximate 95% Confidence Interval: 1-99 deaths
Lower: R'' * L(1- α =.95,D_{adj})
Upper: R'' * U(1- α =.95,D_{adj})

where

R'' = age-adjusted rate (per 100,000 population) = $\sum w_i R_i$
w_i = i^{th} age-specific Standard Population such that $\sum(w_i) = 1.0$
R_i = age-specific rate (per 100,000) for the i^{th} age group
D_i = total number of deaths for the i^{th} age group upon which age-specific rate is based

$$S(R'') = R'' * \frac{RSE(R'')}{100} = \textit{standard error of age - adjusted rate}$$

L(1- α =.95,D_{adj}) and U(1- α =.95,D_{adj}) are lower and upper 95% confidence limit factors and are shown in table S

$$D_{adj} = \frac{1}{\left(\frac{RSE(R'')}{100} \right)^2} = \textit{adjusted number of deaths rounded to nearest integer}$$

*The following formulas are used for CPS population-based death rates for all races, white, black, American Indian, Asian or Pacific Islander, all origins, total Hispanic, total non-Hispanic, non-Hispanic white, non-Hispanic black by **specified** marital status group (never married, married, widowed, and divorced) and by specified educational attainment groups*

OR

*for Mexican, Puerto Rican, Cuban, Other Hispanic for **all** marital status (or all educational attainment) groups combined and by **specified** marital status group (never married, married, widowed, and divorced) and specified educational attainment groups:*

Age-specific and crude death rates--

$$RSE(R) = 100\sqrt{\left(\frac{1}{D}\right) + f\left(a + \frac{b}{P}\right)}$$

Approximate 95% Confidence Interval: 100 or more deaths

Lower: R-1.96*S(R)
Upper: R+1.96*S(R)

Approximate 95% Confidence Interval: 1-99 deaths

$$Lower: \; R * L(1 - \alpha = .96, D) * \left(1 - 2.576\sqrt{f\left(a + \frac{b}{P}\right)}\right)$$

$$Upper: \; R * U(1 - \alpha = .96, D) * \left(1 + 2.576\sqrt{f\left(a + \frac{b}{P}\right)}\right)$$

where

R = rate (deaths per 100,000 population).
D = total number of deaths upon which rate is based
f = factor that depends on whether the population estimate is based on demographic analysis or CPS and the number of years used (see below)
a and b factors are CPS standard error parameters (see below)
P = total estimated population upon which rate is based (if rate is based on a 3-year average, then an approximate P would be three times the population for the most recent year)

$$S(R) = R * \frac{RSE(R)}{100} = standard\ error\ of\ rate$$

L(1- α =.96,D) and U(1- α =.96,D) are lower and upper 96% confidence limit factors and are shown in table S

Age-adjusted death rates--

$$RSE(R'') = 100\,\frac{\sqrt{\Sigma\left(w_i^{\,2} * Ri^2\left(\frac{1}{D_i} + f\left(a + \frac{b}{P}\right)\right)\right)}}{R''}$$

Approximate 95% Confidence Interval: 100 or more deaths

Lower: R'' - 1.96 * S(R'')
Upper: R'' + 1.96 * S(R'')

Approximate 95% Confidence Interval: 1-99 deaths

Lower: R'' * L(1- α =.96,D_{adj}) * (1 -2.576 * RSE(P_{adj}))
Upper: R'' * U(1- α =.96,D_{adj}) * (1+2.576 * RSE(P_{adj}))

where

R'' = age-adjusted rate (per 100,000 population) = $\sum w_i R_i$
w_i = i^{th} age-specific Standard Population such that $\sum (w_i) = 1.0$
R_i = age-specific rate (per 100,000)for the i^{th} age group
D_i = total number of deaths for the i^{th} age group upon which age-specific rate is based
f = factor that depends on whether the population estimate is based on demographic analysis or CPS and the number of years used (see below)
a and b factors are CPS standard error parameters (see below)
P_i = total estimated population for the i^{th} age group upon which the rate is based (if rate is based on 3-year average, then combined P_i would be three times the population for the most recent year)

$$S(R'') = R'' * \frac{RSE(R'')}{100} = standard\ error\ of\ age-adjusted\ rate$$

L(1- α =.96,D_{adj}) and U(1- α =.96,D_{adj}) are lower and upper 96% confidence limit factors and are shown in table S

P_{adj} =$\sum(w_i * P_i)$ = adjusted estimated population rounded to nearest integer

$$RSE(P_{adj}) = \frac{\sqrt{\Sigma\left(w_i^{\,2} * P_i^{\,2} * f\left(a + \frac{b}{P_i}\right)\right)}}{P_{adj}}$$

$$D_{adj} = smaller\ of\ \Sigma(D_i)\ or\ \frac{1}{RSE(R'')^2 - RSE(P_{adj})^2} = \begin{array}{c} adjusted\ number\ of\ deaths \\ rounded\ to\ the \\ nearest\ integer \end{array}$$

If D_{adj} is negative, set D_{adj} to $\sum(D_i)$

Shown below are the "*a*", "*b*", and "*f*" factors for various race, origin, marital status, and educational attainment classifications, by whether the population-based rate was based on a single year (76) or 3-year average (76-78):

Race, origin, and marital status	*Rate based on 1 year*	*Rate based on 3 years*
All races, white, American Indian, all origins, total Hispanic, total non-Hispanic, non-Hispanic white; by never married, married, widowed, divorced	*f* = 0.670 *a* = -0.000019 *b* = 5,211	*f* = 0.440 *a* = -0.000019 *b* = 15,633
Black, non-Hispanic black; by never married, married, widowed, divorced	*f* = 0.670 *a* = -0.000213 *b* = 7,486	*f* = 0.440 *a* = -0.000214 *b* = 22,458
Asian or Pacific Islander; by never married, married, widowed, divorced	*f* = 0.670 *a* = -0.000587 *b* = 7,486	*f* = 0.440 *a* = -0.000587 *b* = 22,458
Mexican, Puerto Rican, Cuban, Other Hispanic; all marital status groups combined, never married, married, widowed, divorced	*f* = 0.670 *a* = -0.000238 *b* = 7,486	*f* = 0.440 *a* = -0.000240 *b* = 22,458
All races, white, American Indian, all origins, total Hispanic, total non-Hispanic, non-Hispanic white; by educational attainment	*f* = 0.670 *a* = -0.000011 *b* = 2,369	*f* = 0.440 *a* = -0.000011 *b* = 7,107
Black, non-Hispanic black; by educational attainment	*f* = 0.670 *a* = -0.000106 *b* = 2,680	*f* = 0.440 *a* = -0.000117 *b* = 8,040
Mexican, Puerto Rican, Cuban, Other Hispanic; by educational attainment	*f* = 0.670 *a* = -0.000082 *b* = 1,811	*f* = 0.440 *a* = -0.000109 *b* = 6,673

The following formulas may be used for live birth-based mortality rates:

The formulas for the RSE and 95-percent CI's of an infant mortality rate (IMR) are as follows:

$$RSE(IMR) = 100\sqrt{\frac{1}{D} + \frac{1}{B}}$$

Approximate 95% Confidence Interval: 100 or more infant deaths
Lower: *IMR* - 1.96 * S(*IMR*)
Upper: *IMR* + 1.96 * S(*IMR*)

Approximate 95% Confidence Interval: 1-99 infant deaths
Lower: IMR * L(1- α =.95,D_{adj})
Upper: IMR * U(1- α =.95,D_{adj})

where

IMR = infant mortality rate (infant deaths per 100,000 live births)
D = total number of infant deaths upon which rate is based
B = total number of live births upon which IMR is based

$$S(IMR) = IMR * \frac{RSE(IMR)}{100} = standard\ error\ of\ infant\ mortality\ rate$$

L(1- α =.95,D_{adj}) and U(1- α =.95,D_{adj}) are lower and upper 95% confidence limit factors and are shown in table S

$$D_{adj} = \frac{D * B}{D + B} = \begin{array}{c} adjusted\ number\ of\ infant\ deaths\ that\ takes \\ into\ account\ the\ RSE\ of\ the\ number \\ of\ infant\ deaths\ and\ live\ births \end{array}$$

Statistical tests

For testing the equality of two rates, R_1 and R_2, the z-test may be used (when both rates are based on 100 deaths or more) or the overlap of 95% CI's of the rates may be used (when either or both of the rates are based on less than 100 deaths).

The z-test is determined as follows:

$$z = \frac{R_1 - R_2}{\sqrt{R_1^2\left(\frac{RSE(R_1)}{100}\right)^2 + R_2^2\left(\frac{RSE(R_2)}{100}\right)^2}}$$

to define a significance test statistic. If $|z|$ is greater than or equal 1.96, then the difference would be considered statistically significant at the 0.05 level; and if $|z|$ is less than 1.96, the difference is not statistically significant.

As a hypothetical example, if the three-year average death rate for Mexicans, R_1, is 36.4 (based on D=120 deaths and P=330,000 population for the three years combined) and the three-year rate for non-Hispanic whites, R_2, is 13.8 (based on D=180 deaths and P=1,300,000 population for the three years combined), then using the formulas above the RSE's and z-test are computed as follows:

$$RSE(R_1) = 100\sqrt{\frac{1}{120} + 0.440 * \left(-.000297 + \frac{20{,}595}{330{,}000}\right)} = 18.88\%$$

$$RSE(R_2) = 100\sqrt{\frac{1}{180}} = 7.45\%$$

and

$$z = \frac{36.4 - 13.8}{\sqrt{36.4^2\left(\frac{18.88}{100}\right)^2 + 13.8^2\left(\frac{7.45}{100}\right)^2}} = 3.25$$

Since $|z|$ is greater than 1.96, the difference between the two rates is statistically significant at the 0.05 level of significance.

If either of two rates is based on less than 100 deaths, then one may determine if the 95% CI's overlap as an indication of a statistically significant or non-significant difference. Users of the method of comparing confidence intervals should be aware that this method is a conservative test for statistical significance. That is, the difference between two rates may, in fact, be statistically significant even though confidence intervals for the two rates overlap (79). Thus, caution should be observed when interpreting a non-significant difference between two rates, especially when the lower and upper limits being compared overlap only slightly.

As a hypothetical example, if the three-year average death rate for Cubans, R_3, is 26.7 (based on D=40 deaths and P=150,000 population for the three years combined) and the three-year rate for non-Hispanic blacks, R_4, is 61.5 (based on D=400 deaths and P=650,000 population for the three years combined), then the 95% CI's are computed using information from the following formulas and table S:

95% CI for R_3

$$Lower := 26.7 * 0.70266\left(1 - 2.576\sqrt{0.44 * \left(-.000297 + \frac{20,595}{150,000}\right)}\right) = 6.9$$

$$Upper := 26.7 * 1.37991\left(1 + 2.576\sqrt{0.44 * \left(-.000297 + \frac{20,595}{150,000}\right)}\right) = 60.1$$

95% CI for R_4

$$RSE(R_4) = 100\sqrt{\frac{1}{400}} = 5.00\%$$

$$Lower = 61.5 - (1.96) = 55.5$$

$$Upper = 61.5 + (1.96) = 67.5$$

Since the CI's overlap, the difference between R_3 and R_4 is not statistically significant.

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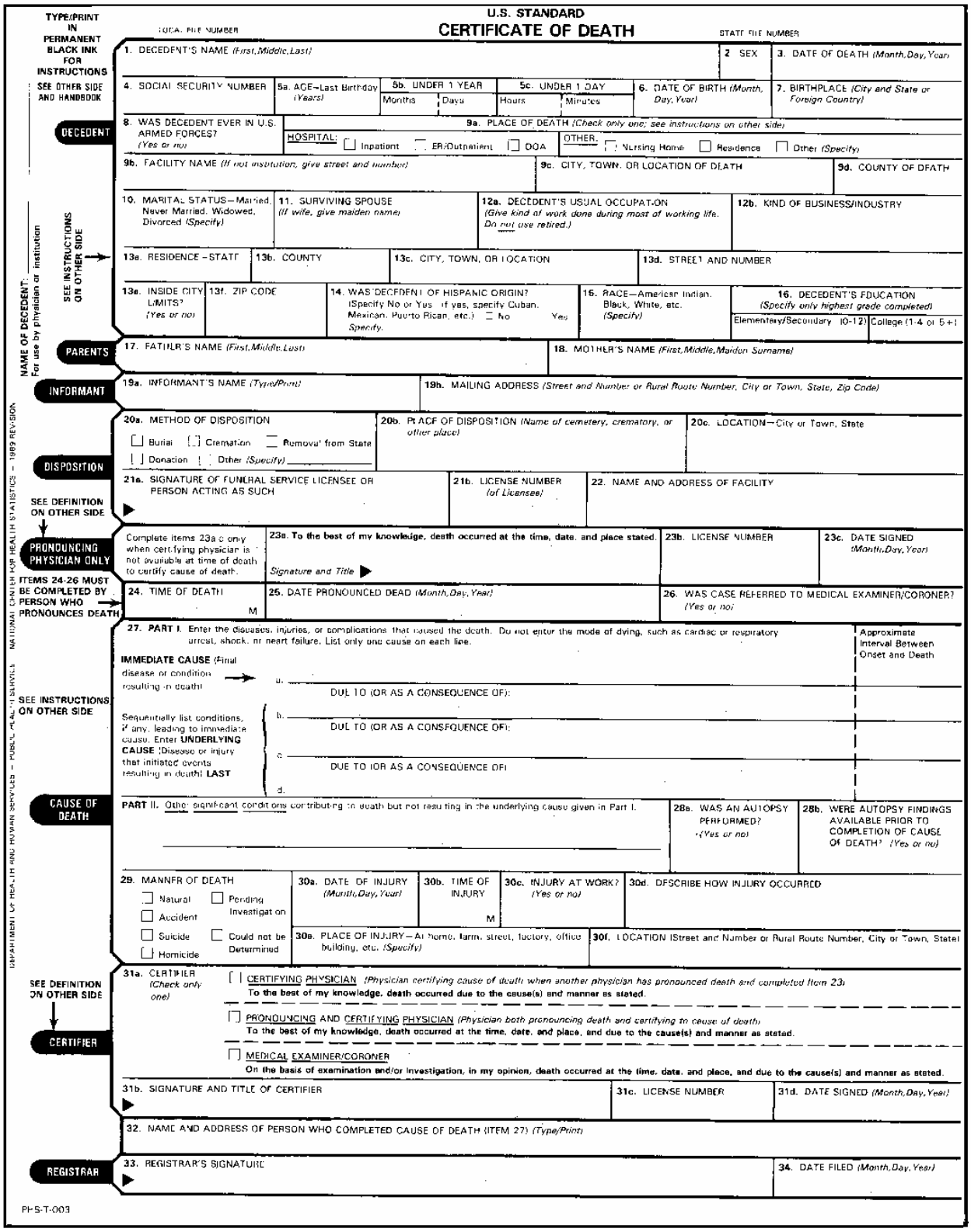
Figure 1. U.S. Standard Certificate of Death



U.S. STANDARD
CERTIFICATE OF DEATH

TYPE/PRINT IN PERMANENT BLACK INK FOR INSTRUCTIONS SEE OTHER SIDE AND HANDBOOK

LOCAL FILE NUMBER

STATE FILE NUMBER

DECEDENT

1. DECEDENT'S NAME (First, Middle, Last)
2. SEX
3. DATE OF DEATH (Month, Day, Year)
4. SOCIAL SECURITY NUMBER
5a. AGE—Last Birthday (Years)
5b. UNDER 1 YEAR (Months, Days)
5c. UNDER 1 DAY (Hours, Minutes)
6. DATE OF BIRTH (Month, Day, Year)
7. BIRTHPLACE (City and State or Foreign Country)
8. WAS DECEDENT EVER IN U.S. ARMED FORCES? (Yes or no)
9a. PLACE OF DEATH (Check only one; see instructions on other side)
HOSPITAL: Inpatient; ER/Outpatient; DOA
OTHER: Nursing Home; Residence; Other (Specify)
9b. FACILITY NAME (If not institution, give street and number)
9c. CITY, TOWN, OR LOCATION OF DEATH
9d. COUNTY OF DEATH

NAME OF DECEDENT: For use by physician or institution

SEE INSTRUCTIONS ON OTHER SIDE

10. MARITAL STATUS—Married, Never Married, Widowed, Divorced (Specify)
11. SURVIVING SPOUSE (If wife, give maiden name)
12a. DECEDENT'S USUAL OCCUPATION (Give kind of work done during most of working life. Do not use retired.)
12b. KIND OF BUSINESS/INDUSTRY
13a. RESIDENCE—STATE
13b. COUNTY
13c. CITY, TOWN, OR LOCATION
13d. STREET AND NUMBER
13e. INSIDE CITY LIMITS? (Yes or no)
13f. ZIP CODE
14. WAS DECEDENT OF HISPANIC ORIGIN? (Specify No or Yes - if yes, specify Cuban, Mexican, Puerto Rican, etc.) No; Yes, Specify.
15. RACE—American Indian, Black, White, etc. (Specify)
16. DECEDENT'S EDUCATION (Specify only highest grade completed)
Elementary/Secondary (0-12); College (1-4 or 5+)

PARENTS

17. FATHER'S NAME (First, Middle, Last)
18. MOTHER'S NAME (First, Middle, Maiden Surname)

INFORMANT

19a. INFORMANT'S NAME (Type/Print)
19b. MAILING ADDRESS (Street and Number or Rural Route Number, City or Town, State, Zip Code)

DISPOSITION

20a. METHOD OF DISPOSITION: Burial; Cremation; Removal from State; Donation; Other (Specify)
20b. PLACE OF DISPOSITION (Name of cemetery, crematory, or other place)
20c. LOCATION—City or Town, State
21a. SIGNATURE OF FUNERAL SERVICE LICENSEE OR PERSON ACTING AS SUCH
21b. LICENSE NUMBER (of Licensee)
22. NAME AND ADDRESS OF FACILITY

SEE DEFINITION ON OTHER SIDE

PRONOUNCING PHYSICIAN ONLY

Complete items 23a-c only when certifying physician is not available at time of death to certify cause of death.
23a. To the best of my knowledge, death occurred at the time, date, and place stated. Signature and Title
23b. LICENSE NUMBER
23c. DATE SIGNED (Month, Day, Year)

ITEMS 24-26 MUST BE COMPLETED BY PERSON WHO PRONOUNCES DEATH

24. TIME OF DEATH
25. DATE PRONOUNCED DEAD (Month, Day, Year)
26. WAS CASE REFERRED TO MEDICAL EXAMINER/CORONER? (Yes or no)

CAUSE OF DEATH

27. PART I. Enter the diseases, injuries, or complications that caused the death. Do not enter the mode of dying, such as cardiac or respiratory arrest, shock, or heart failure. List only one cause on each line.
Approximate Interval Between Onset and Death
IMMEDIATE CAUSE (Final disease or condition resulting in death)
a.
DUE TO (OR AS A CONSEQUENCE OF):
Sequentially list conditions, if any, leading to immediate cause. Enter UNDERLYING CAUSE (Disease or injury that initiated events resulting in death) LAST
b.
DUE TO (OR AS A CONSEQUENCE OF):
c.
DUE TO (OR AS A CONSEQUENCE OF)
d.

SEE INSTRUCTIONS ON OTHER SIDE

PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I.
28a. WAS AN AUTOPSY PERFORMED? (Yes or no)
28b. WERE AUTOPSY FINDINGS AVAILABLE PRIOR TO COMPLETION OF CAUSE OF DEATH? (Yes or no)

29. MANNER OF DEATH: Natural; Accident; Suicide; Homicide; Pending Investigation; Could not be Determined
30a. DATE OF INJURY (Month, Day, Year)
30b. TIME OF INJURY
30c. INJURY AT WORK? (Yes or no)
30d. DESCRIBE HOW INJURY OCCURRED
30e. PLACE OF INJURY—At home, farm, street, factory, office building, etc. (Specify)
30f. LOCATION (Street and Number or Rural Route Number, City or Town, State)

CERTIFIER

SEE DEFINITION ON OTHER SIDE

31a. CERTIFIER (Check only one)
CERTIFYING PHYSICIAN (Physician certifying cause of death when another physician has pronounced death and completed Item 23) To the best of my knowledge, death occurred due to the cause(s) and manner as stated.
PRONOUNCING AND CERTIFYING PHYSICIAN (Physician both pronouncing death and certifying to cause of death) To the best of my knowledge, death occurred at the time, date, and place, and due to the cause(s) and manner as stated.
MEDICAL EXAMINER/CORONER On the basis of examination and/or investigation, in my opinion, death occurred at the time, date, and place, and due to the cause(s) and manner as stated.
31b. SIGNATURE AND TITLE OF CERTIFIER
31c. LICENSE NUMBER
31d. DATE SIGNED (Month, Day, Year)

32. NAME AND ADDRESS OF PERSON WHO COMPLETED CAUSE OF DEATH (ITEM 27) (Type/Print)

REGISTRAR

33. REGISTRAR'S SIGNATURE
34. DATE FILED (Month, Day, Year)

PHS-T-003

DEPARTMENT OF HEALTH AND HUMAN SERVICES - PUBLIC HEALTH SERVICE - NATIONAL CENTER FOR HEALTH STATISTICS - 1989 REVISION

Table A. Percent agreement between number of deaths from death certificates and from census and Current Population Survey files, by race and Hispanic origin, and ratio of number of deaths 1960 census and the National Longitudinal Mortality Study

Race[1] and Hispanic origin [2]	1960 census		NLMS[3] 1979-1985/1989	
	Percent agreement	Ratio of census to death certificate	Percent agreement	Ratio of CPS[4] to death certificate
White	99.8	1.00	99.8	1.00
Black	98.2	1.00	98.6	1.00
American Indian [5]	79.2	1.12	57.4	1.37
Asian or Pacific Islander	---	---	82.5	1.13
Japanese	97.0	1.04	---	---
Chinese	90.3	1.07	---	---
Filipino	72.6	1.28	---	---
Hispanic	---	---	89.7	1.07
Mexican	---	---	84.9	1.11
Puerto Rican	---	---	85.9	1.04
Cuban	---	---	80.0	1.07
Other Hispanic	---	---	47.6	0.89
Non-Hispanic	---	---	99.8	1.00

--- Data not available.

[1] NLMS race data are nine CPS files and for deaths occurring 1979-89.

[2] NLMS Hispanic-origin data are for 12 CPS fields and for deaths occurring 1979-85 for selected States.

[3] National Longitudinal Mortality Study.

[4] Current Population Survey.

[5] Includes Aleuts and Eskimos.

SOURCES: Hambright TZ. Comparability of marital status, race, nativity, and country of origin on the death certificate and matching census record: U.S., May-August 1960. National Center for Health Statistics. Vital Health Stat 2(34). 1969; Rosenberg HM, Maurer JD, Sorlie PD, Johnson NJ, et al. Quality of death rates by race and Hispanic origin: A summary of current research, 1999. National Center for Health Statistics. Vital Health Stat 2(128). 1999. Sorlie PD, Rogot E, Johnson NJ. Validity of demographic characteristics on the death certificate. Epidemiology 3(2):181-4. 1992.

Table B. Reported age-adjusted death rates and rates adjusted for reporting bias and undercoverage, by race and Hispanic origin: United States, 1999

[Age-adjusted rates per 100,000 U.S. standard population based on year 2000 standard]

Race and origin	1999 age-adjusted rate[1]	1979-89 NLMS ratio[2]	1990 census undercount ratio[3]	Combined ratio[4]	Rates adjusted for reporting bias and estimated census undercount[5]	Race ratio[6] before adjustment	Estimated race ratio[6] after adjustment
White.....	860.7	1.00	0.99	0.99	852.1	1.00	1.00
Black.....	1,147.1	1.00	0.95	0.95	1,089.7	1.33	1.28
American Indian [7].....	716.1	1.37	0.88	1.21	866.5	0.83	1.02
Asian or Pacific Islander [8].....	517.5	1.13	0.98	1.11	574.4	0.60	0.67
Hispanic.....	601.0	1.07	0.95	1.02	613.0	0.70	0.72

--- Data not available.

[1] Hoyert DL, Arias E, Smith BS, Murphy SL, Kochanek KD. Deaths: Final data for 1999. National vital statistics reports; vol 49 no 8. Hyattsville, Maryland: National Center for Health Statistics. 2001.

[2] The National Longitudinal Mortality Study (NLMS) race ratios based on weighted data for nine Current Population Survey (CPS) files; NLMS ratios are the ratio of CPS-weighted number of deaths for a race group divided by the death certificated weighted number of deaths for the corresponding race group. The ratio for Hispanic persons was based on 12 CPS files for selected States for 1979-85.

[3] The census undercount ratio is based on the ratio of the 1990 resident census-level population to the resident population adjusted for net census undercount (Hogan H. The 1990 post-enumeration survey: Operations and results. J Am Stat Assoc 88(423):1047-60. 1993).

[4] Product of the NLMS ratio multiplied by the census undercount ratio.

[5] Product of the 1999 age-adjusted rate multiplied by the combined ratio.

[6] Ratio of the rate for a race or origin group to the rate for the white population.

[7] Includes Aleuts and Eskimos.

[8] Includes deaths among Chinese, Filipino, Hawaiian, Japanese, and other Asian or Pacific Islanders.

NOTE: The NLMS ratios, the census undercount ratios, and the age-adjusted rates are subject to variability and/or biases. Therefore, the results based on these ratios should be interpreted with caution.

Table C. Number of States whose Hispanic data was considered of sufficient quality for analysis and publication by NCHS and estimated percent of U.S. Hispanic population residing in reporting States, 1984-1999

Year	Number of States whose Hispanic data was considered of sufficient quality for analysis and publication by NCHS	Estimated percent of U.S. Hispanic population residing in reporting States [1]
1999	50 States and D.C.	100.0
1998	50 States and D.C.	100.0
1997	50 States and D.C.	100.0
1996	49 States and D.C.	99.6
1995	49 States and D.C.	99.6
1994	49 States and D.C.	99.6
1993	49 States and D.C.	99.6
1992	48 States and D.C.	99.6
1991	47 States, New York State (excl. New York City) and D.C.	91
1990	45 States, New York State (excl. New York City) and D.C.	89
1989	44 States and D.C.	97
1988	26 States and D.C.	82
1987	18 States and D.C.	80
1986	18 States and D.C.	80
1985	17 States and D.C.	77
1984	15 States	45

[1] Percents are based on the 1980 Census for 1984-89 and on the 1990 Census for 1990-99.

Table D. Year in which State began reporting Hispanic data and year in which data reached level of acceptable quality and completeness for analysis by NCHS: Each State

[Prior to 1992, mortality data by Hispanic origin was considered of acceptable completeness if it was at least 90 percent complete on a place-of-occurrence basis. Thereafter, it was considered of acceptable completeness if it was at least 80 percent complete]

States	Year in which State first began reporting deaths by Hispanic origin	Year data reach level of acceptable quality and completeness for analysis by NCHS
Alabama	1988	1988
Alaska	1989	1989
Arizona	1984	1984
Arkansas	1984	1985
California	1984	1985
Colorado	1984	1984
Connecticut	1989	1991
Delaware	1989	1989
District of Columbia	1984	1985
Florida	1989	1989
Georgia	1984	1984
Hawaii	1984	1984
Idaho	1989	1989
Illinois	1984	1984
Indiana	1984	1984
Iowa	1989	1989
Kansas	1984	1984
Kentucky	1988	1988
Louisiana	1991	1991
Maine	1984	1988
Maryland	1989	1990
Massachusetts	1989	1989
Michigan	1989	1989
Minnesota	1989	1989
Mississippi	1984	1984
Missouri	1989	1989
Montana	1988	1988
Nebraska	1984	1984
Nevada	1984	1989
New Hampshire	1993	1993
New Jersey	1984	1986
New Mexico	1984	1989
New York (excluding New York City) 1/	1984	1984
New York City	1984	1984
North Carolina	1988	1988
North Dakota	1984	1984
Ohio	1984	1984
Oklahoma	1997	1997
Oregon	1988	1988
Pennsylvania	1989	1989
Rhode Island	1988	1988
South Carolina	1989	1989
South Dakota	1989	1989
Tennessee	1984	1989

Table D. Year in which State began reporting Hispanic data and year in which data reached level of acceptable quality and completeness for analysis by NCHS: Each State

[Prior to 1992, mortality data by Hispanic origin was considered of acceptable completeness if it was at least 90 percent complete on a place-of-occurrence basis. Thereafter, it was considered of acceptable completeness if it was at least 80 percent complete]

States	Year in which State first began reporting deaths by Hispanic origin	Year data reach level of acceptable quality and completeness for analysis by NCHS
Texas	1984	1984
Utah	1984	1984
Vermont	1989	1989
Virginia	1989	1990
Washington	1988	1988
West Virginia	1989	1989
Wisconsin	1989	1989
Wyoming	1984	1984

1/ Data were excluded from analysis in 1990 and 1991 because more than 10 percent of New York City's deaths were classified to "unknown origin.

Table E. Comparable category codes and estimated comparability ratios for 113 selected causes of death, injury by firearms, drug-induced deaths and alcohol-induced deaths according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated comparability ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Salmonella infections	A01-A02	002-003	30	37	0.8108	0.0644	7.9	0.6846	0.9370
Shigellosis and amebiasis	A03,A06	004,006	*	*	*	*	*	*	*
Certain other intestinal infections	A04,A07-A09	007-009	*	*	*	*	*	*	*
Tuberculosis	A16-A19	010-018	653	764	0.8547	0.0172	2.0	0.8209	0.8885
Respiratory tuberculosis	A16	010-012	518	572	0.9056	0.0201	2.2	0.8662	0.9450
Other tuberculosis	A17-A19	013-018	135	192	0.7031	0.0407	5.8	0.6233	0.7830
Whooping cough	A37	033	*	*	*	*	*	*	*
Scarlet fever and erysipelas	A38,A46	034.1-035	*	*	*	*	*	*	*
Meningococcal infection	A39	036	221	222	0.9955	0.0149	1.5	0.9663	1.0247
Septicemia	A40-A41	038	21,258	17,791	1.1949	0.0042	0.3	1.1867	1.2030
Syphilis	A50-A53	090-097	21	33	0.6364	0.1184	18.6	0.4043	0.8685
Acute poliomyelitis	A80	045	*	*	*	*	*	*	*
Arthropod-borne viral encephalitis	A83-A84,A85.2	062-064	*	*	*	*	*	*	*
Measles	B05	055	*	*	*	*	*	*	*
Viral hepatitis	B15-B19	070	1,123	1,346	0.8343	0.0120	1.4	0.8109	0.8578
Human immunodeficiency virus (HIV) disease	B20-B24	*042-*044	12,765	11,150	1.1448	0.0045	0.4	1.1360	1.1536
Malaria	B50-B54	084	*	*	*	*	*	*	*
Other and unspecified infectious and parasitic diseases and their sequelae	A00,A05,A20-A36, A42-A44,A48-A49, A54-A79,A81-A82, A85.0-A85.1, A85.8,A86-B04, B06-B09,B25-B49, B55-B99	001,005,020-032, 037,039-041,046-054,056-061,065-066,071-083,085-088,098-134,136-139,771.3	2,865	2,607	1.0990	0.0154	1.4	1.0688	1.1291
Malignant neoplasms	C00-C97	140-208	464,688	461,544	1.0068	0.0002	0.0	1.0064	1.0072
Malignant neoplasms of lip, oral cavity and pharynx	C00-C14	140-149	5,927	6,172	0.9603	0.0040	0.4	0.9525	0.9681
Malignant neoplasm of esophagus	C15	150	9,596	9,630	0.9965	0.0020	0.2	0.9926	1.0003
Malignant neoplasm of stomach	C16	151	11,480	11,408	1.0063	0.0019	0.2	1.0025	1.0101
Malignant neoplasms of colon, rectum and anus	C18-C21	153-154	48,583	48,619	0.9993	0.0009	0.1	0.9975	1.0010
Malignant neoplasms of liver and intrahepatic bile ducts	C22	155	9,732	10,102	0.9634	0.0023	0.2	0.9588	0.9679
Malignant neoplasm of pancreas	C25	157	24,313	24,361	0.9980	0.0009	0.1	0.9963	0.9997
Malignant neoplasm of larynx	C32	161	3,209	3,194	1.0047	0.0053	0.5	0.9943	1.0150
Malignant neoplasms of trachea, bronchus and lung	C33-C34	162	131,750	133,936	0.9837	0.0005	0.1	0.9827	0.9846
Malignant melanoma of skin	C43	172	5,941	6,139	0.9677	0.0032	0.3	0.9614	0.9741
Malignant neoplasm of breast	C50	174-175	38,102	37,891	1.0056	0.0010	0.1	1.0036	1.0075
Malignant neoplasm of cervix uteri	C53	180	3,753	3,802	0.9871	0.0034	0.3	0.9805	0.9938
Malignant neoplasms of corpus uteri and uterus, part unspecified	C54-C55	179,182	5,318	5,183	1.0260	0.0040	0.4	1.0182	1.0339
Malignant neoplasm of ovary	C56	183	11,292	11,344	0.9954	0.0016	0.2	0.9923	0.9985
Malignant neoplasm of prostate	C61	185	30,672	30,267	1.0134	0.0015	0.1	1.0105	1.0162
Malignant neoplasms of kidney and renal pelvis	C64-C65	189.0,189.1	9,521	9,521	1.0000	0.0022	0.2	0.9957	1.0043
Malignant neoplasm of bladder	C67	188	9,563	9,594	0.9968	0.0026	0.3	0.9916	1.0019
Malignant neoplasms of meninges, brain and other parts of central nervous system	C70-C72	191-192	10,039	10,359	0.9691	0.0025	0.3	0.9642	0.9740
Malignant neoplasms of lymphoid, hematopoietic and related tissue	C81-C96	200-208	44,715	44,530	1.0042	0.0012	0.1	1.0019	1.0064
Hodgkin's disease	C81	201	1,021	1,036	0.9855	0.0089	0.9	0.9680	1.0030

Table E. Comparable category codes and estimated comparability ratios for 113 selected causes of death, injury by firearms, drug-induced deaths and alcohol-induced deaths according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated comparability ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Non-Hodgkin's lymphoma	C82-C85	200,202	17,924	18,326	0.9781	0.0018	0.2	0.9745	0.9817
Leukemia	C91-C95	204-208	16,600	16,405	1.0119	0.0019	0.2	1.0083	1.0155
Multiple myeloma and immunoproliferative neoplasms	C88,C90	203	9,099	8,763	1.0383	0.0030	0.3	1.0324	1.0443
Other and unspecified malignant neoplasms of lymphoid, hematopoietic and related tissue	C96	- - -	*	*	*	*	*	*	*
All other and unspecified malignant neoplasms	C17,C23-C24,C26-C31,C37-C41,C44-C49,C51-C52,C57-C60,C62-C63,C66,C68-C69,C73-C80,C97	152,156,158-160,163-171,173,181,183.2-184,186-187,189.2-190,193-199	51,182	45,492	1.1251	0.0021	0.2	1.1210	1.1292
In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior	D00-D48	210-239	9,263	5,532	1.6744	0.0164	1.0	1.6422	1.7067
Anemias	D50-D64	280-285	3,059	3,200	0.9559	0.0077	0.8	0.9409	0.9710
Diabetes mellitus	E10-E14	250	48,636	48,242	1.0082	0.0011	0.1	1.0060	1.0103
Nutritional deficiencies	E40-E64	260-269	3,215	2,763	1.1636	0.0165	1.4	1.1312	1.1960
Malnutrition	E40-E46	260-263	2,607	2,665	0.9782	0.0151	1.5	0.9487	1.0078
Other nutritional deficiencies	E50-E64	264-269	608	98	6.2041	0.5961	9.6	5.0358	7.3724
Meningitis	G00,G03	320-322	592	584	1.0137	0.0136	1.3	0.9871	1.0403
Parkinson's disease	G20-G21	332	10,404	10,392	1.0012	0.0028	0.3	0.9956	1.0067
Alzheimer's disease [1]	G30	331.0	29,707	19,121	1.5536	0.0071	0.5	1.5398	1.5675
Major cardiovascular diseases	I00-I78	390-434,436-448	796,919	798,435	0.9981	0.0002	0.0	0.9977	0.9985
Diseases of heart	I00-I09,I11,I13,I20-I51	390-398,402,404,410-429	615,564	624,405	0.9858	0.0002	0.0	0.9854	0.9863
Acute rheumatic fever and chronic rheumatic heart diseases	I00-I09	390-398	2,446	2,980	0.8208	0.0089	1.1	0.8034	0.8382
Hypertensive heart disease	I11	402	17,322	21,577	0.8028	0.0028	0.3	0.7973	0.8083
Hypertensive heart and renal disease	I13	404	2,170	2,027	1.0705	0.0160	1.5	1.0392	1.1019
Ischemic heart diseases diseases	I20-I25	410-414,429.2	466,459	466,935	0.9990	0.0002	0.0	0.9985	0.9994
Acute myocardial infarction	I21-I22	410	178,125	180,169	0.9887	0.0003	0.0	0.9880	0.9893
Other acute ischemic heart diseases	I24	411	2,667	2,638	1.0110	0.0117	1.2	0.9880	1.0340
Other forms of chronic ischemic heart disease	I20,I25	412-414,429.2	285,667	284,128	1.0054	0.0004	0.0	1.0046	1.0062
Atherosclerotic cardiovascular disease, so described	I25.0	429.2	64,354	61,362	1.0488	0.0016	0.2	1.0456	1.0519
All other forms of chronic ischemic heart disease	I20,I25.1-I25.9	412-414	221,313	222,766	0.9935	0.0004	0.0	0.9927	0.9942
Other heart diseases	I26-I51	415-429.1,429.3-429.9	127,167	130,886	0.9716	0.0010	0.1	0.9696	0.9736
Acute and subacute endocarditis	I33	421	552	554	0.9964	0.0137	1.4	0.9695	1.0233
Diseases of pericardium and acute myocarditis	I30-I31,I40	420,422-423	489	475	1.0295	0.0160	1.6	0.9981	1.0608
Heart failure	I50	428	44,297	42,554	1.0410	0.0013	0.1	1.0384	1.0435
All other forms of heart disease	I26-I28,I34-I38,I42-I49,I51	415-417,424-427,429.0-429.1,429.3-429.9	81,829	87,303	0.9373	0.0014	0.2	0.9345	0.9401
Essential (primary) hypertension and hypertensive renal disease	I10,I12	401,403	11,958	10,684	1.1192	0.0050	0.4	1.1094	1.1291
Cerebrovascular diseases	I60-I69	430-434,436-438	137,264	129,640	1.0588	0.0008	0.1	1.0572	1.0604
Atherosclerosis	I70	440	13,894	14,417	0.9637	0.0025	0.3	0.9588	0.9686
Other diseases of circulatory system	I71-I78	441-448	18,239	19,289	0.9456	0.0021	0.2	0.9414	0.9498
Aortic aneurysm and dissection	I71	441	12,216	12,201	1.0012	0.0010	0.1	0.9992	1.0032

Table E. Comparable category codes and estimated comparability ratios for 113 selected causes of death, injury by firearms, drug-induced deaths and alcohol-induced deaths according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated comparability ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Other diseases of arteries, arterioles and capillaries	I72-I78	442-448	6,023	7,088	0.8497	0.0053	0.6	0.8394	0.8601
Other disorders of circulatory system	I80-I99	451-459	2,984	2,899	1.0293	0.0172	1.7	0.9956	1.0631
Influenza and pneumonia	J10-J18	480-487	50,526	72,371	0.6982	0.0018	0.3	0.6947	0.7016
Influenza	J10-J11	487	572	567	1.0088	0.0073	0.7	0.9945	1.0231
Pneumonia	J12-J18	480-486	49,954	71,804	0.6957	0.0018	0.3	0.6922	0.6992
Other acute lower respiratory infections	J20-J22	466	346	355	0.9746	0.0392	4.0	0.8978	1.0515
Acute bronchitis and bronchiolitis	J20-J21	466	265	355	0.7465	0.0264	3.5	0.6947	0.7983
Unspecified acute lower respiratory infection	J22	- - -	*	*	*	*	*	*	*
Chronic lower respiratory diseases	J40-J47	490-494,496	94,326	90,022	1.0478	0.0009	0.1	1.0460	1.0496
Bronchitis, chronic and unspecified	J40-J42	490-491	913	2,320	0.3935	0.0107	2.7	0.3726	0.4145
Emphysema	J43	492	14,369	14,774	0.9726	0.0031	0.3	0.9666	0.9786
Asthma	J45-J46	493	4,217	4,718	0.8938	0.0061	0.7	0.8819	0.9057
Other chronic lower respiratory diseases	J44,J47	494,496	74,827	68,210	1.0970	0.0014	0.1	1.0943	1.0998
Pneumoconioses and chemical effects	J60-J66,J68	500-506	860	845	1.0178	0.0099	1.0	0.9983	1.0372
Pneumonitis due to solids and liquids	J69	507	10,183	9,104	1.1185	0.0048	0.4	1.1092	1.1279
Other diseases of respiratory system	J00-J06,J30-J39, J67,J70-J98	034.0,460-465, 470-478,495, 508-519	16,656	14,269	1.1673	0.0052	0.4	1.1572	1.1774
Peptic ulcer	K25-K28	531-534	3,574	3,686	0.9696	0.0045	0.5	0.9608	0.9784
Diseases of appendix	K35-K38	540-543	209	202	1.0347	0.0242	2.3	0.9873	1.0820
Hernia	K40-K46	550-553	658	633	1.0395	0.0154	1.5	1.0094	1.0696
Chronic liver disease and cirrhosis	K70,K73-K74	571	21,688	20,920	1.0367	0.0027	0.3	1.0314	1.0420
Alcoholic liver disease	K70	571.0-571.3	10,147	9,965	1.0183	0.0050	0.5	1.0085	1.0281
Other chronic liver disease and cirrhosis	K73-K74	571.4-571.9	11,541	10,955	1.0535	0.0041	0.4	1.0454	1.0615
Cholelithiasis and other disorders of gallbladder	K80-K82	574-575	1,725	1,803	0.9567	0.0060	0.6	0.9450	0.9685
Nephritis, nephrotic syndrome and nephrosis [1]	N00-N07,N17-N19, N25-N27	580-589	24,939	20,242	1.2320	0.0044	0.4	1.2234	1.2407
Acute and rapidly progressive nephritic and nephritic syndrome	N00-N01,N04	580-581	161	249	0.6466	0.0342	5.3	0.5796	0.7136
Chronic glomerulonephritis, nephritis and nephropathy not specified as acute or chronic, and renal sclerosis unspecified	N02-N03,N05-N07, N26	582-583,587	468	1,213	0.3858	0.0144	3.7	0.3575	0.4141
Renal failure [1]	N17-N19	584-586	24,290	18,758	1.2949	0.0050	0.4	1.2852	1.3047
Other disorders of kidney	N25,N27	588-589	20	22	0.9091	0.0867	9.5	0.7392	1.0790
Infections of kidney	N10-N12,N13.6, N15.1	590	731	726	1.0069	0.0144	1.4	0.9786	1.0352
Hyperplasia of prostate	N40	600	326	327	0.9969	0.0159	1.6	0.9658	1.0280
Inflammatory diseases of female pelvic organs	N70-N76	614-616	63	64	0.9844	0.0410	4.2	0.9040	1.0648
Pregnancy, childbirth and the puerperium [1]	O00-099	630-676	*	*	*	*	*	*	*
Pregnancy with abortive outcome	O00-O07	630-639	*	*	*	*	*	*	*
Other complications of pregnancy, childbirth and the puerperium	O10-O99	640-676	*	*	*	*	*	*	*
Certain conditions originating in the perinatal period	P00-P96	760-771.2,771.4-779	10,184	9,555	1.0658	0.0033	0.3	1.0593	1.0724
Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	740-759	5,950	7,025	0.8470	0.0055	0.6	0.8362	0.8577
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00-R99	780-799	16,940	17,732	0.9553	0.0034	0.4	0.9487	0.9620
All other diseases (Residual)	Residual	Residual	109,853	122,107	0.8996	0.0015	0.2	0.8968	0.9025
Accidents (unintentional injuries)	V01-X59,Y85-Y86	E800-E869,E880-	31,084	30,163	1.0305	0.0014	0.1	1.0278	1.0333

Table E. Comparable category codes and estimated comparability ratios for 113 selected causes of death, injury by firearms, drug-induced deaths and alcohol-induced deaths according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated comparability ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Transport accidents	V01-V99,Y85	E929 E800-E848, E929.0,E929.1	17,547	17,586	0.9978	0.0006	0.1	0.9966	0.9990
Motor vehicle accidents [1]	V02-V04,V09.0, V09.2,V12-V14, V19.0-V19.2,19.4-V19.6,V20-V79, V80.3-V80.5, V81.0-V81.1, V82.0-V82.1,V83-V86,V87.0-V87.8, V88.0-V88.8, V89.0,V89.2	E810-E825	16,632	17,051	0.9754	0.0006	0.1	0.9742	0.9766
Other land transport accidents [1]	V01,V05-V06, V09.1,V09.3-V09.9,V10-V11, V15-V18,V19.3, V19.8-V19.9, V80.0-V80.2, V80.6-V80.9, V81.2-V81.9, V82.2-V82.9, V87.8,V88.9, V89.1,V89.3,V89.9	E800-E807,E826-E829	*	*	*	*	*	*	*
Water, air and space, and other and unspecified transport accidents and their sequelae	V90-V99,Y85	E830-E848, E929.0,E929.1	351	347	1.0115	0.0209	2.1	0.9706	1.0525
Nontransport accidents	W00-X59,Y86	E850-E869,E880-E928,E929.2-E929.9	13,537	12,577	1.0763	0.0035	0.3	1.0696	1.0831
Falls	W00-W19	E880-E888	5,173	6,152	0.8409	0.0049	0.6	0.8313	0.8505
Accidental discharge of firearms	W32-W34	E922	493	466	1.0579	0.0127	1.2	1.0331	1.0828
Accidental drowning and submersion	W65-W74	E910	283	284	0.9965	0.0127	1.3	0.9716	1.0213
Accidental exposure to smoke, fire and flames	X00-X09	E890-E899	493	506	0.9743	0.0089	0.9	0.9568	0.9918
Accidental poisoning and exposure to noxious substances	X40-X49	E850-E869, E924.1	*	*	*	*	*	*	*
Other and unspecified nontransport accidents and their sequelae	W20-W31,W35-W64,W75-W99, X10-X39, X50-X59,Y86	E900-E909,E911-E921,E923-E924.0,E924.8-E928,E929.2-E929.9	6,698	4,721	1.4188	0.0123	0.9	1.3947	1.4428
Intentional self-harm (suicide)	X60-X84,Y87.0	E950-E959	18,352	18,422	0.9962	0.0005	0.0	0.9952	0.9972
Intentional self-harm (suicide) by discharge of firearms	X72-X74	E955.0-E955.4	14,157	14,183	0.9982	0.0007	0.1	0.9968	0.9996
Intentional self-harm (suicide) by other and unspecified means and their sequelae	X60-X71,X75-X84, Y87.0	E950-E954, E955.5-E959	4,195	4,239	0.9896	0.0023	0.2	0.9850	0.9942
Assault (homicide)	X85-Y09,Y87.1	E960-E969	12,287	12,308	0.9983	0.0006	0.1	0.9972	0.9994
Assault (homicide) by discharge of firearms	X93-X95	E965.0-E965.4	8,718	8,745	0.9969	0.0008	0.1	0.9953	0.9985
Assault (homicide) by other and unspecified means and their sequelae	X85-X92,X96-Y09, Y87.1	E960-E964, E965.5-E969	3,569	3,563	1.0017	0.0024	0.2	0.9969	1.0064
Legal intervention	Y35,Y89.0	E970-E978	*	*	*	*	*	*	*
Events of undetermined intent	Y10-Y34,Y87.2, Y89.9	E980-E989	*	*	*	*	*	*	*
Discharge of firearms, undetermined intent	Y22-Y24	E985.0-E985.4	*	*	*	*	*	*	*

Table E. Comparable category codes and estimated comparability ratios for 113 selected causes of death, injury by firearms, drug-induced deaths and alcohol-induced deaths according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated compara-bility ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Other and unspecified events of undetermined intent and their sequelae	Y10-Y21,Y25-Y34, Y87.2, Y89.9	E980-E984, E985.5-E989	*	*	*	*	*	*	*
Operations of war and their sequelae	Y36,Y89.1	E990-E999	*	*	*	*	*	*	*
Complications of medical and surgical care	Y40-Y84,Y88	E870-E879,E930-E949	*	*	*	*	*	*	*
Injury by firearms [2]	W32-W34,X72-X74,X93-X95,Y22-Y24,Y35.0	E922,E955.0-E955.4,E965.0-E965.4,E970, E985.0-E985.4	23,355	23,418	0.9973	0.0006	0.1	0.9961	0.9985
Drug-induced deaths [2]	F11.0-F11.5,F11.7-F11.9,F12.0-F12.5, F12.7-F12.9,F13.0-F13.5,F13.7-F13.9, F14.0-F14.5,F14.7-F14.9,F15.0-F15.5, F15.7-F15.9,F16.0-F16.5,F16.7-F16.9, F17.0,F17.3-F17.5, F17.7-F17.9,F18.0-F18.5,F18.7-F18.9, F19.0-F19.5,F19.7-F19.9,X40-X44, X60-X64,X85,Y10-Y14	292,304,305.2-305.9,E850-E858, E950.0-E950.5, E962.0,E980.0-E980.5	1,158	969	1.1950	0.0225	1.9	1.1509	1.2391
Alcohol-induced deaths [2]	F10,G31.2,G62.1, I42.6,K29.2,K70, R78.0,X45,X65, Y15	291,303,305.0, 357.5,425.5, 535.3,571.0-571.3,790.3, E860	14,783	15,269	0.9682	0.0025	0.3	0.9633	0.9731

Figure does not meet standards of reliability or precision.
- - - Category not applicable.
0.0 Quantity more than zero but less than 0.05.
[1] Included in selected categories.
[2] Comparability ratio should be interpreted with caution due to concerns with its accuracy. See *Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates* (29) and *Deaths: Final data for 1999* (19).

Table F. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated compara-bility ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Certain infectious and parasitic diseases	A00-B99	001-033,034.1-134,136-139,771.3	284	387	0.7339	0.0339	4.6	0.6673	0.8004
Certain intestinal infectious diseases	A00-A08	001-008	*	*	*	*	*	*	*
Diarrhea and gastroenteritis of infectious origin 1/	A09	009	-	144	0.0000	0.0000	0.0	0.0000	0.0000
Tuberculosis	A16-A19	010-018	*	*	*	*	*	*	*
Tetanus	A33,A35	037,771.3	*	*	*	*	*	*	*
Diptheria	A36	032	*	*	*	*	*	*	*
Whooping cough	A37	033	*	*	*	*	*	*	*
Meningococcal infection	A39	036	25	26	0.9615	0.0377	3.9	0.8876	1.0355
Septicemia	A40-A41	038	167	121	1.3802	0.0713	5.2	1.2403	1.5200
Congenital syphillis	A50	090	*	*	*	*	*	*	*
Gonococcal infection	A54	098	*	*	*	*	*	*	*
Viral diseases	A80-B34	042-079	62	62	1.0000	0.0757	7.6	0.8517	1.1483
Acute poliomyelitis	A80	045	*	*	*	*	*	*	*
Varicella (chickenpox)	B01	052	*	*	*	*	*	*	*
Measles	B05	055	*	*	*	*	*	*	*
Human immunodeficiency virus (HIV) disease	B20-B24	042-044	*	*	*	*	*	*	*
Mumps	B26	072	*	*	*	*	*	*	*
Other and unspecified viral diseases	A81-B00,B02-B04,B06-B19,B25,B27-B34	046-051,053-054,056-071,073-079	35	36	0.9722	0.1255	12.9	0.7262	1.2182
Candidiasis	B37	112	*	*	*	*	*	*	*
Malaria	B50-B54	084	*	*	*	*	*	*	*
Pneumocystosis	B59	136.3	*	*	*	*	*	*	*
All other and unspecified infectious and parasitic diseases	A20-A32,A38,A42-A49,A51-A53,A55-A79,B35-B36,B38-B49,B55-B58,B60-B99	020-031,034.1-035,039-041,080-083,085-088,091-097,099-111,114-134,136.0-136.2,136.4-139	*	*	*	*	*	*	*
Neoplasms	C00-D48	140-239	73	72	1.0139	0.0420	4.1	0.9317	1.0961
Malignant neoplasms	C00-C97	140-208	48	46	1.0435	0.0544	5.2	0.9369	1.1501
Hodgkin's disease and non-Hodgkin's lymphomas	C81-C85	200-202	*	*	*	*	*	*	*
Leukemia	C91-C95	204-208	*	*	*	*	*	*	*
Other and unspecified malignant neoplasms	C00-C80,C88-C90,C96-C97	140-199,203	30	28	1.0714	0.0906	8.5	0.8939	1.2489
In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior	D00-D48	210-239	25	26	0.9615	0.1131	11.8	0.7398	1.1833
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89	135, 279-289	35	50	0.7000	0.0803	11.5	0.5427	0.8573
Anemias	D50-D64	280-285	*	*	*	*	*	*	*
Other diseases of blood and blood-forming organs	D65-D76	286-289	*	*	*	*	*	*	*
Certain disorders involving the immune mechanism	D80-D89	135,279	*	*	*	*	*	*	*
Endocrine, nutritional and metabolic diseases	E00-E88	240-278	112	129	0.8682	0.0555	6.4	0.7595	0.9770
Short stature, not elsewhere classified	E34.3	259.4	*	*	*	*	*	*	*

Table F. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated compara-bility ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Malnutrition and other nutritional deficiencies	E40-E64	260-269	*	*	*	*	*	*	*
Cystic fibrosis	E84	277.0	*	*	*	*	*	*	*
Volume depletion, disorders of fluid, electrolyte and acid-base balance	E86-E87	276	40	53	0.7547	0.0852	11.3	0.5878	0.9217
All other endocrine, nutritional and metabolic diseases	E00-E32,E34.0-E34.2,E34.4-E34.9,E65-E83,E85,E88	240-259.3,259.8-259.9,270-275,277.1-278	64	55	1.1636	0.0809	6.9	1.0051	1.3221
Diseases of the nervous system	G00-G98	320-359,435	305	286	1.0664	0.0263	2.5	1.0149	1.1180
Meningitis	G00,G03	320-322	70	70	1.0000	0.0404	4.0	0.9208	1.0792
Infantile spinal muscular atrophy, type I (Werdnig-Hoffman)	G12.0	335.0	47	47	1.0000	0.0521	5.2	0.8978	1.1022
Infantile cerebral palsy	G80	343	*	*	*	*	*	*	*
Anoxic brain damage, not elsewhere classified	G93.1	348.1	29	30	0.9667	0.1269	13.1	0.7179	1.2155
Other diseases of nervous system	G04,G06-G11,G12.1-G12.9,G20-G72,G81-G92,G93.0,G93.2-G93.9,G95-G98	323-334,335.1-342,344-348.0,348.2-359,435	145	126	1.1508	0.0532	4.6	1.0466	1.2550
Diseases of the ear and mastoid process	H60-H93	380-389	*	*	*	*	*	*	*
Diseases of the circulatory system	I00-I99	390-434,436-459	419	587	0.7138	0.0244	3.4	0.6659	0.7617
Pulmonary heart disease and diseases of pulmonary circulation	I26-I28	415-417	138	123	1.1220	0.0447	4.0	1.0342	1.2097
Pericarditis, endocarditis and myocarditis	I30,I33,I40	420-422	*	*	*	*	*	*	*
Cardiomyopathy	I42	425	82	84	0.9762	0.0166	1.7	0.9436	1.0088
Cardiac arrest	I46	427.5	25	87	0.2874	0.0508	17.7	0.1878	0.3869
Cerebrovascular diseases	I60-I69	430-434,436-438	77	163	0.4724	0.0510	10.8	0.3725	0.5723
All other diseases of circulatory system	I00-I25,I31,I34-I38,I44-I45,I47-I51,I70-I99	390-414,423-424,426-427.4,427.6-429,440-459	88	123	0.7154	0.0519	7.3	0.6137	0.8172
Disease of the respiratory system	J00-J98	034.0,460-519	420	516	0.8140	0.0220	2.7	0.7709	0.8570
Acute upper respiratory infections	J00-J06	034.0,460-465	*	*	*	*	*	*	*
Influenza and pneumonia	J10-J18	480-487	231	303	0.7624	0.0261	3.4	0.7112	0.8135
Influenza	J10-J11	487	*	*	*	*	*	*	*
Pneumonia	J12-J18	480-486	224	295	0.7593	0.0266	3.5	0.7072	0.8114
Acute bronchitis and acute bronchiolitis	J20-J21	466	33	41	0.8049	0.0758	9.4	0.6563	0.9534
Bronchitis, chronic and unspecified	J40-J42	490-491	*	*	*	*	*	*	*
Asthma	J45-J46	493	*	*	*	*	*	*	*
Pneumonitis due to solids and liquids	J69	507	*	*	*	*	*	*	*
Other and unspecified diseases of respiratory system	J22,J30-J39,J43-J44,J47-J68,J70-J98	470-479,492,494-506,508-519	117	127	0.9213	0.0632	6.9	0.7973	1.0452
Diseases of the digestive system.	K00-K92	520-579	278	167	1.6647	0.1084	6.5	1.4521	1.8772
Gastritis, duodenitis, and noninfective enteritis and colitis	K29,K50-K55	535,555-558	137	47	2.9149	0.3879	13.3	2.1547	3.6751
Hernia of abdominal cavity and intestinal obstruction without hernia	K40-K46,K56	550-553,560	*	*	*	*	*	*	*
All other and unspecified diseases of digestive system	K00-K28,K30-K38,K57-K92	520-534,536-543,562-579	84	86	0.9767	0.0708	7.3	0.8379	1.1156
Diseases of the genitourinary system	N00-N98	580-629	117	117	1.0000	0.0567	5.7	0.8889	1.1111
Renal failure and other disorders of kidney	N17-N19,N25,N27	584-589	102	98	1.0408	0.0658	6.3	0.9118	1.1699

Table F. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated compara-bility ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Other and unspecified diseases of genitourinary system	N00-N15,N20-N23, N26, N28-N98	580-583,590-629	*	*	*	*	*	*	*
Certain conditions originating in the perinatal period	P00-P96	760-771.2,771.4-779	10,047	9,495	1.0581	0.0032	0.3	1.0519	1.0643
Newborn affected by maternal factors and by complications of pregnancy, labor and delivery	P00-P04	760-763	1,305	1,256	1.0390	0.0099	1.0	1.0196	1.0585
Newborn affected by maternal hypertensive disorders	P00.0	760.0	23	22	1.0455	0.0465	4.4	0.9544	1.1365
Newborn affected by other maternal conditions which may be unrelated to present pregnancy	P00.1-P00.9	760.1-760.6, 760.8-760.9	*	*	*	*	*	*	*
Newborn affected by maternal complications of pregnancy	P01	761	662	643	1.0295	0.0138	1.3	1.0024	1.0567
Newborn affected by incompetent cervix	P01.0	761.0	205	201	1.0199	0.0188	1.8	0.9831	1.0567
Newborn affected by premature rupture of membranes	P01.1	761.1	314	307	1.0228	0.0136	1.3	0.9962	1.0494
Newbom affected by multiple pregnancy	P01.5	761.5	104	103	1.0097	0.0507	5.0	0.9103	1.1091
Newborn affected by other maternal complications of pregnancy.	P01.2-P01.4, P01.6-P01.9	761.2-761.4, 761.6-761.9	39	32	1.2188	0.1655	13.6	0.8945	1.5430
Newborn affected by complications of placenta, cord and membranes	P02	762	579	553	1.0470	0.0128	1.2	1.0219	1.0721
Newborn affected by complications involving placenta	P02.0-P02.3	762.0-762.3	306	285	1.0737	0.0174	1.6	1.0395	1.1079
Newborn affected by complications involving cord	P02.4-P02.6	762.4-762.6	*	*	*	*	*	*	*
Newborn affected by chorioamnionitis	P02.7	762.7	258	255	1.0118	0.0163	1.6	0.9799	1.0436
Newborn affected by other and unspecified abnormalities of membranes.	P02.8-P02.9	762.8-762.9	*	*	*	*	*	*	*
Newborn affected by other complications of labor and delivery.	P03	763.0-763.4, 763.6-763.9	37	20	1.8500	0.3262	17.6	1.2107	2.4893
Newborn affected by noxious influences transmitted via placenta or breast milk	P04	760.7, 763.5	*	*	*	*	*	*	*
Disorders related to length of gestation and fetal malnutrition	P05-P08	764-766	3,843	3,474	1.1062	0.0064	0.6	1.0936	1.1188
Slow fetal growth and fetal malnutrition	P05	764	34	30	1.1333	0.1004	8.9	0.9366	1.3301
Disorders related to short gestation and low birth weight, not elsewhere classified	P07	765	3,809	3,444	1.1060	0.0064	0.6	1.0934	1.1186
Extremely low birth weight or extreme immaturity	P07.0,P07.2	765.0	2,835	2,558	1.1083	0.0079	0.7	1.0927	1.1239
Other low birth weight or preterm	P07.1,P07.3	765.1	974	886	1.0993	0.0135	1.2	1.0729	1.1258
Disorders related to long gestation and high birth weight	P08	766	*	*	*	*	*	*	*
Birth trauma 1/	P10-P15	767	5	113	0.0442	0.0197	44.5	0.0056	0.0829
Intrauterine hypoxia and birth asphyxia	P20-P21	768	401	277	1.4477	0.0599	4.1	1.3303	1.5650
Intrauterine hypoxia	P20	768.2-768.4	57	63	0.9048	0.1227	13.6	0.6643	1.1452
Birth asphyxia	P21	768.5-768.9	344	214	1.6075	0.0763	4.7	1.4579	1.7571

Table F. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated compara-bility ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Respiratory distress of newborn	P22	769	917	894	1.0257	0.0131	1.3	1.0001	1.0513
Other respiratory conditions originating in the perinatal period	P23-P28	770	1,160	1,372	0.8455	0.0216	2.6	0.8032	0.8878
Congenital pneumonia	P23	770.0	57	15	3.8000	0.9004	23.7	2.0352	5.5648
Neonatal aspiration syndromes	P24	770.1	78	56	1.3929	0.1115	8.0	1.1743	1.6114
Interstitial emphysema and related conditions originating in the perinatal period	P25	770.2	146	121	1.2066	0.0595	4.9	1.0899	1.3233
Pulmonary hemorrhage originating in the perinatal period	P26	770.3	212	145	1.4621	0.0751	5.1	1.3150	1.6092
Chronic respiratory disease originating in the perinatal period	P27	770.7	243	214	1.1355	0.0327	2.9	1.0715	1.1995
Atelectasis	P28.0-P28.1	770.4-770.5	382	185	2.0649	0.1144	5.5	1.8406	2.2891
All other respiratory conditions originating in the perinatal period.	P28.2-P28.9	770.6,770.8	42	636	0.0660	0.0101	15.2	0.0463	0.0858
Infections specific to the perinatal period	P35-P39	771.0-771.2, 771.4-771.8	563	552	1.0199	0.0261	2.6	0.9688	1.0710
Bacterial sepsis of newborn	P36	771.8	470	514	0.9144	0.0272	3.0	0.8611	0.9677
Omphalitis of newborn with or without mild hemorrhage	P38	771.4	*	*	*	*	*	*	*
All other infections specific to the perinatal period	P35,P37,P39	771.0-771.2, 771.5-771.7	93	38	2.4474	0.3705	15.1	1.7211	3.1736
Hemorrhagic and hematological disorders of newborn	P50-P61	772-774, 776	390	274	1.4234	0.0640	4.5	1.2979	1.5488
Neonatal hemorrhage	P50-P52,P54	772	319	222	1.4369	0.0698	4.9	1.3002	1.5737
Hemorrhagic disease of newborn	P53	776.0	*	*	*	*	*	*	*
Hemolytic disease of newborn due to isoimmunization and other perinatal jaundice	P55-P59	773-774	*	*	*	*	*	*	*
Hematological disorders	P60-P61	776.1-776.9	*	*	*	*	*	*	*
Syndrome of infant of a diabetic mother and neonatal diabetes mellitus	P70.0-P70.2	775.0-775.1	*	*	*	*	*	*	*
Necrotizing enterocolitis of newborn	P77	777.5	249	203	1.2266	0.0456	3.7	1.1371	1.3161
Hydrops fetalis not due to hemolytic disease.	P83.2	778.0	120	120	1.0000	0.0264	2.6	0.9483	1.0517
Other perinatal conditions.	P29,P70.3-P76, P78-P81,P83.0-P83.1,P83.3-P96	775.2-775.9, 777.0-777.4, 777.6-777.9, 778.1-779	1092	954	1.1447	0.0192	1.7	1.1070	1.1823
Congenital malformations, deformations and chromosomal abnormalities	Q00-Q99	740-759	3,400	3,751	0.9064	0.0057	0.6	0.8953	0.9176
Anencephaly and similar malformations.	Q00	740	299	299	1.0000	0.0000	0.0	1.0000	1.0000
Congenital hydrocephalus.	Q03	742.3	62	91	0.6813	0.0552	8.1	0.5732	0.7895
Spina bifida.	Q05	741	24	32	0.7500	0.0765	10.2	0.6000	0.9000
Other congenital malformations of nervous system.	Q01-Q02,Q04, Q06-Q07	742.0-742.2, 742.4-742.9	191	177	1.0791	0.0477	4.4	0.9856	1.1725
Congenital malformations of heart.	Q20-Q24	745-746	1,022	1,027	0.9951	0.0081	0.8	0.9793	1.0109
Other congenital malformations of circulatory system.	Q25-Q28	747	75	121	0.6198	0.0504	8.1	0.5210	0.7186
Congenital malformations of respiratory system.	Q30-Q34	748	361	571	0.6322	0.0225	3.6	0.5882	0.6762
Congenital malformations of digestive system.	Q35-Q45	749-751	*	*	*	*	*	*	*
Congenital malformations of genitourinary system.	Q50-Q64	752-753	216	229	0.9432	0.0244	2.6	0.8955	0.9910

Table F. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated compara-bility ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Congenital malformations and deformation of musculoskeletal system, limbs and integument	Q65-Q85	754-757	269	311	0.8650	0.0319	3.7	0.8024	0.9275
Down's syndrome	Q90	758.0	57	58	0.9828	0.0705	7.2	0.8446	1.1209
Edward's syndrome	Q91.0-Q91.3	758.2	277	278	0.9964	0.0080	0.8	0.9807	1.0121
Patau's syndrome	Q91.4-Q91.7	758.1	170	173	0.9827	0.0099	1.0	0.9632	1.0021
Other congenital malformations and deformations	Q10-Q18,Q86-Q89	743-744,759	304	312	0.9744	0.0210	2.2	0.9332	1.0155
Other chromosomal abnormalities, not elsewhere classified	Q92-Q99	758.3-758.9	57	53	1.0755	0.0783	7.3	0.9221	1.2289
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00-R99	780-799	2,799	2,732	1.0245	0.0042	0.4	1.0163	1.0327
Sudden infant death syndrome 1/	R95	798.0	2,575	2,485	1.0362	0.0040	0.4	1.0284	1.0440
Other symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00-R53,R55-594, R96-R99	780-796,798.1-799	224	247	0.9069	0.0270	3.0	0.8540	0.9598
All other diseases	F01-F99,H00-H57, L00-M99	290-319,360-379, 680-739	*	*	*	*	*	*	*
External causes of mortality	V01-Y84	E800-E999	441	444	0.9932	0.0098	1.0	0.9741	1.0124
Accidents (unintentional injuries)	V01-V59	E800-E869,E880-E929	292	285	1.0246	0.0107	1.0	1.0037	1.0454
Transport accidents	V01-V99	E800-E848,E920-E929.1	99	108	0.9167	0.0294	3.2	0.8590	0.9743
Motor vehicle accidents	V02-V04,V09.0, V09.2,V12-V14, V19.0-V19.2, V19.4-V19.6,V20-V79,V80.3-V80.5, V81.0-V81.1, V82.0-V82.1,V83-V86,V87.0-V87.8, V88.0-V88.8, V89.0,V89.2	E810-E825	95	98	0.9694	0.0176	1.8	0.9349	1.0039
Other and unspecified transport accidents	V01,V05-V06, V09.1,V09.3-V09.9,V10-V11, V15-V18,V19.3, V19.8,V19.9, V80.0-V80.2, V80.6-V80.9, V81.2-V81.9, V82.2-V82.9, V87.9,V88.9, V89.1,V89.3, V89.9,V90-V99	E800-E807,E826-E848, E929.0-E929.1	*	*	*	*	*	*	*
Falls	W00-W19		*	*	*	*	*	*	*
Accidental discharge of firearms	W32-W34	E922	*	*	*	*	*	*	*
Accidental drowning and submersion	W65-W74	E910	*	*	*	*	*	*	*
Accidental suffocation and strangulation in bed	W75	E913.0	*	*	*	*	*	*	*
Other accidental suffocation and strangulation	W76-W77,W81-W84	E913.1-E913.9	79	69	1.1449	0.0537	4.7	1.0396	1.2502
Accidental inhalation and ingestion of food or other objects causing obstruction of respiratory tract	W78-W80	E911-E912	32	29	1.1034	0.0810	7.3	0.9447	1.2622
Accidents caused by exposure to smoke, fire and flames	X00-X09	E890-E899	*	*	*	*	*	*	*

Table F. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases, 1992*)	Category codes according to the Tenth Revision (ICD-10)	Category codes according to the Ninth Revision (ICD-9)	Number of deaths allocated according to		Estimated compara-bility ratio	Relative standard error	Standard error	95 percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Accidental poisoning and exposure to noxious substances	X40-X49	E850-E869, E924.1	*	*	*	*	*	*	*
Other and unspecified accidents	W20-W31,W35-W64,W85-W99, X10-X39,X50-X59	E900-E909,E914-E921,E923-E924.0,E924.8-E929	*	*	*	*	*	*	*
Assault (homicide)	X85-Y09	E960-E968	146	154	0.9481	0.0179	1.9	0.9130	0.9831
Assault (homicide) by hanging, strangulation and suffocation	X91	E963	*	*	*	*	*	*	*
Assault (homicide) by discharge of firearms	X93-X95	E965.0-E965.4	*	*	*	*	*	*	*
Neglect, abandonment and other maltreatment syndromes	Y06-Y07	E967,E968.4	*	*	*	*	*	*	*
Assault (homicide) by other and unspecified means	X85-X90,X92, X96-X99,Y00-Y05,Y08-Y09	E960-E962,E964, E965.5-E966, E968.0-E968.3, 968.8-E968.9	91	88	1.0341	0.0417	4.0	0.9524	1.1158
Complications of medical and surgical care	Y40-Y84	E870-E879,E930-E949	*	*	*	*	*	*	*
Other external causes	X60-X84,Y10-Y36	E970-E979	*	*	*	*	*	*	*

* Figure does not meet standards of reliability or precision.

- Quantity zero.

0.0 Quantity more than zero but less than 0.05.

1/ Comparability ratio should be interpreted with caution due to concerns with its accuracy. See *Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates* (29) and *Deaths: Final data for 1999* (19).

Table G. Infant mortality rates by race of infant from the death certificate and by race of mother from the birth certificate, and ratio of rates, 1995-96

[Rates per 1,000 live births in specified group]

Race	Infant mortality rate		Ratio birth/ death
	Race from death certificate	Race from birth certificate	
All races	7.5	7.4	0.99
White	6.2	6.2	1.00
Black	14.9	14.4	0.97
American Indian [1]	8.3	9.5	1.14
Asian or Pacific Islander	4.1	5.2	1.27
Chinese	2.9	3.5	1.21
Japanese	2.3	4.7	2.04
Hawaiian	7.2	6.1	0.85
Filipino	3.4	5.7	1.68
Other Asian or Pacific Islander	4.8	5.6	1.17

[1] Includes Aleuts and Eskimos.

SOURCE: Rosenberg HM, Maurer JD, Sorlie PD, Johnson NJ, et al. Quality of death rates by race and Hispanic origin: A summary of current research, 1999. National Center for Health Statistics. Vital Health Stat 2(128). 1999.

Table H. Infant mortality rates by Hispanic origin of infant from the death certificate and by race of mother from the birth certificate, and ratio of rates, 1996

[Rates per 1,000 live births in specified group]

Race	Infant mortality rate		Ratio linked file/ birth/death
	Hispanic origin from death certificate	Hispanic origin from birth certificate	
All origins [1]	7.3	7.4	1.01
Total Hispanic	5.9	6.2	1.05
Mexican	5.9	5.9	1.00
Puerto Rican	7.8	8.7	1.12
Cuban	5.1	5.2	1.02
Other Hispanic [2]	5.3	5.9	1.11
Non-Hispanic total [3]	7.6	7.7	1.01
Non-Hispanic white	6.1	6.2	1.02
Non-Hispanic black	14.7	14.4	0.98

[1] Includes Hispanic origin not stated.
[2] Includes Central and South American and Other and unknown Hispanic.
[3] Includes races other than white and black.

NOTE: Data exclude Oklahoma, which did not have a question on Hispanic origin on its death certificate.

SOURCE: Rosenberg HM, Maurer JD, Sorlie PD, Johnson NJ, et al. Quality of death rates by race and Hispanic origin: A summary of current research, 1999. National Center for Health Statistics. Vital Health Stat 2(128). 1999.

Table I. Population of birth- and death-registration States, 1900-1932, and United States, 1900-1999

[Population enumerated as of April 1 for 1940, 1950, 1960, 1970, 1980, and 1990 and estimated as of July 1 for all other years]

Year	United States[1]		Year	United States[1]		Birth-registration States		Death-registration States	
	Population including Armed Forces abroad	Population residing in area		Population including Armed Forces abroad	Population residing in area	Number of States[2]	Population residing in area	Number of States[2]	Population residing in area
1999	272,945,300	272,690,813	1949	149,188,000	148,665,000	. . .	. . .	. . .	. . .
1998	270,509,187	270,298,524	1948	146,631,000	146,093,000	. . .	. . .	. . .	. . .
1997	267,901,000	267,636,061	1947	144,126,000	143,446,000	. . .	. . .	. . .	. . .
1996	265,556,890	265,283,783	1946	141,389,000	140,054,000	. . .	. . .	. . .	. . .
1995	263,033,968	262,755,270	1945	139,928,000	132,481,000	. . .	. . .	. . .	. . .
1994	260,650,842	260,340,990	1944	138,397,000	132,885,000	. . .	. . .	. . .	. . .
1994	258,119,768	257,783,004	1943	136,739,000	134,245,000	. . .	. . .	. . .	. . .
1992	255,457,501	255,077,536	1942	134,860,000	133,920,000	. . .	. . .	. . .	. . .
1991	252,688,000	252,177,000	1941	133,402,000	133,121,000	. . .	. . .	. . .	. . .
1990	249,225,000	248,709,873	1940	131,820,000	131,669,275	. . .	. . .	. . .	. . .
1989	247,342,000	246,819,000	1939	131,028,000	130,879,718	. . .	. . .	. . .	. . .
1988	245,021,000	244,499,000	1938	129,969,000	129,824,939	. . .	. . .	. . .	. . .
1987	242,804,000	242,289,000	1937	128,961,000	128,824,829	. . .	. . .	. . .	. . .
1986	240,651,000	240,133,000	1936	128,181,000	128,053,180	. . .	. . .	. . .	. . .
1985	238,466,000	237,924,000	1935	127,362,000	127,250,232	. . .	. . .	. . .	. . .
1984	236,348,000	235,825,000	1934	126,485,000	126,373,773	. . .	. . .	. . .	. . .
1983	234,307,000	233,792,000	1933	125,690,000	125,578,763	. . .	. . .	. . .	. . .
1982	232,188,000	231,664,000	1932	124,949,000	124,840,471	47	118,903,899	47	118,903,899
1981	229,966,000	229,466,000	1931	124,149,000	124,039,648	46	117,455,229	47	118,148,987
1980	227,061,000	226,545,805	1930	123,188,000	123,076,741	46	116,544,946	47	117,238,278
1979	225,055,000	224,567,000	1929	- - -	121,769,939	46	115,317,450	46	115,317,450
1978	222,585,000	222,095,000	1928	- - -	120,501,115	44	113,636,160	44	113,636,160
1977	220,239,000	219,760,000	1927	- - -	119,038,062	40	104,320,830	42	107,084,532
1976	218,035,000	217,563,000	1926	- - -	117,399,225	35	90,400,590	41	103,822,683
1975	215,973,000	215,465,000	1925	- - -	115,831,963	33	88,294,564	40	102,031,555
1974	213,854,000	213,342,000	1924	- - -	114,113,463	33	87,000,295	39	99,318,098
1973	211,909,000	211,357,000	1923	- - -	111,949,945	30	81,072,123	38	96,788,197
1972	209,896,000	209,284,000	1922	- - -	110,054,778	30	79,560,746	37	92,702,901
1971	207,661,000	206,827,000	1921	- - -	108,541,489	27	70,807,090	34	87,814,447
1970	204,270,000	203,211,926	1920	- - -	106,466,420	23	63,597,307	34	86,079,263
1969	202,677,000	201,385,000	1919	105,063,000	104,512,110	22	61,212,076	33	83,157,982
1968	200,706,000	199,399,000	1918	104,550,000	103,202,801	20	55,153,782	30	79,008,412
1967	198,712,000	197,457,000	1917	103,414,000	103,265,913	20	55,197,952	27	70,234,775
1966	196,560,000	195,576,000	1916	- - -	101,965,984	11	32,944,013	26	66,971,177
1965	194,303,000	193,526,000	1915	- - -	100,549,013	10	31,096,697	24	61,894,847
1964	191,889,000	191,141,000	1914	- - -	99,117,567	. . .	. . .	24	60,963,309
1963	189,242,000	188,483,000	1913	- - -	97,226,814	. . .	. . .	23	58,156,740
1962	186,538,000	185,771,000	1912	- - -	95,331,300	. . .	. . .	22	54,847,700
1961	183,691,000	182,992,000	1911	- - -	93,867,814	. . .	. . .	22	53,929,644

Table I. Population of birth- and death-registration States, 1900-1932, and United States, 1900-1999

[Population enumerated as of April 1 for 1940, 1950, 1960, 1970, 1980, and 1990 and estimated as of July 1 for all other years]

Year	United States[1]		Year	United States[1]		Birth-registration States		Death-registration States	
	Population including Armed Forces abroad	Population residing in area		Population including Armed Forces abroad	Population residing in area	Number of States[2]	Population residing in area	Number of States[2]	Population residing in area
1960	179,933,000	179,323,175	1910	- - -	92,406,536	. . .	. . .	20	47,470,437
1959	177,264,000	176,513,000	1909	- - -	90,491,525	. . .	. . .	18	44,223,513
1958	174,141,000	172,320,000	1908	- - -	88,708,976	. . .	. . .	17	38,634,759
1957	171,274,000	170,371,000	1907	- - -	87,000,271	. . .	. . .	15	34,552,837
1956	168,221,000	167,306,000	1906	- - -	85,436,556	. . .	. . .	15	33,782,288
1955	165,275,000	164,308,000	1905	- - -	83,819,666	. . .	. . .	10	21,767,980
1954	162,391,000	161,164,000	1904	- - -	82,164,974	. . .	. . .	10	21,332,076
1953	159,565,000	158,242,000	1903	- - -	80,632,152	. . .	. . .	10	20,943,222
1952	156,954,000	155,687,000	1902	- - -	79,160,196	. . .	. . .	10	20,582,907
1951	154,287,000	153,310,000	1901	- - -	77,585,128	. . .	. . .	10	20,237,453
1950	151,132,000	150,697,361	1900	- - -	76,094,134	. . .	. . .	10	19,965,446

--- Data not available.

... Category not applicable.

[1] Alaska included beginning 1959 and Hawaii, 1960.

[2] The District of Columbia is not included in "Number of States," but it is represented in all data shown for each year.

SOURCE: Published and unpublished data from the U.S. Bureau of the Census; see text.

Table J. Source for resident population and population including Armed Forces abroad: Birth- and death-registration States, 1900-32, and United States, 1900-99

Year	Source
1999	U.S. Bureau of the Census, Electronic Data File, NESTV99, and unpublished data.
1998	U.S. Bureau of the Census, Electronic Data File, NESTV98, and unpublished data.
1997	U.S. Bureau of the Census, Electronic Data File, NESTV97, and unpublished data.
1996	U.S. Bureau of the Census, Electronic Data File, RESD0796, and unpublished data.
1995	U.S. Bureau of the Census, Electronic Data File, RESD0795, and unpublished data.
1994	U.S. Bureau of the Census, Electronic Data File, RESD0794, and unpublished data.
1993	U.S. Bureau of the Census, Electronic Data File, RESP0793, and unpublished data.
1992	U.S. Bureau of the Census, Electronic Data File, RESP0792, and unpublished data.
1991	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 1095, 1993.
1990	U.S. Bureau of the Census, Unpublished data from the 1990 census, 1990 CPH-L-74 and unpublished data consistent with *Current Population Reports*, Series P-25, No. 1095.
1981-89	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 1095, 1993.
1980	U.S. Bureau of the Census, *U.S. Census of Population: 1980, Number of Inhabitants*, PC-80-1A1, United States Summary, 1983.
1971-79	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 917, July 1982.
1970	U.S. Bureau of the Census, *U.S. Census of Population: 1970, Number of Inhabitants*, Final Report PC(1)-A1, United States Summary, 1971.
1961-69	U.S. Bureau of the Census, Current Population *Reports*, Series P-25, No. 519, April 1974.
1960	U.S. Bureau of the Census, *U.S. Census of Population: 1960, Number of Inhabitants,* PC(1)-A1, United States Summary, 1964.
1951-59	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 310, June 30, 1965.
1940-50	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 499, May 1973.
1930-39	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 499, May 1973, and National Office of Vital Statistics, *Vital Statistics Rates in the United States*, 1900-1940, 1947.
1920-29	National Office of Vital Statistics, *Vital Statistics Rates in the United States*, 1900-1940, 1947.
1917-19	Same as for 1930-39.
1900-16	Same as for 1920-29.

Table K. Estimated population of the United States, by 5-year age groups, race, and sex: July 1, 1999

[Figures include Armed forces stationed in the United States and exclude those stationed outside the United States]

Age	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	272,690,813	133,276,559	139,414,254	224,610,797	110,336,291	114,274,506	48,080,016	22,940,268	25,139,748	34,862,169	16,557,186	18,304,983
Under 1 year	3,819,903	1,952,133	1,867,770	3,027,180	1,549,389	1,477,791	792,723	402,744	389,979	568,772	289,078	279,694
1-4 years	15,122,239	7,730,542	7,391,697	12,015,456	6,155,680	5,859,776	3,106,783	1,574,862	1,531,921	2,226,888	1,129,687	1,097,201
5-9 years	19,946,746	10,207,957	9,738,789	15,706,268	8,047,451	7,658,817	4,240,478	2,160,506	2,079,972	3,145,614	1,597,522	1,548,092
10-14 years	19,548,484	10,011,707	9,536,777	15,388,526	7,892,905	7,495,621	4,159,958	2,118,802	2,041,156	3,087,258	1,569,095	1,518,163
15-19 years	19,747,923	10,150,997	9,596,926	15,647,637	8,069,271	7,578,366	4,100,286	2,081,726	2,018,560	3,043,767	1,548,256	1,495,511
15-17 years	11,762,063	6,058,282	5,703,781	9,304,359	4,803,475	4,500,884	2,457,704	1,254,807	1,202,897	1,807,421	924,663	882,758
17-18 years	7,985,860	4,092,715	3,893,145	6,343,278	3,265,796	3,077,482	1,642,582	826,919	815,663	1,236,346	623,593	612,753
20-24 years	18,025,589	9,183,052	8,842,537	14,367,068	7,371,872	6,995,196	3,658,521	1,811,180	1,847,341	2,696,655	1,333,366	1,363,289
25-29 years	18,209,100	9,055,292	9,153,808	14,504,772	7,289,220	7,215,552	3,704,328	1,766,072	1,938,256	2,611,248	1,248,879	1,362,369
30-34 years	19,726,712	9,770,996	9,955,716	15,926,621	7,984,101	7,942,520	3,800,091	1,786,895	2,013,196	2,675,415	1,256,405	1,419,010
35-39 years	22,544,607	11,215,732	11,328,875	18,503,500	9,302,148	9,201,352	4,041,107	1,913,584	2,127,523	2,901,808	1,364,864	1,536,944
40-44 years	22,268,042	11,038,584	11,229,458	18,443,045	9,238,092	9,204,953	3,824,997	1,800,492	2,024,505	2,750,550	1,288,831	1,461,719
45-49 years	19,356,220	9,500,663	9,855,557	16,205,941	8,047,476	8,158,465	3,150,279	1,453,187	1,697,092	2,239,697	1,025,799	1,213,898
50-54 years	16,446,138	7,998,425	8,447,713	14,043,588	6,906,744	7,136,844	2,402,550	1,091,681	1,310,869	1,688,828	757,911	930,917
55-59 years	12,875,299	6,182,625	6,692,674	11,077,469	5,379,073	5,698,396	1,797,830	803,552	994,278	1,289,244	564,183	725,061
60-64 years	10,513,786	4,967,782	5,546,004	9,056,192	4,331,042	4,725,150	1,457,594	636,740	820,854	1,055,855	450,465	605,390
65-69 years	9,447,220	4,336,705	5,110,515	8,188,753	3,797,077	4,391,676	1,258,467	539,628	718,839	935,175	400,069	535,106
70-74 years	8,771,028	3,861,991	4,909,037	7,769,876	3,446,700	4,323,176	1,001,152	415,291	585,861	743,318	307,454	435,864
75-79 years	7,329,496	3,057,003	4,272,493	6,584,585	2,759,812	3,824,773	744,911	297,191	447,720	557,747	217,526	340,221
80-84 years	4,817,199	1,814,131	3,003,068	4,381,055	1,654,360	2,726,695	436,144	159,771	276,373	331,333	115,771	215,562
85 years and over	4,175,082	1,240,242	2,934,840	3,773,265	1,113,878	2,659,387	401,817	126,364	275,453	312,997	92,025	220,972

SOURCE: Published and unpublished data from the U.S. Bureau of the Census; see text.

Table L. Estimated population, by age, for the United States, each division and State, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas: July 1, 1999

[Figures include Armed Forces stationed in each area, and exclude Armed Forces stationed outside the United States]

Area	Total	Under 1 year	1-4 years	5-14 years	15-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65-74 years	75-84 years	85 years and over
United States....	272,690,813	3,819,903	15,122,239	39,495,230	37,773,512	37,935,812	44,812,649	35,802,358	23,389,085	18,218,248	12,146,695	4,175,082
Alabama	4,369,862	59,792	231,041	590,148	624,730	614,609	692,778	582,175	406,637	310,568	192,412	64,972
Alaska	619,500	9,703	40,062	113,329	104,654	72,283	106,349	91,254	47,116	21,975	10,377	2,398
Arizona.....	4,778,332	76,688	309,300	739,189	669,065	628,940	735,990	588,143	402,384	341,024	221,704	65,905
Arkansas	2,551,373	35,799	141,850	366,129	367,919	327,575	378,711	326,205	245,843	191,328	125,515	44,499
California.....	33,145,121	503,227	1,996,031	5,058,628	4,684,221	5,114,990	5,592,337	4,107,384	2,440,771	1,930,889	1,292,566	424,077
Colorado	4,056,133	58,422	229,793	592,039	577,959	523,975	698,674	607,548	359,950	221,673	138,479	47,621
Connecticut...	3,282,031	42,707	175,458	478,846	386,963	446,479	563,663	436,112	283,227	231,909	173,456	63,211
Delaware.....	753,538	10,299	39,866	102,238	99,302	113,221	130,219	97,062	63,196	54,477	33,517	10,141
District of Columbia	519,000	5,932	21,368	54,840	58,821	95,007	88,718	72,725	49,487	38,181	24,698	9,223
Florida.....	15,111,244	190,737	761,637	2,033,258	1,820,203	1,881,169	2,357,168	1,891,468	1,433,755	1,429,984	991,262	320,603
Georgia.....	7,788,240	119,066	461,084	1,140,252	1,110,401	1,205,249	1,337,846	1,023,436	629,763	419,257	256,548	85,338
Hawaii.....	1,185,497	16,742	63,645	162,143	166,543	146,817	198,212	165,659	103,847	88,018	56,576	17,295
Idaho	1,251,700	18,863	73,972	192,032	209,572	154,208	186,707	163,298	111,019	73,510	50,592	17,927
Illinois	12,128,370	176,578	701,101	1,783,938	1,662,918	1,701,968	2,002,805	1,569,666	1,033,219	771,168	532,621	192,388
Indiana	5,942,901	82,957	330,718	850,473	841,153	823,952	962,925	784,770	522,933	391,285	261,480	90,255
Iowa	2,869,413	36,380	146,440	402,039	417,004	356,641	440,536	379,687	262,199	207,766	156,221	64,500
Kansas.....	2,654,052	37,382	146,631	387,725	398,281	340,484	427,182	342,695	219,593	175,171	127,266	51,642
Kentucky	3,960,825	52,621	206,472	534,114	576,942	542,574	640,592	541,556	372,800	267,645	168,067	57,442
Louisiana	4,372,035	64,438	249,712	659,054	697,815	571,970	674,905	568,266	384,417	277,259	168,291	55,908
Maine	1,253,040	13,439	53,779	167,703	166,148	166,472	218,280	180,810	111,052	92,615	60,561	22,181
Maryland	5,171,634	69,852	277,006	749,685	654,867	760,262	937,609	699,077	426,315	321,639	208,861	66,461
Massachusetts	6,175,169	79,438	312,802	840,989	748,057	939,471	1,056,482	824,911	513,288	430,160	314,187	115,384
Michigan.....	9,863,775	130,271	524,564	1,463,152	1,371,045	1,362,355	1,632,196	1,315,328	841,304	644,881	434,460	144,219
Minnesota	4,775,508	63,931	257,692	720,497	683,731	629,537	813,063	627,419	394,244	290,556	210,388	84,450
Mississippi	2,768,619	41,463	160,972	415,669	437,233	378,055	417,349	342,086	240,300	182,203	112,170	41,119
Missouri.....	5,468,338	73,173	289,868	788,243	768,695	721,307	889,573	704,211	487,584	387,871	259,758	98,055
Montana.....	882,779	10,527	42,533	126,176	133,972	94,112	137,378	132,182	88,660	60,167	41,746	15,326
Nebraska.....	1,666,028	22,944	91,858	247,224	251,915	206,359	261,113	215,316	141,013	113,657	80,316	34,313
Nevada	1,809,253	28,418	114,566	273,288	230,962	247,790	297,336	241,563	167,918	124,268	66,795	16,349
New Hampshire...	1,201,134	14,424	59,491	177,586	151,060	178,006	222,845	160,662	92,475	76,518	50,193	17,874
New Jersey....	8,143,412	108,042	435,221	1,144,793	987,659	1,106,507	1,425,511	1,101,086	726,336	577,398	397,496	133,363
New Mexico..	1,739,844	26,915	104,485	277,101	263,327	210,923	278,038	229,305	149,776	111,274	67,080	21,620
New York	18,196,601	245,769	968,426	2,522,692	2,322,799	2,622,029	3,022,344	2,431,527	1,631,383	1,274,753	844,712	310,167
North Carolina	7,650,789	108,818	425,409	1,094,661	1,021,529	1,111,053	1,240,690	1,008,482	685,281	525,494	324,527	104,845
North Dakota.	633,666	7,692	31,606	89,204	100,097	77,782	97,360	82,205	55,337	44,830	32,792	14,761
Ohio	11,256,654	148,237	591,975	1,604,821	1,564,312	1,531,688	1,827,324	1,494,236	992,925	789,012	535,631	176,493
Oklahoma	3,358,044	47,986	184,631	488,327	504,049	417,337	508,480	439,147	319,389	238,257	153,232	57,209
Oregon	3,316,154	44,248	175,353	461,205	458,239	424,653	527,012	488,428	301,917	218,382	160,451	56,266
Pennsylvania .	11,994,016	141,544	570,548	1,638,741	1,526,896	1,570,310	1,945,111	1,614,829	1,087,101	971,549	695,092	232,295
Rhode Island .	990,819	12,365	49,672	139,607	123,457	144,164	163,918	125,192	78,096	75,286	57,941	21,121
South Carolina	3,885,736	52,149	201,313	537,751	557,225	560,080	629,340	525,412	349,095	267,928	158,717	46,726
South Dakota	733,133	9,977	39,809	110,689	115,721	85,830	112,371	92,094	61,200	51,683	37,860	15,899
Tennessee	5,483,535	75,211	291,633	746,320	747,565	776,272	897,425	753,637	514,518	370,485	231,574	78,895
Texas.....	20,044,141	333,219	1,306,356	3,136,761	3,043,095	2,771,877	3,261,864	2,554,534	1,619,938	1,108,940	674,010	233,547
Utah	2,129,836	43,971	166,470	374,983	422,926	292,796	279,697	221,960	141,430	99,006	65,105	21,492
Vermont.....	593,740	6,400	25,636	80,765	79,740	83,144	104,763	88,898	51,478	38,063	25,165	9,688
Virginia	6,872,912	91,463	359,175	936,269	951,171	1,047,601	1,193,584	931,107	587,657	427,961	262,908	84,016
Washington ...	5,756,361	77,940	311,996	836,854	817,496	789,042	985,915	804,248	475,558	334,588	240,165	82,559
West Virginia.....	1,806,928	19,814	80,944	226,047	256,094	226,085	270,058	265,863	189,127	146,139	94,835	31,922
Wisconsin	5,250,446	65,859	265,963	766,603	758,160	688,229	867,958	696,354	449,911	349,158	247,593	94,658

Table L. Estimated population, by age, for the United States, each division and State, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas: July 1, 1999

[Figures include Armed Forces stationed in each area, and exclude Armed Forces stationed outside the United States]

Area	Total	Under 1 year	1-4 years	5-14 years	15-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65-74 years	75-84 years	85 years and over
Wyoming	479,602	6,071	24,306	70,410	79,804	52,573	74,345	71,140	45,323	30,440	18,726	6,464
Puerto Rico	3,889,507	60,062	251,439	629,364	670,712	609,500	509,183	438,878	320,482	221,366	80,680	97,841
Virgin Islands..	119,615	1,899	8,386	23,530	18,860	14,229	15,373	16,002	11,569	6,178	1,813	1,776
Guam	151,968	4,214	16,577	31,843	21,326	21,652	22,025	16,455	8,973	6,051	1,558	1,294
American Samoa.....	63,781	1,676	6,819	16,414	11,217	8,287	7,333	5,346	3,785	2,074	449	381
Northern Marianas	69,216	1,322	4,971	10,212	10,878	17,946	14,152	6,442	2,161	795	198	139

SOURCE: Published and unpublished data from the U.S. Bureau of the Census; see text.

Table M. Estimated population by 5-year age groups, specified Hispanic origin, race for non-Hispanic population, and sex: United States, July 1, 1999

[Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States. Populations for all origins, Hispanic, non-Hispanic, non-Hispanic white, and non-Hispanic black are postcensal estimates based on the 1990 census, estimated as of July 1, 1999; populations for Mexican, Puerto Rican, Cuban, Central and South American and other and unknown Hispanic are based on the Current Population Survey adjusted to resident population control totals. Due to rounding, population estimates for Hispanic subgroups may not add to Hispanic control totals.The control totals are 1990-based population estimates for the United States for July 1, 1999; see text]

Sex and age	All origins	Hispanic					Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Other Hispanic [1]	Total [2]	White	Black
Both sexes									
All ages	272,690,813	31,337,122	20,488,782	2,945,172	1,344,410	6,558,797	241,353,691	196,049,435	33,092,421
Under 1 year	3,819,903	721,512	512,263	60,495	16,287	132,460	3,098,391	2,366,679	528,998
1-4 years	15,122,239	2,745,592	1,982,862	231,465	54,265	477,011	12,376,647	9,504,144	2,074,442
5-9 years	19,946,746	3,243,040	2,282,612	269,965	62,448	628,012	16,703,706	12,748,940	2,961,201
10-14 years	19,548,484	2,739,391	1,882,506	274,588	72,907	509,386	16,809,093	12,913,252	2,925,762
15-19 years	19,747,923	2,780,366	1,916,741	281,289	77,446	504,884	16,967,557	13,116,918	2,890,618
20-24 years	18,025,589	2,689,820	1,871,070	224,286	58,630	535,844	15,335,769	11,902,736	2,555,750
25-29 years	18,209,100	2,569,952	1,798,723	211,884	70,634	488,713	15,639,148	12,159,026	2,474,893
30-34 years	19,726,712	2,660,206	1,705,225	239,422	104,817	610,754	17,066,506	13,508,484	2,521,909
35-39 years	22,544,607	2,583,422	1,584,034	236,592	110,610	652,180	19,961,185	16,157,243	2,747,911
40-44 years	22,268,042	2,164,811	1,341,143	203,038	97,790	522,844	20,103,231	16,481,842	2,618,544
45-49 years	19,356,220	1,657,654	1,002,838	168,952	86,244	399,617	17,698,566	14,702,438	2,140,338
50-54 years	16,446,138	1,257,005	705,315	148,785	83,600	319,298	15,189,133	12,898,332	1,616,691
55-59 years	12,875,299	932,256	533,127	98,958	75,934	224,244	11,943,043	10,226,211	1,235,670
60-64 years	10,513,786	746,762	390,906	94,106	97,688	164,072	9,767,024	8,372,235	1,013,555
65-69 years	9,447,220	612,055	326,275	71,225	82,751	131,804	8,835,165	7,627,871	899,880
70-74 years	8,771,028	489,670	271,561	56,063	62,208	99,848	8,281,358	7,317,379	717,911
75-79 years	7,329,496	351,245	185,622	38,746	63,674	63,203	6,978,251	6,258,533	540,772
80-84 years	4,817,199	203,190	106,660	23,510	33,992	39,027	4,614,009	4,191,691	321,931
85 years and over	4,175,082	189,173	89,299	11,803	32,485	55,596	3,985,909	3,595,481	305,645
Male									
All ages	133,276,559	15,761,482	10,548,482	1,419,464	646,862	3,146,678	1,419,464	646,862	3,146,678
Under 1 year	1,952,133	367,921	261,059	30,919	7,260	68,679	30,919	7,260	68,679
1-4 years	7,730,542	1,401,915	997,510	128,458	17,640	258,314	128,458	17,640	258,314
5-9 years	10,207,957	1,654,620	1,166,537	145,357	33,549	309,174	145,357	33,549	309,174
10-14 years	10,011,707	1,400,143	984,573	135,285	38,625	241,660	135,285	38,625	241,660
15-19 years	10,150,997	1,445,082	1,008,035	132,731	41,294	263,014	132,731	41,294	263,014
20-24 years	9,183,052	1,394,818	996,037	114,097	24,908	259,786	114,097	24,908	259,786
25-29 years	9,055,292	1,319,120	938,050	105,402	31,219	244,446	105,402	31,219	244,446
30-34 years	9,770,996	1,375,331	900,723	105,565	55,031	314,024	105,565	55,031	314,024
35-39 years	11,215,732	1,328,380	847,519	103,801	59,379	317,672	103,801	59,379	317,672
40-44 years	11,038,584	1,094,726	683,204	99,558	52,697	259,263	99,558	52,697	259,263
45-49 years	9,500,663	818,707	516,540	81,060	41,513	179,587	81,060	41,513	179,587
50-54 years	7,998,425	605,227	360,159	67,968	40,848	136,249	67,968	40,848	136,249
55-59 years	6,182,625	436,613	261,264	48,186	43,193	83,974	48,186	43,193	83,974
60-64 years	4,967,782	341,509	189,133	42,448	43,143	66,793	42,448	43,143	66,79
65-69 years	4,336,705	272,995	151,311	25,210	45,583	50,891	25,210	45,583	50,891
70-74 years	3,861,991	212,848	120,603	23,900	29,606	38,745	23,900	29,606	38,745
75-79 years	3,057,003	149,756	87,874	15,078	20,603	26,202	15,078	20,603	26,202
80-84 years	1,814,131	78,239	44,779	10,705	10,927	11,825	10,705	10,927	11,825
85 years and over	1,240,242	63,532	33,572	3,736	9,844	16,380	3,736	9,844	16,380

Table M. Estimated population by 5-year age groups, specified Hispanic origin, race for non-Hispanic population, and sex: United States, July 1, 1999

[Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States. Populations for all origins, Hispanic, non-Hispanic, non-Hispanic white, and non-Hispanic black are postcensal estimates based on the 1990 census, estimated as of July 1, 1999; populations for Mexican, Puerto Rican, Cuban, Central and South American and other and unknown Hispanic are based on the Current Population Survey adjusted to resident population control totals. Due to rounding, population estimates for Hispanic subgroups may not add to Hispanic control totals.The control totals are 1990-based population estimates for the United States for July 1, 1999; see text]

Sex and age	All origins	Hispanic					Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Other Hispanic [1]	Total [2]	White	Black
Female									
All ages	139,414,254	15,575,640	9,940,300	1,525,708	697,548	3,412,119	123,838,614	100,087,357	17,418,360
Under 1 year	1,867,770	353,591	251,204	29,576	9,027	63,781	1,514,179	1,154,113	260,295
1-4 years	7,391,697	1,343,677	985,352	103,007	36,625	218,697	6,048,020	4,630,612	1,022,954
5-9 years	9,738,789	1,588,420	1,116,075	124,608	28,899	318,838	8,150,369	6,209,300	1,458,543
10-14 years	9,536,777	1,339,248	897,933	139,303	34,282	267,726	8,197,529	6,284,953	1,439,908
15-19 years	9,596,926	1,335,284	908,706	148,558	36,152	241,870	8,261,642	6,364,387	1,421,534
20-24 years	8,842,537	1,295,002	875,033	110,189	33,722	276,058	7,547,535	5,811,778	1,293,090
25-29 years	9,153,808	1,250,832	860,673	106,482	39,415	244,267	7,902,976	6,076,568	1,293,186
30-34 years	9,955,716	1,284,875	804,502	133,857	49,786	296,730	8,670,841	6,776,868	1,342,837
35-39 years	11,328,875	1,255,042	736,515	132,791	51,231	334,508	10,073,833	8,062,787	1,461,476
40-44 years	11,229,458	1,070,085	657,939	103,480	45,093	263,581	10,159,373	8,235,379	1,397,135
45-49 years	9,855,557	838,947	486,298	87,892	44,731	220,030	9,016,610	7,397,437	1,163,815
50-54 years	8,447,713	651,778	345,156	80,817	42,752	183,049	7,795,935	6,543,455	893,322
55-59 years	6,692,674	495,643	271,863	50,772	32,741	140,270	6,197,031	5,246,222	696,270
60-64 years	5,546,004	405,253	201,773	51,658	54,545	97,279	5,140,751	4,354,579	581,810
65-69 years	5,110,515	339,060	174,964	46,015	37,168	80,913	4,771,455	4,081,378	515,270
70-74 years	4,909,037	276,822	150,958	32,163	32,602	61,103	4,632,215	4,067,888	421,184
75-79 years	4,272,493	201,489	97,748	23,668	43,071	37,001	4,071,004	3,638,263	330,105
80-84 years	3,003,068	124,951	61,881	12,805	23,065	27,202	2,878,117	2,610,341	209,608
85 years and over	2,934,840	125,641	55,727	8,067	22,641	39,216	2,809,199	2,541,049	216,018

[1] Includes Central and South American and Other and unknown Hispanic.
[2] Includes races other than white and black.

Table N. Estimated population for ages 15 years and over, by 5-year age groups, marital status, race, and sex: United States, 1999

[Figures may be subject to large sampling variability. Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States]

Race, sex, and marital status	15 years and over	15-17 years	18-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40-44 years	45-49 years
All races	214,253,450	11,762,059	7,985,858	18,025,599	18,209,082	19,726,707	22,544,605	22,268,056	19,356,216
Never married	59,325,869	11,582,708	7,648,528	14,049,500	8,264,643	5,178,476	4,024,422	3,004,323	1,955,335
Married	120,319,059	135,481	326,827	3,707,946	9,004,961	12,816,677	15,635,012	15,751,334	13,988,751
Widowed	14,703,589	3,767	837	9,409	28,784	63,570	168,789	235,804	365,851
Divorced	19,904,933	40,103	9,666	258,744	910,694	1,667,984	2,716,382	3,276,595	3,046,279
All races, male	103,374,198	6,058,281	4,092,723	9,183,056	9,055,281	9,770,990	11,215,723	11,038,589	9,500,649
Never married	32,158,349	5,988,047	4,014,939	7,660,754	4,714,638	2,985,958	2,339,670	1,744,853	1,040,125
Married	59,887,583	51,567	74,773	1,431,781	3,948,339	6,065,711	7,548,974	7,735,826	6,997,737
Widowed	2,697,871	846	-	359	5,742	12,249	45,117	59,323	73,000
Divorced	8,630,395	17,821	3,011	90,162	386,562	707,072	1,281,962	1,498,587	1,389,787
All races, female	110,879,252	5,703,778	3,893,135	8,842,543	9,153,801	9,955,717	11,328,882	11,229,467	9,855,567
Never married	27,167,520	5,594,661	3,633,589	6,388,746	3,550,005	2,192,518	1,684,752	1,259,470	915,210
Married	60,431,476	83,914	252,054	2,276,165	5,056,622	6,750,966	8,086,038	8,015,508	6,991,014
Widowed	12,005,718	2,921	837	9,050	23,042	51,321	123,672	176,481	292,851
Divorced	11,274,538	22,282	6,655	168,582	524,132	960,912	1,434,420	1,778,008	1,656,492
White	178,473,363	9,304,356	6,343,280	14,367,072	14,504,770	15,926,617	18,503,497	18,443,051	16,205,947
Never married	44,853,837	9,160,893	6,040,987	10,845,868	6,020,921	3,655,633	2,811,620	2,114,571	1,391,147
Married	104,652,644	111,002	293,729	3,288,514	7,677,974	10,860,702	13,307,137	13,475,971	12,021,935
Widowed	12,439,757	846	837	7,044	18,973	47,134	135,323	180,455	268,789
Divorced	16,527,125	31,615	7,727	225,646	786,902	1,363,148	2,249,417	2,672,054	2,524,076
White, male	86,690,843	4,803,471	3,265,801	7,371,872	7,289,214	7,984,095	9,302,140	9,238,093	86,690,843
Never married	24,910,873	4,746,456	3,195,536	6,033,209	3,550,133	2,236,597	1,769,578	1,300,123	797,922
Married	51,623,813	41,443	69,193	1,255,710	3,396,711	5,167,167	6,413,267	6,655,335	6,007,564
Widowed	1,817,352	846	-	-	5,742	11,672	33,459	46,570	53,742
Divorced	7,224,922	14,726	1,072	82,953	336,628	568,659	1,085,836	1,236,065	1,188,244
White, female	91,782,520	4,500,885	3,077,479	6,995,200	7,215,556	7,942,522	9,201,357	9,204,958	8,158,475
Never married	19,792,379	4,414,437	2,845,451	4,812,659	2,470,788	1,419,036	1,042,042	814,448	593,225
Married	52,020,850	69,559	224,536	2,032,804	4,281,263	5,693,535	6,893,870	6,820,636	6,014,371
Widowed	8,134,491	-	837	7,044	13,231	35,462	101,864	133,885	215,047
Divorced	9,175,418	16,889	6,655	142,693	450,274	794,489	1,163,581	1,435,989	1,335,832
Black	25,833,663	1,807,421	1,236,352	2,696,654	2,611,238	2,675,423	2,901,806	2,750,556	2,239,695
Never married	11,191,899	1,781,607	1,215,444	2,404,161	1,625,501	1,205,459	1,002,891	773,114	478,085
Married	9,986,018	15,775	18,969	272,409	888,707	1,204,497	1,493,301	1,421,035	1,241,159
Widowed	1,835,077	1,551	-	705	9,811	14,874	20,824	51,994	80,312
Divorced	2,820,669	8,488	1,939	19,379	87,219	250,593	384,790	504,413	440,139
Black, male	11,971,816	924,668	623,597	1,333,365	1,248,877	1,256,405	1,364,864	1,288,835	1,025,796
Never married	5,474,842	911,449	616,078	1,223,006	809,493	564,973	457,056	373,903	207,552
Married	4,926,136	10,124	5,580	106,745	399,822	575,606	735,552	683,122	627,882
Widowed	330,859	-	-	-	-	-	7,510	12,587	19,258
Divorced	1,147,956	3,095	1,939	3,614	39,562	115,826	164,746	219,223	171,104

Table N. Estimated population for ages 15 years and over, by 5-year age groups, marital status, race, and sex: United States, 1999

[Figures may be subject to large sampling variability. Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States]

Race, sex, and marital status	15 years and over	15-17 years	18-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40-44 years	45-49 years
Black, female	13,861,847	882,753	612,755	1,363,289	1,362,361	1,419,018	1,536,942	1,461,721	1,213,899
Never married	5,707,169	870,158	599,366	1,181,155	816,008	640,486	545,835	399,211	270,533
Married	5,000,122	5,651	13,389	165,664	488,885	628,891	757,749	737,913	613,277
Widowed	1,274,502	1,551	-	705	9,811	14,874	13,314	39,407	61,054
Divorced	1,659,079	5,393	-	15,765	47,657	134,767	220,044	285,190	269,035
American Indian	1,727,323	145,820	88,833	194,323	193,240	180,800	185,826	172,940	143,274
Never married	633,828	144,943	87,884	138,503	99,630	55,184	38,799	23,903	19,026
Married	830,015	877	949	43,930	77,204	107,311	114,708	123,435	103,792
Widowed	91,473	-	-	1,660	-	669	2,314	317	5,341
Divorced	172,007	-	-	10,230	16,406	17,636	30,005	25,285	15,115
American Indian, male	846,883	73,686	44,239	97,859	99,070	92,196	93,251	84,868	69,536
Never married	336,749	73,686	44,239	69,323	57,542	31,692	27,645	13,033	10,658
Married	412,809	-	-	25,640	38,522	53,411	58,956	56,856	48,275
Widowed	17,674	-	-	359	-	-	-	166	-
Divorced	73,187	-	-	2,537	3,006	7,093	6,650	14,813	10,603
American Indian, female	880,440	72,134	44,594	96,464	94,170	88,604	92,575	88,072	73,738
Never married	294,122	71,257	43,645	69,180	42,088	23,492	11,154	10,870	8,368
Married	413,855	877	949	18,290	38,682	3,900	55,752	66,579	55,517
Widowed	59,722	-	-	1,301	-	669	2,314	151	5,341
Divorced	98,820	-	-	7,693	13,400	10,543	23,355	10,472	4,512
Asian or Pacific Islander	8,219,101	504,462	317,393	767,550	899,834	943,867	953,476	901,509	767,300
Never married	2,646,305	495,265	304,213	660,968	518,591	262,200	171,112	92,735	67,077
Married	4,850,382	7,827	13,180	103,093	361,076	644,167	719,866	730,893	621,865
Widowed	337,282	1,370	-	-	-	893	10,328	3,038	11,409
Divorced	385,132	-	-	3,489	20,167	36,607	52,170	74,843	66,949
Asian or Pacific Islander, male	3,864,656	256,456	159,086	379,960	418,120	438,294	455,468	426,793	357,845
Never married	1,398,481	256,456	159,086	335,216	297,470	152,696	85,391	57,794	23,993
Married	2,258,060	-	-	43,686	113,284	269,527	341,199	340,513	314,016
Widowed	41,488	-	-	-	-	577	4,148	-	-
Divorced	138,751	-	-	1,058	7,366	15,494	24,730	28,486	19,836
Asian or Pacific Islander, female	4,354,445	248,006	158,307	387,590	481,714	505,573	498,008	474,716	409,455
Never married	1,244,147	238,809	145,127	325,752	221,121	109,504	85,721	34,941	43,084
Married	2,572,482	7,827	13,180	59,407	247,792	374,640	378,667	390,380	307,849
Widowed	254,109	1,370	-	-	-	316	6,180	3,038	11,409
Divorced	243,141	-	-	2,431	12,801	21,113	27,440	46,357	47,113

Table N. Estimated population for ages 15 years and over, by 5-year age groups, marital status, race, and sex: United States, 1999

[Figures may be subject to large sampling variability. Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States]

Race, sex, and marital status	50-54 years	55-59 years	60-64 years	65-69 years	70-74 years	75-79 years	80-84 years	85 years and over
All races	16,446,154	12,875,293	10,513,779	9,447,215	8,771,023	7,329,515	4,817,199	4,175,090
Never married	1,068,084	725,594	490,492	380,387	314,341	285,557	186,372	167,107
Married	12,358,855	9,451,058	7,702,145	6,557,705	5,564,075	4,087,013	2,140,287	1,090,932
Widowed	508,973	765,285	1,052,824	1,622,145	2,225,898	2,580,336	2,297,925	2,773,392
Divorced	2,510,242	1,933,356	1,268,318	886,978	666,709	376,609	192,615	143,659
All races, male	7,998,426	6,182,629	4,967,770	4,336,704	3,861,985	3,057,014	1,814,132	1,240,246
Never married	515,058	354,000	257,445	189,554	118,418	126,872	70,614	37,404
Married	6,368,717	4,870,688	4,011,164	3,470,345	3,049,782	2,289,115	1,306,299	666,765
Widowed	101,507	151,363	168,338	298,246	412,261	495,206	383,816	490,498
Divorced	1,013,144	806,578	530,823	378,559	281,524	145,821	53,403	45,579
All races, female	8,447,728	6,692,664	5,546,009	5,110,511	4,909,038	4,272,501	3,003,067	2,934,844
Never married	553,026	371,594	233,047	190,833	195,923	158,685	115,758	129,703
Married	5,990,138	4,580,370	3,690,981	3,087,360	2,514,293	1,797,898	833,988	424,167
Widowed	407,466	613,922	884,486	1,323,899	1,813,637	2,085,130	1,914,109	2,282,894
Divorced	1,497,098	1,126,778	737,495	508,419	385,185	230,788	139,212	98,080
White	14,043,596	11,077,452	9,056,189	8,188,756	7,769,878	6,584,584	4,381,053	3,773,265
Never married	797,491	528,498	386,793	270,461	266,236	246,577	165,556	150,585
Married	10,766,533	8,301,773	6,856,322	5,868,081	5,042,556	3,777,465	1,994,969	1,007,981
Widowed	393,305	606,144	808,083	1,315,983	1,874,202	2,242,505	2,052,220	2,487,914
Divorced	2,086,267	1,641,037	1,004,991	734,231	586,884	318,037	168,308	126,785
White, male	6,906,739	5,379,069	4,331,036	3,797,084	3,446,701	2,759,816	1,654,357	1,113,883
Never married	393,077	273,664	208,091	138,800	97,861	108,050	61,776	30,694
Married	5,573,640	4,288,043	3,567,966	3,117,053	2,756,570	2,107,968	1,206,183	613,299
Widowed	78,697	117,166	127,158	232,189	344,856	425,944	339,311	430,359
Divorced	861,325	700,196	427,821	309,042	247,414	117,854	47,087	39,531
White, female	7,136,857	5,698,383	4,725,153	4,391,672	4,323,177	3,824,768	2,726,696	2,659,382
Never married	404,414	254,834	178,702	131,661	168,375	138,527	103,780	119,891
Married	5,192,893	4,013,730	3,288,356	2,751,028	2,285,986	1,669,497	788,786	394,682
Widowed	314,608	488,978	680,925	1,083,794	1,529,346	1,816,561	1,712,909	2,057,555
Divorced	1,224,942	940,841	577,170	425,189	339,470	200,183	121,221	87,254
Black	1,688,830	1,289,253	1,055,854	935,171	743,319	557,759	331,334	312,998
Never married	235,758	175,889	95,693	98,798	38,051	33,506	18,054	9,888
Married	995,865	727,748	540,918	458,395	352,355	200,296	94,829	59,760
Widowed	92,710	136,388	194,129	237,950	289,881	275,410	198,822	229,716
Divorced	364,497	249,228	225,114	140,028	63,032	48,547	19,629	13,634
Black, male	757,915	564,190	450,461	400,066	307,452	217,528	115,774	92,023
Never married	108,165	73,351	43,454	45,437	16,590	16,988	7,347	1,021
Married	501,005	365,032	293,980	241,335	200,252	111,897	68,202	35,989
Widowed	20,546	33,334	27,107	51,868	59,885	62,779	35,985	50,363
Divorced	128,199	92,473	85,920	61,426	30,725	25,864	4,240	4,650

Table N. Estimated population for ages 15 years and over, by 5-year age groups, marital status, race, and sex: United States, 1999

[Figures may be subject to large sampling variability. Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States]

Race, sex, and marital status	50-54 years	55-59 years	60-64 years	65-69 years	70-74 years	75-79 years	80-84 years	85 years and over
Black, female	930,915	725,063	605,393	535,105	435,867	340,231	215,560	220,975
Never married	127,593	102,538	52,239	53,361	21,461	16,518	10,707	8,867
Married	494,860	362,716	246,938	217,060	152,103	88,399	26,627	23,771
Widowed	72,164	103,054	167,022	186,082	229,996	212,631	162,837	179,353
Divorced	236,298	156,755	139,194	78,602	32,307	22,683	15,389	8,984
American Indian	112,733	83,514	64,598	50,051	40,452	31,401	19,133	20,385
Never married	12,221	6,398	-	510	2,096	1,774	-	2,957
Married	75,581	57,839	43,431	33,941	19,029	15,349	9,288	3,351
Widowed	4,553	6,952	11,657	11,427	13,726	11,537	7,243	14,077
Divorced	20,378	12,325	9,510	4,173	5,601	2,741	2,602	-
American Indian, male	54,152	39,470	30,127	22,577	18,173	13,472	7,743	6,464
Never married	6,066	894	-	400	858	713	-	2,957
Married	36,861	30,236	20,278	16,734	9,926	12,759	4,355	651
Widowed	1,053	863	4,997	2,844	4,004	-	3,388	2,856
Divorced	10,172	7,477	4,852	2,599	3,385	-	-	-
American Indian, female	58,581	44,044	34,471	27,474	22,279	17,929	11,390	13,921
Never married	6,155	5,504	-	110	1,238	1,061	-	-
Married	38,720	27,603	23,153	17,207	9,103	2,590	4,933	2,700
Widowed	3,500	6,089	6,660	8,583	9,722	11,537	3,855	11,221
Divorced	10,206	4,848	4,658	1,574	2,216	2,741	2,602	-
Asian or Pacific Islander	600,995	425,074	337,138	273,237	217,374	155,771	85,679	68,442
Never married	22,614	14,809	8,006	10,618	7,958	3,700	2,762	3,677
Married	520,876	363,698	261,474	197,288	150,135	93,903	41,201	19,840
Widowed	18,405	15,801	38,955	56,785	48,089	50,884	39,640	41,685
Divorced	39,100	30,766	28,703	8,546	11,192	7,284	2,076	3,240
Asian or Pacific Islander, male	279,620	199,900	156,146	116,977	89,659	66,198	36,258	27,876
Never married	7,750	6,091	5,900	4,917	3,109	1,121	1,491	2,732
Married	257,211	187,377	128,940	95,223	83,034	56,491	27,559	16,826
Widowed	1,211	-	9,076	11,345	3,516	6,483	5,132	6,920
Divorced	13,448	6,432	12,230	5,492	-	2,103	2,076	1,398
Asian or Pacific Islander, female	321,375	225,174	180,992	156,260	127,715	89,573	49,421	40,566
Never married	14,864	8,718	2,106	5,701	4,849	2,579	1,271	945
Married	263,665	176,321	132,534	102,065	67,101	37,412	13,642	3,014
Widowed	17,194	15,801	29,879	45,440	44,573	44,401	34,508	34,765
Divorced	25,652	24,334	16,473	3,054	11,192	5,181	-	1,842

- Quantity zero.

SOURCE: Population estimates based on unpublished tabulations prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census.

Table O. Estimated population for ages 15 years and over, by 5-year age groups, marital status, specified Hispanic origin, race for non-Hispanic population, and sex: United States, 1999

[Figures may be subject to large sampling variability. Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States]

Hispanic origin, race for non-Hispanic origin, sex, and marital status	15 years and over	15-17 years	18-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40-44 years	45-49 years
Mexican, male									
Never married	2,519,541	497,545	329,226	656,294	472,017	242,842	161,611	84,215	37,085
Married	3,456,600	3,249	19,962	241,450	465,413	587,998	527,743	448,690	329,809
Widowed	97,884	-	-	519	590	3,870	2,861	1,933	2,789
Divorced	324,767	2,596	519	9,060	20,171	50,894	51,320	47,110	48,845
Mexican, female									
Never married	1,605,553	403,590	242,190	384,360	201,913	130,512	82,695	43,066	35,544
Married	3,316,475	16,230	51,303	362,360	497,639	551,978	489,264	393,823	288,870
Widowed	305,267	-	-	-	5,224	950	5,758	7,917	13,276
Divorced	403,100	-	-	15,713	24,982	50,671	63,103	64,296	63,446
Puerto Rican, male									
Never married	420,535	94,506	54,911	84,399	57,478	39,021	41,636	24,469	8,258
Married	465,856	357	2,183	14,525	35,538	79,165	76,335	65,346	54,670
Widowed	15,354	-	-	-	-	-	-	437	381
Divorced	82,761	-	417	1,592	3,072	9,149	12,262	18,991	15,156
Puerto Rican, female									
Never married	421,129	100,010	47,960	84,069	49,974	38,673	32,743	18,638	13,748
Married	506,147	477	1,771	22,391	64,706	86,943	72,838	61,894	52,883
Widowed	75,382	-	-	-	-	682	1,902	2,799	3,140
Divorced	134,542	-	-	4,750	4,856	16,900	26,667	26,981	14,953
Cuban, male									
Never married	149,860	13,891	10,428	30,108	23,370	18,252	20,550	8,567	1,530
Married	301,052	-	-	7,172	19,422	39,508	26,510	26,213	24,868
Widowed	11,047	-	-	-	-	-	-	-	1,407
Divorced	54,900	-	-	-	634	6,825	8,828	12,422	6,047
Cuban, female									
Never married	89,519	16,386	10,072	19,588	6,581	7,266	4,777	767	3,600
Married	264,100	-	553	9,326	19,304	33,579	32,840	26,774	27,895
Widowed	64,623	-	678	-	-	-	-	813	1,943
Divorced	63,263	-	-	1,098	5,839	4,413	7,389	6,165	11,489
Other Hispanic, male									
Never married	980,896	158,752	114,605	258,537	186,079	108,480	67,872	27,714	21,649
Married	1,121,256	2,839	2,584	51,015	97,256	183,529	192,535	156,705	133,470
Widowed	21,447	-	-	-	-	-	477	-	3,224
Divorced	135,568	580	-	3,016	3,210	21,192	19,567	26,539	21,707

Table O. Estimated population for ages 15 years and over, by 5-year age groups, marital status, specified Hispanic origin, race for non-Hispanic population, and sex: United States, 1999

[Figures may be subject to large sampling variability. Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States]

Hispanic origin, race for non-Hispanic origin, sex, and marital status	15 years and over	15-17 years	18-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40-44 years	45-49 years
Other Hispanic, female									
Never married	716,678	157,948	100,400	150,648	97,814	64,412	38,182	33,033	17,193
Married	1,238,828	3,337	11,426	69,080	156,007	204,686	196,330	183,354	125,685
Widowed	174,577	-	-	319	2,006	1,188	2,533	7,420	10,208
Divorced	215,418	-	-	2,572	11,978	23,913	44,479	32,816	28,999
White non-Hispanic, male									
Never married	20,232,753	3,869,158	2,436,784	4,791,353	3,084,799	1,968,241	1,393,808	986,648	604,120
Married	45,808,695	16,381	51,364	1,034,108	3,040,868	4,775,272	5,856,204	5,710,263	5,420,984
Widowed	2,118,813	1,047	-	-	4,173	17,509	14,847	32,475	41,723
Divorced	6,140,710	10,646	5,177	81,143	295,885	680,562	948,125	1,007,65-	981,374
White non-Hispanic, female									
Never married	15,915,208	3,598,503	2,199,227	3,806,879	2,131,690	1,197,055	787,428	619,215	406,262
Married	45,942,911	45,611	162,372	1,649,882	3,831,709	5,461,323	6,233,162	5,768,416	5,342,823
Widowed	9,612,474	1,909	-	7,236	12,610	32,521	70,191	117,271	188,366
Divorced	8,072,530	8,471	5,348	188,240	438,704	779,045	1,070,714	1,243,509	1,182,599
Black non-Hispanic, male									
Never married	4,998,082	828,885	531,513	1,064,251	771,661	606,535	478,469	299,142	145,247
Married	4,427,255	13,666	5,983	120,860	343,635	521,931	663,539	585,907	544,127
Widowed	322,408	828	-	-	875	5,238	2,150	6,939	13,053
Divorced	978,369	2,390	1,498	16,290	53,293	103,279	106,910	194,857	161,687
Black non-Hispanic, female									
Never married	5,043,212	800,185	504,507	1,063,079	798,240	616,828	468,821	271,207	187,888
Married	4,685,813	12,697	24,776	159,470	408,782	643,048	692,146	715,416	580,199
Widowed	1,336,536	2,470	502	1,113	3,995	11,455	25,727	24,345	46,259
Divorced	1,467,468	998	1,264	11,594	76,235	132,119	231,246	251,716	222,646
Other non-Hispanic, male									
Never married	1,516,684	256,973	155,049	391,376	317,310	172,954	91,639	57,787	33,230
Married	2,111,795	1,486	-	30,097	129,262	271,752	339,611	313,104	273,699
Widowed	70,834	247	-	-	4,948	-	957	-	4,670
Divorced	186,462	-	-	2,090	14,537	21,173	28,874	38,795	26,275
Other non-Hispanic, female									
Never married	1,215,568	246,720	137,407	328,347	259,882	80,905	61,023	38,258	24,129
Married	2,443,146	1,407	11,636	92,638	229,699	380,819	394,057	365,046	298,683
Widowed	346,670	1,468	743	3,049	-	8,795	3,745	2,690	19,225
Divorced	269,014	-	-	3,438	7,925	36,990	36,718	52,437	48,883

Table O. Estimated population for ages 15 years and over, by 5-Year age groups, marital status, race, and specified Hispanic origin, race for non-Hispanic population, and sex: United States, 1999

[Figures may be subject to large sampling variability. Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States]

Hispanic origin, race for non-Hispanic origin, sex, and marital status	50-54 years	55-59 years	60-64 years	65-69 years	70-74 years	75-80 years	80-84 years	85 years and over
Mexican, male								
Never married	13,133	13,809	3,738	2,123	1,355	-	2,602	1,946
Married	241,710	167,307	164,337	104,915	72,364	37,570	27,252	16,831
Widowed	7,203	4,643	6,483	12,886	19,500	19,358	8,741	6,508
Divorced	39,766	14,217	14,546	10,852	6,516	3,778	1,621	2,956
Mexican, female								
Never married	22,280	16,018	11,002	11,030	6,987	7,716	961	5,689
Married	211,565	154,209	109,912	102,134	48,459	15,553	14,578	8,598
Widowed	14,460	14,564	33,943	41,439	49,341	50,569	36,400	31,426
Divorced	37,011	25,385	22,701	10,266	18,176	4,571	1,168	1,611
Puerto Rican, male								
Never married	8,084	5,547	1,409	-	817	-	-	-
Married	35,454	40,696	19,378	16,956	14,468	8,329	1,079	1,377
Widowed	710	712	3,847	2,489	2,472	1,210	1,692	1,404
Divorced	12,513	1,270	3,051	3,224	801	-	603	660
Puerto Rican, female								
Never married	11,607	12,290	4,740	3,098	444	1,346	678	1,111
Married	54,591	30,379	21,712	13,621	11,589	5,582	2,558	2,212
Widowed	5,202	7,055	9,193	9,662	10,818	7,476	7,869	9,584
Divorced	7,328	15,596	10,256	2,549	1,280	2,426	-	-
Cuban, male								
Never married	2,344	8,544	1,041	2,688	3,121	410	506	4,510
Married	19,474	23,498	29,130	35,308	19,896	13,058	8,453	8,542
Widowed	-	-	1,864	819	2,124	3,186	513	1,134
Divorced	1,657	8,957	381	968	6,636	544	1,001	-
Cuban, female								
Never married	4,074	4,477	1,422	1,874	1,281	1,683	1,747	3,924
Married	12,501	21,111	28,157	25,256	14,776	5,570	4,121	2,337
Widowed	-	2,598	3,787	4,568	9,877	18,823	13,267	8,269
Divorced	4,282	3,247	748	4,897	7,788	4,515	1,393	-
Other Hispanic, male								
Never married	11,768	11,353	6,968	3,102	2,328	1,441	-	248
Married	91,817	72,489	37,757	52,450	21,817	17,171	4,802	3,020
Widowed	-	1,013	1,518	2,578	4,985	3,387	2,841	1,424
Divorced	13,806	5,724	5,480	1,427	6,333	4,163	2,824	-

Table O. Estimated population for ages 15 years and over, by 5-Year age groups, marital status, race, and specified Hispanic origin, race for non-Hispanic population, and sex: United States, 1999

[Figures may be subject to large sampling variability. Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States]

Hispanic origin, race for non-Hispanic origin, sex, and marital status	50-54 years	55-59 years	60-64 years	65-69 years	70-74 years	75-80 years	80-84 years	85 years and over
Other Hispanic, female								
Never married	15,282	11,588	6,376	7,427	5,601	2,911	3,715	4,148
Married	101,942	69,617	53,118	33,579	18,623	9,717	1,818	509
Widowed	5,865	11,280	17,377	30,130	24,117	22,568	20,393	19,173
Divorced	17,911	18,267	15,273	7,938	8,586	2,686	-	-
White non-Hispanic, male								
Never married	294,319	185,559	173,378	158,619	128,366	55,479	51,286	50,836
Married	4,312,637	3,605,580	3,115,895	3,040,935	2,544,486	1,833,929	1,007,921	441,868
Widowed	51,659	87,985	141,610	260,802	329,166	407,803	342,436	385,578
Divorced	683,412	462,413	354,879	244,405	215,456	104,826	43,217	21,540
White non-Hispanic, female								
Never married	224,959	159,275	143,122	167,151	125,787	143,978	90,893	113,784
Married	4,153,330	3,368,120	2,864,134	2,624,483	2,157,548	1,361,697	642,300	276,001
Widowed	256,024	361,998	628,151	1,138,359	1,551,446	1,744,501	1,664,717	1,837,174
Divorced	887,305	693,146	505,953	413,696	287,533	185,507	95,549	87,211
Black non-Hispanic, male								
Never married	105,420	65,818	29,835	34,111	13,732	10,451	3,259	9,753
Married	387,941	315,356	298,375	233,617	172,690	113,368	60,800	45,460
Widowed	4,434	25,857	26,090	70,483	57,288	54,967	29,261	24,945
Divorced	104,241	79,486	54,888	40,861	32,329	18,049	6,906	1,405
Black non-Hispanic, female								
Never married	99,541	71,643	56,172	32,970	29,484	16,803	4,073	21,771
Married	381,748	328,588	262,591	219,918	130,712	72,258	35,566	17,898
Widowed	85,113	114,507	142,607	188,740	200,098	194,258	148,380	146,967
Divorced	176,252	106,506	82,988	71,194	45,462	30,200	17,664	9,384
Other non-Hispanic, male								
Never married	6,709	16,702	5,811	1,181	7,773	2,190	-	-
Married	208,912	157,069	136,233	90,114	72,279	37,945	27,324	22,908
Widowed	2,804	5,015	1,336	15,774	6,489	18,783	7,951	1,860
Divorced	24,293	9,865	4,800	10,490	5,270	-	-	-
Other non-Hispanic, female								
Never married	8,877	7,304	7,904	5,255	5,810	2,546	1,201	-
Married	216,793	155,141	114,609	77,480	55,431	32,677	14,513	2,517
Widowed	25,563	31,079	33,877	60,016	53,206	37,633	29,729	35,852
Divorced	21,608	19,001	22,548	9,813	7,765	1,888	-	-

- Quantity zero.

SOURCE: Population estimates based on unpublished tabulations prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census.

Table P. Estimated population for ages 25-64 years, by educational attainment, race, and sex: Total of 46 reporting States and the District of Columbia, July 1, 1999

[Figures include Armed forces stationed in the United States and exclude those stationed outside the United States]

Race, sex, and years of school completed	25-64 years	25-34 years	35-44 years	45-54 years	55-64 years
All races[1], both sexes	134,833,509	36,084,064	42,608,999	33,842,243	22,298,203
Under 12 years	17,266,667	4,433,942	4,933,222	3,819,020	4,080,483
12 years	44,118,610	11,032,314	14,373,871	10,601,169	8,111,256
13 years or more	73,448,232	20,617,808	23,301,906	19,422,054	10,106,464
Male	66,309,181	17,920,066	21,187,418	16,562,700	10,638,997
Under 12 years	8,790,283	2,371,126	2,629,132	1,855,186	1,934,839
12 years	21,261,941	5,762,296	7,282,051	4,733,429	3,484,165
13 years or more	36,256,957	9,786,644	11,276,235	9,974,085	5,219,993
Female	68,524,328	18,163,998	21,421,581	17,279,543	11,659,206
Under 12 years	8,476,384	2,062,816	2,304,090	1,963,834	2,145,644
12 years	22,856,669	5,270,018	7,091,820	5,867,740	4,627,091
13 years or more	37,191,275	10,831,164	12,025,671	9,447,969	4,886,471
White, both sexes	112,335,903	29,155,655	35,262,242	28,667,327	19,250,679
Under 12 years	13,611,638	3,580,403	3,883,472	3,006,966	3,140,797
12 years	36,754,922	8,850,168	11,883,882	8,862,448	7,158,424
13 years or more	61,969,343	16,725,084	19,494,888	16,797,913	8,951,458
Male	55,818,055	14,649,994	17,712,117	14,187,971	9,267,973
Under 12 years	7,087,434	1,966,689	2,132,436	1,490,255	1,498,054
12 years	17,750,947	4,657,801	6,045,832	3,956,186	3,091,128
13 years or more	30,979,674	8,025,504	9,533,849	8,741,530	4,678,791
Female	56,517,848	14,505,661	17,550,125	14,479,356	9,982,706
Under 12 years	6,524,204	1,613,714	1,751,036	1,516,711	1,642,743
12 years	19,003,975	4,192,367	5,838,050	4,906,262	4,067,296
13 years or more	30,989,669	8,699,580	9,961,039	8,056,383	4,272,667
Black, both sexes	15,660,148	4,757,671	5,164,930	3,574,165	2,163,382
Under 12 years	2,681,338	616,583	776,806	568,891	719,058
12 years	5,790,435	1,766,115	1,966,561	1,320,021	737,738
13 years or more	7,188,375	2,374,973	2,421,563	1,685,253	706,586
Male	7,255,471	2,245,383	2,431,073	1,622,199	956,816
Under 12 years	1,274,236	282,543	372,941	268,219	350,533
12 years	2,822,519	917,508	1,011,877	596,917	296,217
13 years or more	3,158,716	1,045,332	1,046,255	757,063	310,066
Female	8,404,677	2,512,288	2,733,857	1,951,966	1,206,566
Under 12 years	1,407,102	334,040	403,865	300,672	368,525
12 years	2,967,916	848,607	954,684	723,104	441,521
13 years or more	4,029,659	1,329,641	1,375,308	928,190	396,520

1/ Includes races other than white and black.

SOURCE: Population estimates based on unpublished tabulations prepared by the Housing and Household Economic Statistics Division, U.S. Bureau of the Census.

Table Q. Ratio of census-level resident population to resident population adjusted for estimated net census undercount by age, sex, and race: April 1, 1990

Age	All races			White			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	0.9815	0.9721	0.9906	0.9802	0.9728	0.9873	0.9432	0.9151	0.9699
Under 5 years	0.9632	0.9634	0.9629	0.9677	0.9685	0.9669	0.9160	0.9139	0.9182
Under 1 year	0.9686	0.9684	0.9689	0.9730	0.9734	0.9725	0.9239	0.9214	0.9264
1-4 years	0.9617	0.9621	0.9613	0.9664	0.9674	0.9654	0.9139	0.9119	0.9159
5-14 years	0.9761	0.9768	0.9753	0.9740	0.9750	0.9730	0.9410	0.9402	0.9418
5-9 years	0.9649	0.9655	0.9642	0.9657	0.9665	0.9649	0.9241	0.9230	0.9252
10-14 years	0.9882	0.9891	0.9873	0.9830	0.9841	0.9818	0.9591	0.9586	0.9595
15-24 years	1.0081	1.0088	1.0073	1.0032	1.0053	1.0010	0.9789	0.9723	0.9855
15-19 years	1.0166	1.0198	1.0133	1.0094	1.0128	1.0059	0.9988	1.0016	0.9959
20-24 years	1.0002	0.9987	1.0017	0.9975	0.9985	0.9966	0.9593	0.9432	0.9753
25-34 years	0.9639	0.9463	0.9821	0.9614	0.9480	0.9755	0.9126	0.8666	0.9580
25-29 years	0.9591	0.9439	0.9748	0.9558	0.9441	0.9681	0.9123	0.8732	0.9510
30-34 years	0.9687	0.9487	0.9892	0.9669	0.9518	0.9828	0.9129	0.8599	0.9651
35-44 years	0.9842	0.9689	0.9996	0.9816	0.9700	0.9935	0.9350	0.8867	0.9810
35-39 years	0.9790	0.9628	0.9954	0.9764	0.9643	0.9888	0.9303	0.8808	0.9778
40-44 years	0.9901	0.9758	1.0044	0.9875	0.9764	0.9988	0.9410	0.8943	0.9850
45-54 years	0.9780	0.9628	0.9929	0.9772	0.9649	0.9894	0.9322	0.8805	0.9799
45-49 years	0.9775	0.9633	0.9916	0.9762	0.9648	0.9877	0.9302	0.8807	0.9762
50-54 years	0.9785	0.9623	0.9944	0.9784	0.9651	0.9914	0.9346	0.8802	0.9844
55-64 years	0.9824	0.9640	0.9995	0.9828	0.9684	0.9962	0.9545	0.8875	1.0138

Table Q. Ratio of census-level resident population to resident population adjusted for estimated net census undercount by age, sex, and race: April 1, 1990

Age	All races			White			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
55-59 years	0.9794	0.9609	0.9968	0.9801	0.9656	0.9941	0.9426	0.8790	0.9999
60-64 years	0.9854	0.9671	0.1002	0.9853	0.9712	0.9982	0.9675	0.8969	1.0287
65-74 years	0.9960	0.9784	1.0101	0.9935	0.9781	1.0060	1.0211	0.9704	1.0596
65-69 years	0.9980	0.9776	1.0152	0.9943	0.9762	1.0096	1.0336	0.9786	1.0773
70-74 years	0.9934	0.9795	1.0040	0.9926	0.9807	1.0017	1.0049	0.9589	1.0376
75-84 years	1.0021	1.0046	1.0006	1.0038	1.0066	1.0021	0.9971	0.9913	1.0004
75-79 years	1.0082	1.0064	1.0094	1.0077	1.0065	1.0085	1.0258	1.0126	1.0337
80-84 years	0.9927	1.0015	0.9881	0.9978	1.0068	0.9931	0.9524	0.9547	0.9512
85 years and over	0.9411	0.9592	0.9342	0.9512	0.9696	0.9444	0.8503	0.8827	0.8373

SOURCE: Unpublished data from the U.S. Bureau of the Census.

Table R. Age-adjusted death rates for selected causes by race and sex, unadjusted and adjusted for estimated net census undercount: United States, 1990

[Based on age-specific death rates per 100,000 population in specified group. Age-adjusted death rates per 100,000 U.S. standard population. Numbers after causes of deaths are numbers of the Ninth Revision, International Classification of Diseases, 1975. Beginning 1987 includes category numbers *042-*044. See section "Cause of death"]

Race, sex, and adjustment for net census undercount	All causes	Human immunodeficiency virus infection (*042-*044)	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues (140-208)	Diabetes mellitus (250)	Diseases of heart (390-398,402, 404-429)	Cerebrovascular diseases (430-438)	Homicide and legal intervention (E960-E978)
All races							
Both sexes:							
Unadjusted	520.2	9.8	135.0	11.7	152.0	27.7	10.2
Adjusted	512.7	9.6	133.3	11.5	149.9	27.3	10.1
Male:							
Unadjusted	680.2	17.7	166.3	12.3	206.7	30.2	16.3
Adjusted	664.3	17.0	162.4	12.1	202.1	29.6	15.9
Female:							
Unadjusted	390.6	2.1	112.7	11.1	108.9	25.7	4.2
Adjusted	387.9	2.1	112.6	11.0	107.9	25.4	4.2
White							
Both sexes:							
Unadjusted	492.8	8.0	131.5	10.4	146.9	25.5	5.9
Adjusted	485.9	7.8	129.9	10.2	145.0	25.2	5.7
Male:							
Unadjusted	644.3	15.0	160.3	11.3	202.0	27.7	8.9
Adjusted	631.0	14.4	156.9	11.1	198.2	27.3	8.7
Female:							
Unadjusted	369.9	1.1	111.2	9.5	103.1	23.8	2.8
Adjusted	367.0	1.0	110.8	9.5	102.2	23.5	2.7
Black							
Both sexes:							
Unadjusted	789.2	25.7	182.0	24.8	213.5	48.4	39.5
Adjusted	760.0	23.9	177.0	24.1	207.2	46.9	37.4
Male:							
Unadjusted	1,061.3	44.2	248.1	23.6	275.9	56.1	68.7
Adjusted	980.8	39.0	230.9	21.9	256.7	52.3	62.9
Female:							
Unadjusted	581.6	9.9	137.2	25.4	168.1	42.7	13.0
Adjusted	579.4	9.7	138.4	25.7	168.2	42.7	12.7

Table S. Lower and upper 95% and 96% confidence limit factors for a death rate based on a Poisson variable of 1 through 99 deaths, D or D_{adj}

D or D_{adj}	L(1- α = .95,D)	U(1- α = .95,D)	L(1- α = .96,D) or L(1- α = .96,D_{adj})	U(1- α = .96,D) or U(1- α = .96,D_{adj})
1	0.02532	5.57164	0.02020	5.83392
2	0.12110	3.61234	0.10735	3.75830
3	0.20622	2.92242	0.18907	3.02804
4	0.27247	2.56040	0.25406	2.64510
5	0.32470	2.33367	0.30591	2.40540
6	0.36698	2.17658	0.34819	2.23940
7	0.40205	2.06038	0.38344	2.11666
8	0.43173	1.97040	0.41339	2.02164
9	0.45726	1.89831	0.43923	1.94553
10	0.47954	1.83904	0.46183	1.88297
11	0.49920	1.78928	0.48182	1.83047
12	0.51671	1.74680	0.49966	1.78566
13	0.53246	1.71003	0.51571	1.74688
14	0.54671	1.67783	0.53027	1.71292
15	0.55969	1.64935	0.54354	1.68289
16	0.57159	1.62394	0.55571	1.65610
17	0.58254	1.60110	0.56692	1.63203
18	0.59266	1.58043	0.57730	1.61024
19	0.60207	1.56162	0.58695	1.59042
20	0.61083	1.54442	0.59594	1.57230
21	0.61902	1.52861	0.60435	1.55563
22	0.62669	1.51401	0.61224	1.54026
23	0.63391	1.50049	0.61966	1.52602
24	0.64072	1.48792	0.62666	1.51278
25	0.64715	1.47620	0.63328	1.50043
26	0.65323	1.46523	0.63954	1.48888

Table S. Lower and upper 95% and 96% confidence limit factors for a death rate based on a Poisson variable of 1 through 99 deaths, D or D_{adj}

D or D_{adj}	L(1- α = .95,D)	U(1- α = .95,D)	L(1- α = .96,D) or L(1- α = .96,D_{adj})	U(1- α = .96,D) or U(1- α = .96,D_{adj})
27	0.65901	1.45495	0.64549	1.47805
28	0.66449	1.44528	0.65114	1.46787
29	0.66972	1.43617	0.65652	1.45827
30	0.67470	1.42756	0.66166	1.44922
31	0.67945	1.41942	0.66656	1.44064
32	0.68400	1.41170	0.67125	1.43252
33	0.68835	1.40437	0.67575	1.42480
34	0.69253	1.39740	0.68005	1.41746
35	0.69654	1.39076	0.68419	1.41047
36	0.70039	1.38442	0.68817	1.40380
37	0.70409	1.37837	0.69199	1.39743
38	0.70766	1.37258	0.69568	1.39134
39	0.71110	1.36703	0.69923	1.38550
40	0.71441	1.36172	0.70266	1.37991
41	0.71762	1.35661	0.70597	1.37454
42	0.72071	1.35171	0.70917	1.36938
43	0.72370	1.34699	0.71227	1.36442
44	0.72660	1.34245	0.71526	1.35964
45	0.72941	1.33808	0.71816	1.35504
46	0.73213	1.33386	0.72098	1.35060
47	0.73476	1.32979	0.72370	1.34632
48	0.73732	1.32585	0.72635	1.34218
49	0.73981	1.32205	0.72892	1.33818
50	0.74222	1.31838	0.73142	1.33431
51	0.74457	1.31482	0.73385	1.33057
52	0.74685	1.31137	0.73621	1.32694

Table S. Lower and upper 95% and 96% confidence limit factors for a death rate based on a Poisson variable of 1 through 99 deaths, D or D_{adj}

D or D_{adj}	L(1- α = .95,D)	U(1- α = .95,D)	L(1- α = .96,D) or L(1- α = .96,D_{adj})	U(1- α = .96,D) or U(1- α = .96,D_{adj})
53	0.74907	1.30802	0.73851	1.32342
54	0.75123	1.30478	0.74075	1.32002
55	0.75334	1.30164	0.74293	1.31671
56	0.75539	1.29858	0.74506	1.31349
57	0.75739	1.29562	0.74713	1.31037
58	0.75934	1.29273	0.74916	1.30734
59	0.76125	1.28993	0.75113	1.30439
60	0.76311	1.28720	0.75306	1.30152
61	0.76492	1.28454	0.75494	1.29873
62	0.76669	1.28195	0.75678	1.29601
63	0.76843	1.27943	0.75857	1.29336
64	0.77012	1.27698	0.76033	1.29077
65	0.77178	1.27458	0.76205	1.28826
66	0.77340	1.27225	0.76373	1.28580
67	0.77499	1.26996	0.76537	1.28340
68	0.77654	1.26774	0.76698	1.28106
69	0.77806	1.26556	0.76856	1.27877
70	0.77955	1.26344	0.77011	1.27654
71	0.78101	1.26136	0.77162	1.27436
72	0.78244	1.25933	0.77310	1.27223
73	0.78384	1.25735	0.77456	1.27014
74	0.78522	1.25541	0.77598	1.26810
75	0.78656	1.25351	0.77738	1.26610
76	0.78789	1.25165	0.77876	1.26415
77	0.78918	1.24983	0.78010	1.26223
78	0.79046	1.24805	0.78143	1.26036

Table S. Lower and upper 95% and 96% confidence limit factors for a death rate based on a Poisson variable of 1 through 99 deaths, D or D_{adj}

D or D_{adj}	L(1- α = .95,D)	U(1- α = .95,D)	L(1- α = .96,D) or L(1- α = .96,D_{adj})	U(1- α = .96,D) or U(1- α = .96,D_{adj})
79	0.79171	1.24630	0.78272	1.25852
80	0.79294	1.24459	0.78400	1.25672
81	0.79414	1.24291	0.78525	1.25496
82	0.79533	1.24126	0.78648	1.25323
83	0.79649	1.23965	0.78769	1.25153
84	0.79764	1.23807	0.78888	1.24987
85	0.79876	1.23652	0.79005	1.24824
86	0.79987	1.23499	0.79120	1.24664
87	0.80096	1.23350	0.79233	1.24507
88	0.80203	1.23203	0.79344	1.24352
89	0.80308	1.23059	0.79453	1.24201
90	0.80412	1.22917	0.79561	1.24052
91	0.80514	1.22778	0.79667	1.23906
92	0.80614	1.22641	0.79771	1.23762
93	0.80713	1.22507	0.79874	1.23621
94	0.80810	1.22375	0.79975	1.23482
95	0.80906	1.22245	0.80074	1.23345
96	0.81000	1.22117	0.80172	1.23211
97	0.81093	1.21992	0.80269	1.23079
98	0.81185	1.21868	0.80364	1.22949
99	0.81275	1.21746	0.80458	1.22822

NOTE: Table S was generated using the SAS© code below. Users can compute other level Confidence Intervals by changing the alpha-value. Table S is a modified version of Table 40 (80).

```
* Program to compute confidence intervals for expectations of Poisson variables ;
* Specify alpha for alpha*100% Confidence Interval  ;

%let alpha = .95;

data CI ;

    alo  = (1-&alpha)/2 ;
    ahi  = (&alpha+1)/2 ;

do n = 1 to 99;

   L = Gaminv ( alo,n )/n ;
   U = Gaminv (ahi,n+1)/n ;

 output;
 end;

proc print data= CI;
   var n  L U ;

run;
```