TECHNICAL APPENDIX FROM

VITAL STATISTICS OF UNITED STATES

1995

MORTALITY

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

PUBLIC HEALTH SERVICE

CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL CENTER FOR HEALTH STATISTICS

Hyattsville, Maryland: April 1999

ACKNOWLEDGMENTS

A copy of the technical appendix may be obtained by contacting the National Center for Health Statistics, Mortality Statistics Branch at 301-436-8884.

**VITAL STATISTICS OF THE UNITED STATES: MORTALITY, 1995
TECHNICAL APPENDIX**

VITAL STATISTICS OF THE UNITED STATES: MORTALITY, 1995
TECHNICAL APPENDIX

VITAL STATISTICS OF THE UNITED STATES: MORTALITY, 1995
TECHNICAL APPENDIX

Sources of data

Death statistics

Mortality statistics for 1995 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. 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, and the Virgin Islands are presented separately from data for the United States. No data are included for American Samoa or the Commonwealth of the Northern Marianas.

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.

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, mortality statistics for 1995 are based on information obtained directly by NCHS from copies of the original certificates received from the registration office.

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 41 States now furnishing such data. In 1995 Maine, Montana, North Dakota, and Wyoming contracted with a private company to provide precoded medical data to NCHS. Kansas provided the medical data for Alaska. The remaining 9 VSCP States, New York City, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam 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
Oklahoma	New Mexico
Rhode Island	

For 1995 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 the State vital statistics law. 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 the national vital statistics agency 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 7-A (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 1995 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. For the United States (50 States and the District of Columbia), deaths of nonresidents 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, and other territories of the United States. Similarly, for Puerto Rico and for the Virgin Islands, deaths of nonresidents refers to deaths that occurred to a resident of any place other than Puerto Rico and the Virgin Islands, 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.

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 1995 this difference amounted to 3,119 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 another instruction manual (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, or Guam--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 1995, 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 record is the age at last birthday, the same as the age classification used by the U.S. Bureau of the Census. For 1995 data, 463 resident death records (0.02 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.

Race

For vital statistics in the United States in 1995, 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 showing five additional Asian or Pacific Islander groups. These groups are Asian Indian, Korean, Samoan, Vietnamese, and Guamanian. These groups are coded only for deaths occurring in California, Hawaii, Illinois, New Jersey, New York, Texas, and Washington. 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). This additional race detail is available on the mortality public-use data tapes (10,11) and in tabular form. Beginning with 1992 data, all records coded as "other races" (0.02 percent of the total deaths in 1995) 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 the race is given as a mixture of white and any other race, the entry is coded to the appropriate nonwhite race. If a mixture of races other than white is given (except Hawaiian), the entry is coded to the first race listed. This procedure for coding the first race listed has been used since 1969. Before 1969 if the entry for race was a mixture of black and any other race except Hawaiian, the entry was coded to black.

Race not stated--For 1995 the number of death records for which race was unknown, not stated, or not classifiable was 1,954 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 self-reported or reported by a member of the household 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 (12). 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 1.0 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 29,713 death certificates were compared with responses to the race questions from a total of 12 CPS's conducted by the U.S. Bureau of the Census for the years 1979-85 (13). The ratio between the two sources for white and black decedents was 1.0 as in the earlier study, however, the ratio for American Indian was 1.22 indicating that 22 percent more decedents were identified as American Indian in the census source as compared to the death certificate. The ratio for Asians was 1.12 (table A). 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 the smaller minority races.

Hispanic deaths

Mortality statistics for the Hispanic population are based on information for those States and the District of Columbia that included items on the death certificate to identify Hispanic or ethnic origin of decedents. Data for 1995 were obtained from the District of Columbia and all States except Oklahoma, which was excluded because its death certificate did not include an item to identify Hispanic or ethnic origin.

Hispanic mortality data were published for the first time in 1984. Generally, the reporting States 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). By comparison, population estimates for Mexicans, Puerto Ricans, Cubans, and Other Hispanics are based in part on the Current Population Survey (15). Rates using the latter, therefore, are subject to sampling variation as well as random variation (see "Random variation and sampling errors").

The 49 States and the District of Columbia accounted for about 99.6 percent of the Hispanic population in the United States in 1990. This included about 99.5 percent of the Mexican population, 99.8 percent of the Puerto Rican population, 99.9 percent of the Cuban population, and 99.7 percent of the "Other Hispanic" population (9). For qualifications regarding infant mortality of the Hispanic-origin population, see "Infant deaths."

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. In 1995 of the 70,752 deaths occurring in New York City, only 3 percent were coded to Unknown origin. Similarly, 4 percent were coded to unknown origin in 1994 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 (13). The ratio of deaths for CPS divided by deaths for death certificate was 1.07 percent indicating net underreporting of Hispanic origin on death certificates as compared with self-reports on the surveys. The sample was too small to assess the reliability of specified Hispanic groups.

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. Several reports analyzing mortality by marital status have been published, including the special study based on 1959-61 data (16). Reference to 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 2,267,097 resident deaths 15 years of age and over in 1995, 9,705 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 (15). 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

Beginning with the 1989 data year, mortality data on educational attainment have been tabulated 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+)

For 1995, mortality data on educational attainment were reported by 46 States and the District of Columbia. Georgia, Oklahoma, Rhode Island, and South Dakota did not include an educational attainment item on their death certificate.

Selected mortality tables on educational attainment are based on deaths to residents of 45 States and the District of Columbia whose data were approximately 80 percent or more complete on a place-of-occurrence basis. In addition to the four States mentioned previously, data for Kentucky are excluded from these tables because more than 20 percent of their death certificates were classified to "unknown educational attainment."

Injury at work

Deaths for "Injury at work" were included on the 1993 public-use data tapes 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 1995 public-use data tapes 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 1995, the occupation and industry mortality data were included for the following 19 reporting States:

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

Data for 1993-95 were coded using the revised NCHS Part 19 instruction manual (17) 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 (18).

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 (17).

In addition to the codes shown in the Bureau of the Census publication (18), the following special codes were created:

Occupation	Industry
913 Retired	961 Own Home/At Home
914 Housewife/	970 Retired
Homemaker	990 Blank, Unknown, NA
915 Student	
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 1994 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.

Except for Oklahoma, 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 three causes, for which the greatest interest in date of occurrence of death has been expressed: Motor vehicle accidents, Suicide, and Homicide and legal intervention.

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" (19).

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 1979, the cause-of-death statistics published by NCHS have been classified according to the Ninth Revision of the *International Classification of Diseases* (ICD-9) (19).

Five lists of causes have been developed by NCHS for tabulation and publication of mortality data--the Each-Cause List, List of 282 Selected Causes of Death, List of 72 Selected Causes of Death, List of 61 Selected

Causes of Infant Death, and List of 34 Selected Causes of Death. These lists were designed to be as comparable as possible with the NCHS lists used under the Eighth Revision. However, complete comparability could not always be achieved.

The Each-Cause List is made up of each three-digit category of the WHO Detailed List to which deaths may be validly assigned and most four-digit subcategories. This list is used for the tabulation of data for the entire United States. The Each-Cause table in *Vital Statistics of the United States* does not show the four-digit or special five-digit subcategories provided for Motor vehicle accidents (E810-E825). The four-digit subcategories that identify persons injured and the five-digit subcategories that identify place of accident for deaths from nontransport accidents are tabulated separately.

The List of 282 Selected Causes of Death is constructed to be compatible with the recommended WHO lists for tabulating mortality data in ICD-9. This list is used for tabulating both State and national mortality data.

The List of 72 Selected Causes of Death was, in part, constructed by combining titles in the List of 282 Selected Causes of Death. It is used in tabulating data for the entire United States and each State and for Metropolitan statistical areas and for ranking leading causes of death excluding infants. (See "Cause-of-death ranking".)

The List of 61 Selected Causes of Infant Death shows more detailed titles for Congenital anomalies and Certain conditions originating in the perinatal period than any other list except the Each-Cause List, and is used for ranking infant causes of death. (See "Cause-of-death ranking".)

The List of 34 Selected Causes of Death was created by combining titles in the List of 72 Selected Causes. This list is used for tabulating data by detailed geographic area.

Beginning with data for 1987, changes were made in these lists to accommodate the introduction in the United States of new categories *042-*044 for Human immunodeficiency virus (HIV) infection. The changes are described in the Technical Appendix from *Vital Statistics of the United States*, 1987. To facilitate data use, beginning with data for 1994, the categories for HIV infection (*042-*044) and Alzheimer's disease (ICD-9 No. 331.0) are included separately at the bottom of tables showing the List of 72 Selected Causes of Death and the List of 282 Selected Causes of Death. They are also subsumed in categories of the list.

Effect of ICD revisions--The International Classification of Diseases (ICD), used in the United States since 1900, has been revised approximately every 10 years so the 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. Cause-of-death statistics beginning with 1979 are classified by NCHS according to ICD-9 (19). For a discussion of each of the classifications used with death statistics since 1900, see *Vital Statistics of the United States*, 1979, Volume II, Mortality, Part A, section 7, pages 9-14.

Revisions of the ICD cause discontinuities in cause of death statistics because of changes in the classification or in the rules for selecting and modifying the underlying cause of death. To measure the discontinuity, dual coding studies have been carried out since the Fifth Revision of the ICD (1940). A dual coding study was undertaken between the Ninth and the Eighth Revisions (20). For additional information about these studies, see the Technical Appendix from *Vital Statistics of the United States*, 1979.

Significant coding changes under the Ninth Revision--Since the implementation of ICD-9 in the United States, effective with mortality data for 1979, several coding changes have been introduced that are described in detail in *Vital Statistics of the United States* for the years in which they were introduced. The more important changes are: 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 indicate these codes are 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.

Coding in 1995--The rules and instructions used in coding 1995 mortality medical data remained essentially the same as those used for the 1994 data.

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 (21), 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 Ninth Revision, Chapter XVI, Symptoms, signs, and ill-defined conditions (ICD-9 Nos. 780-799). Although deaths occur for which it is impossible to determine the underlying cause, this proportion 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 1995, 1.2 percent of all reported deaths in the United States were assigned to this category. The percent of deaths assigned to this category remained stable at 1.5 percent from 1981 to 1987, but has declined slightly since then.

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) (22), 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 intercoder 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 consistently 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 (22,23,24).

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) (25,26), 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 (27). In the first year of implementation, only about 5 percent of the Nation's death records were coded using MICAR with subsequent processing through ACME. This percentage increased from 26 percent in 1991 to 35 percent in 1992, 59 percent in 1993, 72 percent in 1994, and 74 percent in 1995. States whose data were coded by MICAR in 1995 included Alabama, Arizona,

Arkansas, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Missouri, Nebraska, Nevada, New Jersey, New York (excluding New York City), New York City, North Carolina, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, and West Virginia. For these States, MICAR processed about 88 percent of the mortality records with an average system error rate of 0.17 on an underlying cause basis, and a rate of 0.32 on a multiple-cause basis. Records that MICAR was unable to process were coded manually and then processed using ACME.

Beginning with data year 1993, another computer system was implemented for automating cause-of-death coding. This system, called SuperMICAR, is an enhancement of the MICAR 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 SuperMICAR with subsequent processing through MICAR and ACME. This percentage increased from 9 percent in 1993 to 12 percent in 1994, and 14 percent in 1995. States using SuperMICAR in 1995 included Colorado, Connecticut, Hawaii, Idaho, Michigan, Minnesota, New Hampshire, New Mexico, Oklahoma, Oregon, Rhode Island, and Wisconsin. In 1995, for these States, SuperMICAR processed about 75 percent of the mortality records with an average system error rate of 0.59 on an underlying cause basis, and a rate of 1.17 on a multiple-cause basis. Records that SuperMICAR was unable to process were coded manually and then processed using ACME.

Cause-of-death ranking--Cause-of-death ranking except for infants is based on numbers of deaths assigned to categories in the List of 72 Selected Causes of Death, Human immunodeficiency virus infection (*042-*044), and Alzheimer's disease (ICD-9 No. 331.0). Added to the list of rankable causes was HIV infection, effective with data year 1987 and Alzheimer's disease, effective with data year 1994. Cause-of-death ranking for infants is based on the List of 61 Selected Causes of Infant Death and HIV infection (added to the list of rankable causes of infant death effective with data year 1987).

The group titles Major cardiovascular diseases and Symptoms, signs, and ill-defined conditions from the List of 72 Selected Causes of Death are not ranked; Certain conditions originating in the perinatal period and Symptoms, signs, and ill-defined conditions from the List of 61 Selected Causes of Infant Death are not ranked. In addition, category titles beginning with the words "Other" or "All other" are not ranked to determine the leading causes of death. When one of the titles representing a subtotal is ranked (such as Tuberculosis), its component parts (in this case, Tuberculosis of respiratory system and Other tuberculosis) are not ranked.

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-9 Nos. 630-676). In the Ninth Revision, WHO for the first time defined a maternal death as follows:

A maternal death is defined as the death of a woman 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.

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 have been expanded to include Indirect obstetric causes (ICD-9 Nos. 647-648). These causes include 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.

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.

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 1989-95 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" (28).

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 (29,30). 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 (31,32,33).

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 (32).

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 1989-95 data, and that 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" (28).

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 (34).

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 (34).

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 B 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 1.0; 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 (35).

Hispanic origin--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 49 States and the District of Columbia. Data for Oklahoma were excluded, because Oklahoma did not include an item on Hispanic origin on its death certificate. 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 1995 was 1.7 percent and the percent of live births of unknown origin was 1.5 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 C 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 (35).

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.

Amended records for Alaska--Numbers of deaths for selected causes occurring in Alaska for 1995 are in error because NCHS did not receive changes resulting from amended records. An estimate of the effect of these omissions can be derived by comparing NCHS counts of records processed through the VSCP with counts prepared by Alaska as shown in table D. Differences are concentrated among selected causes of death, principally Symptoms, signs, and ill-defined conditions (ICD-9 Nos. 780-799) and external causes.

Quality control procedures

Demographic items on the death certificate--As previously indicated, for 1995 the mortality data for these items were obtained from two sources--photocopies of the original certificates furnished by Guam and electronic data records furnished by the 50 States, the District of Columbia, New York City, Puerto Rico, and the Virgin Islands. For Guam, which sent only copies of the original certificates, the demographic items were coded for 100 percent of the death certificates. The demographic coding for 100 percent of the certificates was independently verified.

For areas sending electronic data records, a sample of 70-80 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 1995 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. For the 41 States sending electronic files, the average outgoing error rate in 1995 was estimated at 2.8 percent for underlying cause data, and 5.5 percent for multiple cause-of-death data.

For the remaining 9 States, the District of Columbia, New York City, Puerto Rico, the Virgin Islands, and Guam, NCHS coded the medical items for all the death records. A 1-percent sample of the records was coded independently for quality control purposes. The estimated average error rate for underlying cause for these areas was 3.6 percent.

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 (36). Further, conditions specified on a list of infrequent or rare causes of death are confirmed by the certifier or a State health officer. 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 1900-95 are shown in table E. In addition, the population including Armed Forces abroad is shown for the United States. Table F lists the sources for these populations.

Populations for 1995--Population estimates of the United States by age, race, and sex for 1995 are shown in table G (37). The 1995 estimates are consistent with those for 1990-94. Population estimates for each State by age for 1995 are shown in table H (38). 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: Total of 49 States and the District of Columbia, 1995 (see table I) (15)
- Estimated population for ages 15 years and over by 5-year age groups, marital status, race, and sex: United States, 1995 (see table J) (15)
- Estimated population for ages 15 years and over, by 5-year age groups, marital status, Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, 1995 (see table K) (15)

Population estimates by specified Hispanic origin and by marital status groups 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").

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 (39). 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) (40) 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 (39). 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 (41). 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 (42). 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-5, 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 (39). 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 (43). 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 (44-47). 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 1995 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 L). 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 M). 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 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 (48). 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 (relative age distribution of 1940 enumerated population of the United States totaling 1,000,000 (30)). By using the same standard population, the rates for the total population and for each race-sex group were adjusted separately. It is important not to compare age-adjusted death rates with crude rates. The U.S. standard population and corresponding weights (w_i) are as follows:

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, 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....................	567,907	1.000000
25-34 years............................	162,066	0.285374
35-44 years............................	139,237	0.245176
45-54 years............................	117,811	0.207448
55-64 years............................	80,294	0.141386
65-74 years............................	48,426	0.085271
75 years and over....................	20,073	0.035346

Life tables

U.S. abridged life tables are constructed by reference to a standard table (49). Life tables for the decennial period 1979-81 are used as the standard life tables in constructing the 1980-95 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 (50).

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.

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 (51). The probable range of values may be estimated from the actual figures according to certain statistical assumptions.

In general, distributions of vital events may be assumed to follow the binomial distribution. 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. Such infrequent events may be assumed to follow a Poisson probability 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. Mortality data may also be subject to non-sampling errors.

Populations-Population estimates of the United States and for each State by age, race, total Hispanic origin, and sex for 1995 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) and by specified marital status groups (never married, married, widowed, and divorced) 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. The 3-year average infant mortality rates for the three-year period are computed by dividing the total number of infant deaths for a class for that period by the sum of the live births of a similarly defined class for the three-year period and multiplying that result by 100,000 (or 1,000).

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

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, non-Hispanic black for **all** marital status groups combined*:

<u>*Age-specific and crude death rates*</u>--

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

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 N

Age-adjusted death rates--

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

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: $R'' * L(1- \alpha =.95, D_{adj})$
    Upper: $R'' * U(1- \alpha =.95, D_{adj})$

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 ith age group
    D_i = total number of deaths for the ith age group upon which age-specific rate is based

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

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 N

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

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

<u>*Age-specific and crude death rates*</u>--

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

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

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

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

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)

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

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

Age-adjusted death rates--

$$RSE(R'') = 100 \frac{\sqrt{\sum\left(w_i^2 * R_i^2 \left(\frac{1}{D_i} + f\left(a + \frac{b}{P_i}\right)\right)\right)}}{R''}$$

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 ith age group
   D_i = total number of deaths for the ith 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 ith 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)

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

   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 N

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

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

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

   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, and marital status classifications, by whether the population-based rate was based on a single year or 3-year average:

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	$f = 0.670$ $a = -0.000017$ $b = 4,786$	$f = 0.440$ $a = -0.000017$ $b = 14,358$
Black, non-Hispanic black; by never married, married, widowed, divorced	$f = 0.670$ $a = -0.000204$ $b = 6,865$	$f = 0.440$ $a = -0.000204$ $b = 20,595$
Asian or Pacific Islander; by never married, married, widowed, divorced	$f = 0.670$ $a = -0.000719$ $b = 6,865$	$f = 0.440$ $a = -0.000719$ $b = 20,595$
Mexican, Puerto Rican, Cuban, Other Hispanic; all marital status groups combined, never married, married, widowed, divorced	$f = 0.670$ $a = -0.000297$ $b = 6,865$	$f = 0.440$ $a = -0.000297$ $b = 20,595$

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: $IMR * L(1 - \alpha = .95, D_{adj})$
Upper: $IMR * U(1 - \alpha = .95, D_{adj})$

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

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

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

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

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.

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 N:

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

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

$$Lower = 61.5 - \left(1.96 * 61.5 * \frac{5.00}{100} \right) = 55.5$$

$$Upper = 61.5 + \left(1.96 * 61.5 * \frac{5.00}{100} \right) = 67.5$$

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

References

1. Tolson GC, Barnes JM, Gay GA, Kowaleski JL. The 1989 revision of the U.S. standard certificates and reports. National Center for Health Statistics. Vital Health Stat 4(28). 1991.

2. Hetzel AM. U.S. vital statistics system: major activities and developments, 1950-95. National Center for Health Statistics. 1997.

3. National Center for Health Statistics. Vital statistics, demographic classification, and coding instructions for death records, 1995. NCHS instruction manual; part 4. Hyattsville, Maryland: Public Health Service. 1995.

4. McCarthy MA. Comparison of the classification of place of residence on death certificates and matching census records: United States, May-August 1960. National Center for Health Statistics. Vital and Health Stat 2(30). 1969.

5. National Center for Health Statistics. Vital statistics, vital records geographic classification, 1994. NCHS instruction manual; part 8. Hyattsville, Maryland: Public Health Service. 1993.

6. U.S. Bureau of the Census. Population of metropolitan areas and component geography: 1990 and 1980 (6-30-93 definitions). CPH-L-145. Washington: U.S. Department of Commerce. 1993.

7. U.S. Department of Commerce. Metropolitan statistical areas classification. Federal register; vol 45 no 2. Washington: U.S. Government Printing Office, 956-62. 1980.

8. U.S. Office of Management and Budget. Standard metropolitan statistical areas, rev. ed. Washington: U.S. Government Printing Office, 89-90. 1975.

9. U.S. Bureau of the Census. 1990 Census of population. General population characteristics; (1990 CP-1-1). Washington: U.S. Department of Commerce. 1992.

10. National Center for Health Statistics. Public use data file documentation: Mortality detail 1995 data. Hyattsville, Maryland: Public Health Service. 1997.

11. National Center for Health Statistics. Public use data file documentation: Multiple cause of death for ICD-9 1995 data. Hyattsville, Maryland: Public Health Service. 1997.

12. Hambright TZ. Comparability of marital status, race, nativity, and country of origin on the death certificate and matching census record: United States, May-August 1960. National Center for Health Statistics. Vital Health Stat 2(34). 1969.

13. Sorlie PD, Rogot E, Johnson NJ. Validity of demographic characteristics on the death certificate. Epidemiology 3(2):181-4. 1992.

14. Poe GS, Powell-Griner E, McLaughlin JK, et al. Comparability of the death certificate and the 1986 national mortality followback survey. National Center for Health Statistics. Vital Health Stat 2(118). 1993.

15. U.S. Bureau of the Census. Population estimates based on unpublished tabulations prepared by the Housing and Household Economic Statistics Division. 1996.

16. Klebba AJ. Mortality from selected causes by marital status: United States, parts A and B. National Center for Health Statistics. Vital Health Stat 20(8a) and 20(8b). 1970.

17. National Center for Health Statistics. Industry and occupation coding for death certificates, 1993. NCHS instruction manual, Part 19. Hyattsville, Maryland: Public Health Service. 1992.

18. U.S. Bureau of the Census. Classified index of industries and occupations. 1990 Census of Population and Housing. Washington: U.S. Department of commerce. 1992.

19. World Health Organization. Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, based on the recommendations of the Ninth Revision Conference, 1975. Geneva: World Health Organization. 1977.

20. National Center for Health Statistics. Estimates of selected comparability ratios based on dual coding of 1976 death certificates by the Eighth and Ninth Revisions of the International Classification of Diseases. Monthly vital statistics report; vol 28 no 11, suppl. Hyattsville, Maryland: Public Health Service. 1980.

21. Gittelsohn A, Royston PN. Annotated bibliography of cause-of-death validation studies, 1958-80. National Center for Health Statistics. Vital Health Stat 2(89). 1982.

22. National Center for Health Statistics. Vital statistics, ICD-9 ACME decision tables for classifying underlying causes of death, 1991. NCHS instruction manual; part 2c. Hyattsville, Maryland: Public Health Service. Published annually.

23. National Center for Health Statistics. Instructions for classifying multiple causes of death. NCHS instruction manual; part 2b. Hyattsville, Maryland: Public Health Service. Published annually.
24. National Center for Health Statistics. Nonindexed terms, standard abbreviations, and state geographic codes used in mortality data classification. NCHS instruction manual; part 2e. Hyattsville, Maryland: Public Health Service. Published annually.
25. National Center for Health Statistics. Vital statistics, data entry instructions for the mortality medical indexing, classification, and retrieval system (MICAR). NCHS instruction manual; part 2g. Hyattsville, Maryland: Public Health Service. Published annually.
26. National Center for Health Statistics. Vital statistics, dictionary of valid terms for the mortality medical indexing, classification, and retrieval system (MICAR). NCHS instruction manual; part 2h. Hyattsville, Maryland: Public Health Service. Published annually.
27. Harris KW, Rosenberg HM, Kochanek KD, et al. Evaluation of an automated multiple causes of death coding system. In: American Statistical Association. 1993 Proceedings of the social statistics section. Alexandria, Virginia: American Statistical Association. 262-5. 1993.
28. Hoyert DL. Effect on mortality rates of the 1989 change in tabulating race. National Center for Health Statistics. Vital Health Stat 20(25). 1994.
29. Guralnick L, Winter ED. A note on cohort infant mortality rates. Public Health Rep 80:692-4. 1965.
30. Grove RD, Hetzel AM. Vital statistics rates in the United States, 1940-60. National Center for Health Statistics. Washington: Public Health Service. 1968.
31. McCarthy B, Terry J, Rochat R, et al. The underregistration of neonatal deaths: Georgia 1974-77. Am J Public Health 70:977-82. 1980.
32. Linder FE, Grove RD. Vital statistics rates in the United States, 1900-40. Washington: National Office of Vital Statistics. 1947.
33. Chase HC, Weiner L, Garfinkel J. Vital signs present at birth. National Center for Health Statistics. Vital and Health Stat 2(46). 1972.
34. Frost F, Shy KK. Racial differences between linked birth and infant death records in Washington State. Am J Public Health 70:974-6. 1980.
35. MacDorman MF, Atkinson JO. Infant mortality statistics from the 1996 period linked birth/infant death data set. Monthly vital statistics report; vol 46 no 12, supp. Hyattsville, Maryland: National Center for Health Statistics. 1998.
36. National Center for Health Statistics. Vital statistics, computer edits for mortality data, effective 1989. NCHS instruction manual; part 11. Hyattsville, Maryland: Public Health Service. 1989.
37. U.S. Bureau of the Census. U.S. population estimates by age, sex, race, and Hispanic origin: July 1, 1995. Census file RESD0795. 1996.
38. U.S. Bureau of the Census. Estimates of the resident population of States by age and sex for July 1, 1995. Census file 95AG795. 1996.
39. U.S. Bureau of the Census. U.S. population estimates by age, sex, race, and Hispanic origin: 1980-91. Current population reports; series P-25, no 1095. Washington: U.S. Department of Commerce. 1993.
40. Executive Office of the President. Office of Management and Budget. Statistical Policy Directive No. 15. Race and ethnic standards for federal statistics and administrative reporting.
41. National Center for Health Statistics. Technical appendix. Vital statistics of the United States, 1980, vol II, mortality, part A. Washington: Public Health Service. 1985.
42. U.S. Bureau of the Census. Coverage of the national population in the 1980 census by age, sex, and race. Preliminary estimates by demographic analysis. Current population reports; series P-23, no 115. Washington: U.S. Department of Commerce. 1982.
43. Hambright TZ. Comparability of age on the death certificate and matching census records: United States, May-August 1960. National Center for Health Statistics. Vital Health Stat 2(29). 1968.
44. U.S. Bureau of the Census. Estimates of coverage of the population by sex, race, and age--demographic analysis: 1970 census of population and housing. PHC(E)-4. Washington: U.S. Department of Commerce. 1974.
45. U.S. Bureau of the Census. Developmental estimates of the coverage of the population of States in the 1970 census--demographic analysis. Current population reports; series P-23, no 65. Washington: U.S. Department of Commerce. 1977.

46. Passel JS, Robinson JG. Revised demographic estimates of the coverage of the population by age, sex, and race in the 1980 Census. Unpublished memorandum, U.S. Bureau of the Census. Washington: U.S. Department of Commerce. 1985.

47. U.S. Bureau of the Census. Estimates of population of the United States by age, sex, and race: 1980 to 1985. Current population reports; series P-25, no 985. Washington: U.S. Department of Commerce. 1986.

48. Feinleib M, Zarate AO, eds. Reconsidering age adjustment procedures: Workshop proceedings. National Center for Health Statistics. Vital Health Stat 4(29). 1992.

49. Sirken MG. Comparison of two methods of constructing abridged life tables by reference to a "standard" table. National Center for Health Statistics. Vital Health Stat 2(4). 1966.

50. Greville TNE, Carlson GA. Estimated average length of life in the death-registration States. Vital statistics-Special reports. vol 33 no 9. National Center for Health Statistics. Washington: Public Health Service. 1951.

51. Chiang CL. Standard error of the age-adjusted death rate. Vital statistics-Special reports. vol 47 no 9. National Center for Health Statistics. Washington: Public Health Service. 1961.

52. Pearson, ES, Hartley, HO. Biometrika tables for statisticians, vol I. Cambridge University Press. 1966.

Table A. Comparison of percent agreement and ratio of deaths for census or survey record to deaths by race for matching death certificate: 1960 and 1979-85

Race	Census		NLMS[1]	
	Percent agreement	Ratio census/ death certificate	Percent agreement	Ratio CPS[2]/ death certificate
White............................	99.8	1.00	99.2	1.00
Black............................	98.2	1.00	98.2	1.00
American Indian............	79.2	1.12	73.6	1.22
Asian............................	---	...	82.4	1.12
Japanese........................	97.0	1.04	...	...
Chinese	90.3	1.07	...	...
Filipino	72.6	1.28	...	...

--- Data not available.

... Category not applicable.

[1] NLMS is defined as National Longitudinal Mortality Study.

[2] CPS is defined as Current Population Survey.

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; Sorlie PD, Rogot E, Johnson NJ. Validity of demographic characteristics on the death certificate. Epidemiology 3(2):181-4. 1992.

Table B. 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	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

SOURCE: Rosenberg H, Maurer JD, Sorlie PD, Johnson NJ, MacDorman M, Hoyert DL, Spitler JF, Scott C. Quality of death rates by race and Hispanic origin: a summary. National vital statistics reports (forthcoming).

Table C. 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 [1]	Hispanic origin from birth certificate	
All origins [2]	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 [3]	5.3	5.9	1.11
Non-Hispanic total [4]	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] Data excludes Oklahoma which did not have a question on Hispanic origin on its death certificate.

[2] Includes Hispanic origin not stated.

[3] Includes Central and South American and Other and unknown Hispanic.

[4] Includes races other than white and black.

SOURCE: Rosenberg H, Maurer JD, Sorlie PD, Johnson NJ, MacDorman M, Hoyert DL, Spitler JF, Scott C. Quality of death rates by race and Hispanic origin: a summary. National vital statistics reports (forthcoming).

Table D. Numbers of deaths and ratios of deaths for selected causes as tabulated by State of occurrence and NCHS, 1995

[Data by place of occurrence include deaths of nonresidents. Numbers after causes of death are category numbers of the Ninth Revision, International Classification of Diseases, 1975]

Causes	Alaska	NCHS	Ratio AK/NCHS
All causes..	2,546	2,546	1.00
Symptoms, signs, and ill-defined conditions....................780-799	42	43	0.98
Accidents and adverse effects......................................E800-E949	368	376	0.98
Motor vehicle accidents...E810-E825	105	96	1.09
All other accidents and adverse effects....E800-E807,E826-E949	263	280	0.94
Suicide...E950-E959	118	105	1.12
Homicide and legal intervention..................................E960-E978	56	55	1.02
All other external causes..E980-E999	7	11	0.64

Table E. Population of birth- and death-registration States, 1900-1932, and United States, 1900-1995

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

| | United States[1] | | | United States[1] | | Birth-registration States | | Death-registration States | |
Year	Population including Armed Forces abroad	Population residing in area	Year	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
1995	263,033,968	262,755,270	1947	144,126,000	143,446,000	. . .	. . .	. . .	. . .
1994	260,650,842	260,340,990	1946	141,389,000	140,054,000	. . .	. . .	. . .	. . .
1994	258,119,768	257,783,004	1945	139,928,000	132,481,000	. . .	. . .	. . .	. . .
1992	255,457,501	255,077,536	1944	138,397,000	132,885,000	. . .	. . .	. . .	. . .
1991	252,688,000	252,177,000	1943	136,739,000	134,245,000	. . .	. . .	. . .	. . .
1990	249,225,000	248,709,873	1942	134,860,000	133,920,000	. . .	. . .	. . .	. . .
1989	247,342,000	246,819,000	1941	133,402,000	133,121,000	. . .	. . .	. . .	. . .
1988	245,021,000	244,499,000	1940	131,820,000	131,669,275	. . .	. . .	. . .	. . .
1987	242,804,000	242,289,000	1939	131,028,000	130,879,718	. . .	. . .	. . .	. . .
1986	240,651,000	240,133,000	1938	129,969,000	129,824,939	. . .	. . .	. . .	. . .
1985	238,466,000	237,924,000	1937	128,961,000	128,824,829	. . .	. . .	. . .	. . .
1984	236,348,000	235,825,000	1936	128,181,000	128,053,180	. . .	. . .	. . .	. . .
1983	234,307,000	233,792,000	1935	127,362,000	127,250,232	. . .	. . .	. . .	. . .
1982	232,188,000	231,664,000	1934	126,485,000	126,373,773	. . .	. . .	. . .	. . .
1981	229,966,000	229,466,000	1933	125,690,000	125,578,763	. . .	. . .	. . .	. . .
1980	227,061,000	226,545,805	1932	124,949,000	124,840,471	47	118,903,899	47	118,903,899
1979	225,055,000	224,567,000	1931	124,149,000	124,039,648	46	117,455,229	47	118,148,987
1978	222,585,000	222,095,000	1930	123,188,000	123,076,741	46	116,544,946	47	117,238,278
1977	220,239,000	219,760,000	1929	- - -	121,769,939	46	115,317,450	46	115,317,450
1976	218,035,000	217,563,000	1928	- - -	120,501,115	44	113,636,160	44	113,636,160
1975	215,973,000	215,465,000	1927	- - -	119,038,062	40	104,320,830	42	107,084,532
1974	213,854,000	213,342,000	1926	- - -	117,399,225	35	90,400,590	41	103,822,683
1973	211,909,000	211,357,000	1925	- - -	115,831,963	33	88,294,564	40	102,031,555
1972	209,896,000	209,284,000	1924	- - -	114,113,463	33	87,000,295	39	99,318,098
1971	207,661,000	206,827,000	1923	- - -	111,949,945	30	81,072,123	38	96,788,197
1970	204,270,000	203,211,926	1922	- - -	110,054,778	30	79,560,746	37	92,702,901
1969	202,677,000	201,385,000	1921	- - -	108,541,489	27	70,807,090	34	87,814,447
1968	200,706,000	199,399,000	1920	- - -	106,466,420	23	63,597,307	34	86,079,263
1967	198,712,000	197,457,000	1919	105,063,000	104,512,110	22	61,212,076	33	83,157,982
1966	196,560,000	195,576,000	1918	104,550,000	103,202,801	20	55,153,782	30	79,008,412
1965	194,303,000	193,526,000	1917	103,414,000	103,265,913	20	55,197,952	27	70,234,775
1964	191,889,000	191,141,000	1916	- - -	101,965,984	11	32,944,013	26	66,971,177
1963	189,242,000	188,483,000	1915	- - -	100,549,013	10	31,096,697	24	61,894,847
1962	186,538,000	185,771,000	1914	- - -	99,117,567	. . .	. . .	24	60,963,309
1961	183,691,000	182,992,000	1913	- - -	97,226,814	. . .	. . .	23	58,156,740
1960	179,933,000	179,323,175	1912	- - -	95,331,300	. . .	. . .	22	54,847,700
1959	177,264,000	176,513,000	1911	- - -	93,867,814	. . .	. . .	22	53,929,644
1958	174,141,000	172,320,000	1910	- - -	92,406,536	. . .	. . .	20	47,470,437
1957	171,274,000	170,371,000	1909	- - -	90,491,525	. . .	. . .	18	44,223,513

Table E. Population of birth- and death-registration States, 1900-1932, and United States, 1900-1995

[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
1956	168,221,000	167,306,000	1908	- - -	88,708,976	. . .	. . .	17	38,634,759
1955	165,275,000	164,308,000	1907	- - -	87,000,271	. . .	. . .	15	34,552,837
1954	162,391,000	161,164,000	1906	- - -	85,436,556	. . .	. . .	15	33,782,288
1953	159,565,000	158,242,000	1905	- - -	83,819,666	. . .	. . .	10	21,767,980
1952	156,954,000	155,687,000	1904	- - -	82,164,974	. . .	. . .	10	21,332,076
1951	154,287,000	153,310,000	1903	- - -	80,632,152	. . .	. . .	10	20,943,222
1950	151,132,000	150,697,361	1902	- - -	79,160,196	. . .	. . .	10	20,582,907
1949	149,188,000	148,665,000	1901	- - -	77,585,128	. . .	. . .	10	20,237,453
1948	146,631,000	146,093,000	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 F. Source for resident population and population including Armed Forces abroad:
Birth- and death-registration States, 1900-32, and United States, 1900-95

Year	Source
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 G. Estimated population of the United States, by 5-year age groups, race, and sex: July 1, 1995

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

Age	All races			White			All other					
	Both sexes	Male	Female	Both sexes	Male	Female	Total			Black		
							Both sexes	Male	Female	Both sexes	Male	Female
All ages	262,755,270	128,313,798	134,441,472	218,085,421	106,993,635	111,091,786	44,669,849	21,320,163	23,349,686	33,141,148	15,721,074	17,420,074
Under 1 year	3,848,106	1,969,872	1,878,234	3,014,707	1,547,420	1,467,287	833,399	422,452	410,947	621,144	314,438	306,706
1-4 years	15,743,042	8,055,333	7,687,709	12,436,458	6,376,721	6,059,737	3,306,584	1,678,612	1,627,972	2,478,716	1,255,910	1,222,806
5-9 years	19,219,956	9,843,300	9,376,656	15,236,617	7,818,268	7,418,349	3,983,339	2,025,032	1,958,307	3,025,305	1,534,797	1,490,508
10-14 years	18,914,532	9,685,241	9,229,291	15,039,772	7,720,711	7,319,061	3,874,760	1,964,530	1,910,230	2,876,972	1,459,558	1,417,414
15-19 years	18,064,517	9,265,025	8,799,492	14,362,303	7,390,200	6,972,103	3,702,214	1,874,825	1,827,389	2,821,796	1,430,218	1,391,578
20-24 years	17,882,118	9,087,045	8,795,073	14,317,137	7,323,846	6,993,291	3,564,981	1,763,199	1,801,782	2,637,568	1,299,324	1,338,244
25-29 years	19,005,343	9,529,765	9,475,578	15,402,702	7,795,910	7,606,792	3,602,641	1,733,855	1,868,786	2,594,461	1,239,775	1,354,686
30-34 years	21,867,796	10,902,150	10,965,646	17,984,412	9,062,225	8,922,187	3,883,384	1,839,925	2,043,459	2,825,366	1,325,134	1,500,232
35-39 years	22,248,914	11,071,207	11,177,707	18,458,496	9,282,016	9,176,480	3,790,418	1,789,191	2,001,227	2,787,896	1,307,303	1,480,593
40-44 years	20,218,805	9,990,476	10,228,329	16,929,523	8,460,555	8,468,968	3,289,282	1,529,921	1,759,361	2,390,339	1,108,770	1,281,569
45-49 years	17,448,898	8,559,836	8,889,062	14,858,289	7,370,499	7,487,790	2,590,609	1,189,337	1,401,272	1,854,835	846,389	1,008,446
50-54 years	13,629,862	6,621,815	7,008,047	11,725,262	5,754,226	5,971,036	1,904,600	867,589	1,037,011	1,380,983	619,729	761,254
55-59 years	11,084,606	5,317,251	5,767,355	9,540,786	4,625,549	4,915,237	1,543,820	691,702	852,118	1,137,905	499,639	638,266
60-64 years	10,046,478	4,726,807	5,319,671	8,723,606	4,152,335	4,571,271	1,322,872	574,472	748,400	988,458	425,295	563,163
65-69 years	9,927,958	4,505,822	5,422,136	8,725,874	3,993,037	4,732,837	1,202,084	512,785	689,299	920,412	393,354	527,058
70-74 years	8,831,205	3,836,272	4,994,933	7,918,213	3,461,716	4,456,497	912,992	374,556	538,436	696,791	280,476	416,315
75-79 years	6,681,247	2,720,385	3,960,862	6,038,810	2,470,292	3,568,518	642,437	250,093	392,344	509,967	194,449	315,518
80-84 years	4,463,733	1,609,321	2,854,412	4,069,152	1,469,402	2,599,750	394,581	139,919	254,662	318,168	107,311	210,857
85 years and over	3,628,154	1,016,875	2,611,279	3,303,302	918,707	2,384,595	324,852	98,168	226,684	274,066	79,205	194,861

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

Table H. Estimated population, by age, for the United States, each division and State, Puerto Rico, Virgin Islands, and Guam: July 1, 1995

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

Division and State	Total	Under 5 years	15-19 years	20-44 years	45-64 years	65 years and over
United States	262,755,270	19,591,148	56,199,005	101,222,976	52,209,844	33,532,297
Geographic divisions:						
New England	13,312,412	895,898	2,627,215	5,258,704	2,667,863	1,862,732
Middle Atlantic	38,153,221	2,721,237	7,634,671	14,472,477	7,894,731	5,430,105
East North Central	43,456,141	3,128,414	9,409,884	16,616,553	8,729,381	5,571,909
West North Central . . .	18,347,676	1,264,639	4,112,086	6,831,914	3,617,041	2,521,996
South Atlantic	46,995,266	3,325,490	9,509,928	18,160,132	9,555,646	6,444,070
East South Central	16,066,495	1,135,805	3,461,262	6,101,786	3,339,026	2,028,616
West South Central . . .	28,827,781	2,320,898	6,706,183	11,030,113	5,560,170	3,210,417
Mountain	15,645,168	1,244,762	3,684,177	5,897,743	3,051,888	1,766,598
Pacific	41,951,110	3,554,005	9,053,599	16,853,554	7,794,098	4,695,854
New England:						
Maine	1,241,382	74,513	262,980	472,162	259,582	172,145
New Hampshire	1,148,253	76,269	245,451	467,324	222,709	136,500
Vermont	584,771	37,092	124,782	231,079	121,369	70,449
Massachusetts	6,073,550	412,862	1,156,540	2,444,165	1,199,376	860,607
Rhode Island	989,794	67,570	193,057	385,682	187,680	155,805
Connecticut	3,274,662	227,592	644,405	1,258,292	677,147	467,226
Middle Atlantic:						
New York	18,136,081	1,359,704	3,631,631	6,990,701	3,730,227	2,423,818
New Jersey	7,945,298	577,194	1,577,326	3,037,472	1,663,133	1,090,173
Pennsylvania	12,071,842	784,339	2,425,714	4,444,304	2,501,371	1,916,114

Table H. Estimated population, by age, for the United States, each division and State, Puerto Rico, Virgin Islands, and Guam: July 1, 1995

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

Division and State	Total	Under 5 years	15-19 years	20-44 years	45-64 years	65 years and over
East North Central:						
Ohio	11,150,506	772,833	2,391,427	4,215,895	2,279,935	1,490,416
Indiana	5,803,471	407,943	1,245,848	2,230,373	1,186,217	733,090
Illinois	11,829,940	920,982	2,521,591	4,564,415	2,338,816	1,484,136
Michigan	9,549,353	682,697	2,099,165	3,672,566	1,913,132	1,181,793
Wisconsin	5,122,871	343,959	1,151,853	1,933,304	1,011,281	682,474
West North Central:						
Minnesota	4,609,548	320,664	1,048,040	1,778,168	889,575	573,101
Iowa	2,841,764	183,794	622,313	1,023,882	579,737	432,038
Missouri	5,323,523	369,321	1,156,726	1,979,691	1,077,359	740,426
North Dakota	641,367	41,830	148,246	236,343	122,192	92,756
South Dakota	729,034	52,310	176,704	258,281	136,919	104,820
Nebraska	1,637,112	114,141	376,888	599,452	318,954	227,677
Kansas	2,565,328	182,579	583,169	956,097	492,305	351,178
South Atlantic:						
Delaware	717,197	51,616	145,089	287,082	142,759	90,651
Maryland	5,042,438	368,055	1,023,354	2,051,902	1,027,382	571,745
District of Columbia . .	554,256	39,909	85,456	241,384	110,267	77,240
Virginia	6,618,358	463,688	1,324,642	2,733,999	1,358,594	737,435
West Virginia	1,828,140	106,460	371,332	656,509	414,624	279,215
North Carolina	7,195,138	513,888	1,476,269	2,824,410	1,481,113	899,458
South Carolina	3,673,287	262,833	787,894	1,430,888	751,769	439,903
Georgia	7,200,882	551,180	1,572,524	2,944,887	1,414,385	717,906
Florida	14,165,570	967,861	2,723,368	4,989,071	2,854,753	2,630,517

Table H. Estimated population, by age, for the United States, each division and State, Puerto Rico, Virgin Islands, and Guam: July 1, 1995

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

Division and State	Total	Under 5 years	15-19 years	20-44 years	45-64 years	65 years and over
East South Central:						
Kentucky	3,860,219	261,108	827,133	1,473,939	811,474	486,565
Tennessee	5,256,051	365,477	1,088,517	2,022,370	1,121,476	658,211
Alabama	4,252,982	300,663	904,543	1,609,445	885,871	552,460
Mississippi	2,697,243	208,557	641,069	996,032	520,205	331,380
West South Central:						
Arkansas	2,483,769	172,617	550,258	883,203	518,417	359,274
Louisiana	4,342,334	336,295	1,040,537	1,624,199	846,822	494,481
Oklahoma	3,277,687	230,362	743,577	1,184,260	677,267	442,221
Texas	18,723,991	1,581,624	4,371,811	7,338,451	3,517,664	1,914,441
Mountain:						
Montana	870,281	56,982	205,670	305,673	188,295	113,661
Idaho	1,163,261	89,426	298,399	415,220	227,661	132,555
Wyoming	480,184	32,257	119,801	175,179	99,674	53,273
Colorado	3,746,585	268,950	814,019	1,501,226	786,087	376,303
New Mexico	1,685,401	138,303	412,650	620,969	330,092	183,387
Arizona	4,217,940	355,808	949,809	1,561,024	790,771	560,528
Utah	1,951,408	183,818	568,951	721,790	304,842	172,007
Nevada	1,530,108	119,218	314,878	596,662	324,466	174,884
Pacific:						
Washington	5,430,940	385,897	1,178,182	2,145,740	1,093,387	627,734
Oregon	3,140,585	209,591	672,424	1,168,806	663,899	425,865
California	31,589,153	2,809,826	6,801,330	12,830,615	5,684,563	3,462,819
Alaska	603,617	52,882	155,312	249,856	115,784	29,783
Hawaii	1,186,815	95,809	246,351	458,537	236,465	149,653

Table H. Estimated population, by age, for the United States, each division and State, Puerto Rico, Virgin Islands, and Guam: July 1, 1995

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

Division and State	Total	Under 5 years	15-19 years	20-44 years	45-64 years	65 years and over
Puerto Rico	3,731,006	319,833	967,608	1,367,887	699,770	375,908
Virgin Islands	111,950	11,746	30,308	36,893	24,731	8,272
Guam	143,855	20,016	38,101	56,922	21,526	7,290

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

Table I. Estimated population by 5-year age groups, specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, July 1, 1995

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

Sex and age	All origins	Hispanic					Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Other Hispanic [1]	Total [2]	White	Black
Both sexes									
All ages	259,504,615	26,903,271	17,355,772	2,769,337	1,131,663	5,646,499	232,601,344	190,850,619	31,362,664
Under 1 year	3,809,275	655,554	470,799	64,678	8,367	111,710	3,153,721	2,384,798	578,805
1-4 years	15,580,062	2,543,683	1,831,485	212,544	52,849	446,805	13,036,379	9,978,680	2,320,160
5-9 years	19,012,420	2,651,648	1,827,552	275,458	67,706	480,932	16,360,772	12,660,787	2,847,501
10-14 years	18,630,833	2,417,045	1,640,556	285,618	54,814	436,057	16,213,788	12,623,204	2,710,259
15-19 years	17,819,048	2,270,583	1,461,401	270,401	59,450	479,331	15,548,465	12,107,989	2,664,902
20-24 years	17,672,363	2,328,759	1,581,229	200,083	67,422	480,025	15,343,604	12,039,504	2,485,920
25-29 years	18,817,030	2,494,511	1,700,668	212,113	77,023	504,707	16,322,519	12,972,578	2,442,477
30-34 years	21,650,105	2,524,224	1,611,589	227,880	89,061	595,694	19,125,881	15,498,672	2,667,118
35-39 years	21,991,526	2,150,017	1,310,414	233,753	99,407	506,443	19,841,509	16,292,926	2,635,411
40-44 years	19,954,489	1,716,147	1,015,553	190,484	78,309	431,801	18,238,342	15,157,873	2,257,012
45-49 years	17,220,601	1,307,489	751,352	158,791	81,819	315,527	15,913,112	13,475,210	1,765,840
50-54 years	13,430,283	958,448	556,698	129,488	49,707	222,555	12,471,835	10,678,551	1,318,856
55-59 years	10,925,387	758,260	432,167	98,311	60,555	167,227	10,167,127	8,705,433	1,088,923
60-64 years	9,899,196	632,954	358,687	76,178	65,229	132,860	9,266,242	8,008,598	950,312
65-69 years	9,812,348	540,568	304,944	45,729	63,881	126,014	9,271,780	8,127,172	884,416
70-74 years	8,702,959	403,168	219,217	40,286	56,636	87,029	8,299,791	7,420,570	676,445
75-79 years	6,583,805	254,182	120,665	18,276	51,868	63,373	6,329,623	5,714,811	493,861
80-84 years	4,408,015	167,139	96,302	15,701	19,958	35,178	4,240,876	3,861,759	307,575
85 years and over	3,584,870	128,892	64,494	13,565	27,602	23,231	3,455,978	3,141,504	266,871
Male									
All ages	126,752,625	13,628,500	8,974,090	1,303,169	568,949	2,782,292	113,124,125	93,270,479	14,828,366
Under 1 year	1,950,448	336,434	248,742	30,711	5,199	51,782	1,614,014	1,227,497	290,941
1-4 years	7,974,893	1,302,113	927,676	99,554	32,451	242,432	6,672,780	5,121,759	1,175,545
5-9 years	9,735,795	1,356,198	914,348	144,442	39,111	258,297	8,379,597	6,497,997	1,445,807
10-14 years	9,536,570	1,233,877	808,092	161,091	27,560	237,134	8,302,693	6,486,892	1,372,005
15-19 years	9,143,122	1,162,112	774,039	129,647	26,834	231,592	7,981,010	6,234,908	1,352,603

Table I. Estimated population by 5-year age groups, specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, July 1, 1995

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

Sex and age	All origins	Hispanic					Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Other Hispanic [1]	Total [2]	White	Black
20-24 years	8,979,149	1,227,296	857,708	88,891	36,259	244,438	7,751,853	6,125,276	1,220,795
25-29 years	9,446,366	1,340,052	940,380	91,997	44,081	263,594	8,106,314	6,503,109	1,160,579
30-34 years	10,791,780	1,328,484	879,990	102,131	45,048	301,315	9,463,296	7,754,055	1,244,394
35-39 years	10,951,099	1,107,376	695,076	114,486	54,313	243,501	9,843,723	8,179,225	1,229,869
40-44 years	9,851,416	860,573	534,558	84,524	37,865	203,626	8,990,843	7,567,522	1,041,341
45-49 years	8,472,709	642,933	395,439	66,350	35,143	146,001	7,829,776	6,714,254	799,865
50-54 years	6,510,211	460,474	268,781	64,902	26,641	100,150	6,049,737	5,241,592	589,922
55-59 years	5,243,725	356,245	207,394	37,720	34,963	76,168	4,887,480	4,231,003	478,799
60-64 years	4,656,801	292,546	174,331	33,902	27,778	56,535	4,364,255	3,819,584	408,331
65-69 years	4,453,305	240,855	139,365	19,085	31,018	51,387	4,212,450	3,722,238	377,203
70-74 years	3,780,240	176,596	98,650	18,121	27,892	31,933	3,603,644	3,242,236	272,714
75-79 years	2,680,830	102,125	51,452	6,232	21,487	22,954	2,578,705	2,337,566	188,359
80-84 years	1,584,091	59,655	37,819	3,391	5,150	13,295	1,524,436	1,391,899	101,425
85 years and over	1,010,075	42,556	20,250	5,992	10,156	6,158	967,519	871,867	77,869
Female									
All ages	132,751,990	13,274,771	8,381,682	1,466,168	562,714	2,864,207	119,477,219	97,580,140	16,534,298
Under 1 year	1,858,827	319,120	222,057	33,967	3,168	59,928	1,539,707	1,157,301	287,864
1-4 years	7,605,169	1,241,570	903,809	112,990	20,398	204,373	6,363,599	4,856,921	1,144,615
5-9 years	9,276,625	1,295,450	913,204	131,016	28,595	222,635	7,981,175	6,162,790	1,401,694
10-14 years	9,094,263	1,183,168	832,464	124,527	27,254	198,923	7,911,095	6,136,312	1,338,254
15-19 years	8,675,926	1,108,471	687,362	140,754	32,616	247,739	7,567,455	5,873,081	1,312,299
20-24 years	8,693,214	1,101,463	723,521	111,192	31,163	235,587	7,591,751	5,914,228	1,265,125
25-29 years	9,370,664	1,154,459	760,288	120,116	32,942	241,113	8,216,205	6,469,469	1,281,898
30-34 years	10,858,325	1,195,740	731,599	125,749	44,013	294,379	9,662,585	7,744,617	1,422,724
35-39 years	11,040,427	1,042,641	615,338	119,267	45,094	262,942	9,997,786	8,113,701	1,405,542
40-44 years	10,103,073	855,574	480,995	105,960	40,444	228,175	9,247,499	7,590,351	1,215,671

Table I. Estimated population by 5-year age groups, specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, July 1, 1995

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

Sex and age	All origins	Hispanic					Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Other Hispanic [1]	Total [2]	White	Black
45-49 years	8,747,892	664,556	355,913	92,441	46,676	169,526	8,083,336	6,760,956	965,975
50-54 years	6,920,072	497,974	287,917	64,586	23,066	122,405	6,422,098	5,436,959	728,934
55-59 years	5,681,662	402,015	224,773	60,591	25,592	91,059	5,279,647	4,474,430	610,124
60-64 years	5,242,395	340,408	184,356	42,276	37,451	76,325	4,901,987	4,189,014	541,981
65-69 years	5,359,043	299,713	165,579	26,644	32,863	74,627	5,059,330	4,404,934	507,213
70-74 years	4,922,719	226,572	120,567	22,165	28,744	55,096	4,696,147	4,178,334	403,731
75-79 years	3,902,975	152,057	69,213	12,044	30,381	40,419	3,750,918	3,377,245	305,502
80-84 years	2,823,924	107,484	58,483	12,310	14,808	21,883	2,716,440	2,469,860	206,150
85 years and over	2,574,795	86,336	44,244	7,573	17,446	17,073	2,488,459	2,269,637	189,002

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

Table J. Estimated population for ages 15 years and over, by 5-year age groups, marital status, race, and sex: United States, 1995

[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
White, male									
Never married	23,750,005	4,474,440	2,809,114	5,787,809	3,792,697	2,346,118	1,692,627	1,057,271	627,638
Married	51,250,071	17,889	75,290	1,445,577	3,661,405	5,893,078	6,543,111	6,326,628	5,730,011
Widowed	2,104,997	1,189	315	-	5,229	15,259	24,800	36,068	50,687
Divorced	6,425,431	9,449	2,509	90,457	336,578	807,768	1,021,478	1,040,588	962,156
White, female									
Never married	18,192,353	4,173,426	2,483,742	4,458,856	2,373,723	1,426,763	901,826	616,717	417,743
Married	51,742,023	52,788	246,917	2,306,878	4,675,165	6,540,284	6,942,335	6,442,465	5,700,667
Widowed	10,320,547	588	339	10,808	16,713	40,393	90,459	114,322	209,813
Divorced	8,572,453	5,886	8,425	216,745	541,191	914,759	1,241,857	1,295,463	1,159,578
Black, male									
Never married	5,217,613	869,069	547,531	1,165,762	810,062	620,472	477,994	286,672	154,253
Married	4,701,195	6,327	1,253	122,128	386,772	615,821	698,148	620,641	560,293
Widowed	319,907	420	-	-	-	1,671	4,512	10,195	8,819
Divorced	917,652	5,620	-	11,437	42,935	87,161	126,653	191,268	123,026
Black, female									
Never married	5,138,791	840,458	528,317	1,129,588	805,603	620,945	460,771	267,489	183,942
Married	4,893,415	5,999	14,155	188,803	460,700	698,877	732,533	697,581	572,248
Widowed	1,424,088	1,265	-	1,462	2,439	16,808	23,599	37,657	47,931
Divorced	1,526,366	-	1,389	18,400	85,952	163,599	263,691	278,838	204,324

Table J. Estimated population for ages 15 years and over, by 5-year age groups, marital status, race, and sex: United States, 1995

[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
American Indian, male									
Never married	286,152	64,551	34,302	67,805	50,189	30,361	17,887	11,178	2,303
Married	376,812	-	2,311	26,325	35,866	47,744	50,088	47,904	49,245
Widowed	23,787	-	-	-	-	1,399	559	-	2,855
Divorced	83,983	-	-	470	7,022	13,541	18,767	16,288	6,367
American Indian, female									
Never married	255,491	60,821	32,249	58,903	51,487	15,086	9,519	9,396	2,218
Married	371,103	1,275	2,517	28,290	29,671	57,865	66,221	50,887	41,817
Widowed	78,422	1,170	1,494	-	-	3,170	504	2,365	5,068
Divorced	97,808	-	-	3,121	5,986	16,756	13,529	17,535	15,035
Asian or Pacific Islander, male									
Never married	1,271,962	212,391	128,562	339,586	261,374	149,950	81,197	49,431	19,571
Married	1,882,658	1,578	910	29,691	129,989	261,779	291,809	270,396	245,044
Widowed	38,375	-	-	-	2,981	-	-	-	791
Divorced	109,445	-	-	-	6,666	10,018	21,586	25,956	16,772
Asian or Pacific Islander, female									
Never married	988,646	204,348	122,714	276,193	200,872	70,303	47,973	23,894	11,872
Married	2,231,482	1,695	5,462	92,109	219,864	354,566	361,861	341,791	267,472
Widowed	257,286	1,686	-	2,175	-	5,650	5,244	2,915	14,143
Divorced	179,343	-	384	2,752	6,216	19,832	15,786	29,008	35,191

Table J. Estimated population for ages 15 years and over, by 5-year age groups, marital status, race, and sex: United States, 1995

[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
White, male								
Never married	303,354	216,138	165,215	170,503	138,637	70,242	53,787	44,415
Married	4,725,765	3,829,836	3,482,112	3,280,266	2,793,139	1,932,538	1,047,438	465,988
Widowed	66,695	84,525	141,186	267,914	338,555	363,694	328,760	380,121
Divorced	658,417	495,051	363,831	274,354	191,383	103,814	39,412	28,186
White, female								
Never married	270,307	202,164	157,323	168,623	164,555	152,077	94,783	129,725
Married	4,522,863	3,581,871	3,199,446	2,874,328	2,332,948	1,402,859	635,805	284,404
Widowed	281,180	416,694	662,822	1,286,623	1,664,854	1,844,560	1,767,488	1,912,891
Divorced	896,684	714,500	551,687	403,262	294,140	169,022	101,682	57,572
Black, male								
Never married	106,276	58,275	47,769	20,723	17,486	20,436	5,786	9,047
Married	388,332	358,855	280,399	254,459	190,307	112,829	60,007	44,624
Widowed	12,310	14,624	39,342	76,454	44,445	48,051	33,766	25,298
Divorced	112,813	67,882	57,782	41,722	28,235	13,130	7,752	236
Black, female								
Never married	77,869	64,840	54,710	38,477	31,162	11,400	10,456	12,764
Married	413,236	353,999	274,069	213,925	148,331	74,521	31,111	13,327
Widowed	92,370	123,976	158,261	193,880	196,599	208,224	157,003	162,614
Divorced	177,782	95,449	76,124	80,777	40,219	21,376	12,290	6,156

Table J. Estimated population for ages 15 years and over, by 5-year age groups, marital status, race, and sex: United States, 1995

[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
American Indian, male								
Never married	1,720	3,289	1,712	-	855	-	-	-
Married	37,235	24,960	19,752	15,595	10,821	3,417	2,203	3,346
Widowed	977	1,006	646	1,582	2,378	6,793	4,133	1,459
Divorced	4,974	4,922	4,977	4,132	2,523	-	-	-
American Indian, female								
Never married	5,068	3,147	784	1,814	837	4,162	-	-
Married	29,950	23,681	15,634	10,843	7,516	2,499	2,437	-
Widowed	9,711	5,138	7,907	10,522	7,228	6,377	7,590	10,178
Divorced	3,811	6,074	6,621	2,297	5,242	1,741	60	-
Asian or Pacific Islander, male								
Never married	6,939	5,546	4,065	1,788	6,772	2,580	-	2,210
Married	182,835	141,898	112,177	85,898	60,604	34,521	23,859	9,670
Widowed	1,250	1,863	2,121	8,333	8,020	8,334	2,407	2,275
Divorced	11,935	8,571	3,727	2,105	2,109	-	-	-
Asian or Pacific Islander, female								
Never married	10,239	3,507	2,130	6,213	2,713	1,759	3,916	-
Married	177,853	136,391	98,592	84,827	50,379	25,076	10,587	2,957
Widowed	17,575	16,157	36,410	39,890	44,085	33,461	19,212	18,683
Divorced	21,544	19,759	17,158	5,836	4,122	1,755	-	-

- Quantity zero.

Table K. Estimated population for ages 15 years and over, by 5-year age groups, marital status, specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, 1995

[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	2,322,825	457,701	295,170	603,495	446,087	233,563	153,949	64,788	30,410
Married	3,297,451	4,766	14,340	250,615	459,330	572,445	480,813	417,848	313,727
Widowed	97,547	-	-	-	-	3,866	3,890	1,393	4,244
Divorced	357,424	2,058	-	3,599	34,963	70,119	56,433	50,526	47,059
Mexican, female									
Never married	1,527,024	397,750	222,502	338,783	213,449	135,568	79,024	43,925	26,901
Married	3,270,290	16,313	49,763	365,743	511,615	539,485	453,673	364,736	271,323
Widowed	316,760	-	1,030	703	3,663	4,430	8,781	10,153	15,657
Divorced	396,077	-	-	18,291	31,561	52,118	73,856	62,180	42,029
Puerto Rican, male									
Never married	352,630	81,264	46,075	72,249	47,956	35,726	29,008	14,880	9,564
Married	428,958	-	2,309	14,628	41,501	60,257	72,807	54,520	47,801
Widowed	17,600	-	-	-	-	-	-	-	-
Divorced	68,187	-	-	2,016	2,540	6,150	12,670	15,123	8,986
Puerto Rican, female									
Never married	381,157	88,517	44,689	75,968	45,798	34,808	26,400	21,252	15,225
Married	504,684	2,096	5,446	30,619	69,279	75,260	71,154	64,426	64,314
Widowed	73,505	-	-	1,126	-	829	2,050	3,108	3,193
Divorced	104,311	-	-	3,478	5,042	14,851	19,669	17,177	9,706

Table K. Estimated population for ages 15 years and over, by 5-year age groups, marital status, specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, 1995

[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
Cuban, male									
Never married	127,649	18,460	8,374	29,216	20,293	8,986	17,857	5,421	5,160
Married	275,402	-	-	7,043	19,810	32,399	28,346	26,224	24,246
Widowed	15,165	-	-	-	-	-	-	-	385
Divorced	46,410	-	-	-	3,977	3,663	8,108	6,218	5,352
Cuban, female									
Never married	85,168	20,684	11,199	15,642	5,958	6,385	2,857	1,122	3,595
Married	266,532	-	417	12,810	21,520	33,535	34,489	29,803	34,845
Widowed	66,612	-	317	-	-	-	-	3,275	2,459
Divorced	64,993	-	-	2,712	5,469	4,095	7,749	6,245	5,777
Other Hispanic, male									
Never married	811,525	137,554	90,555	195,234	151,429	109,091	58,023	27,421	14,241
Married	1,052,273	786	2,493	46,322	104,886	177,503	170,945	151,462	118,370
Widowed	20,520	-	-	-	-	-	699	-	474
Divorced	108,327	204	-	2,880	7,283	14,720	13,827	24,744	12,916
Other Hispanic, female									
Never married	652,747	138,608	96,065	150,142	87,517	55,678	33,588	28,225	14,084
Married	1,152,917	2,453	9,687	79,230	138,913	212,729	178,841	160,235	114,654
Widowed	155,806	-	-	162	403	1,748	5,534	2,190	8,844
Divorced	216,890	647	283	6,056	14,284	24,226	44,980	37,525	31,949

Table K. Estimated population for ages 15 years and over, by 5-year age groups, marital status, specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, 1995

[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
White non-Hispanic, male									
Never married	20,245,460	3,791,468	2,364,743	4,921,513	3,171,758	1,966,046	1,449,787	945,579	569,893
Married	45,917,584	12,372	55,016	1,120,573	3,041,677	5,060,787	5,775,486	5,645,516	5,214,272
Widowed	1,937,395	1,204	322	-	5,327	9,645	17,761	34,476	43,993
Divorced	5,835,874	7,229	2,562	83,194	284,340	717,579	936,187	941,947	886,100
White non-Hispanic, female									
Never married	15,651,617	3,536,170	2,107,657	3,914,191	2,042,535	1,212,558	768,114	528,100	360,996
Married	46,281,708	32,608	182,978	1,807,332	3,931,751	5,682,767	6,190,751	5,804,934	5,160,216
Widowed	9,611,884	591	-	7,941	12,785	33,430	71,147	93,739	175,274
Divorced	7,721,626	5,300	7,777	184,765	482,408	815,861	1,083,684	1,163,574	1,064,472
Black non-Hispanic, male									
Never married	4,907,358	817,919	521,577	1,101,958	755,604	582,615	445,606	261,366	146,790
Married	4,455,660	6,205	974	107,570	363,817	577,442	660,156	588,671	529,153
Widowed	311,121	412	-	-	-	1,592	4,363	9,892	8,517
Divorced	869,940	5,513	-	11,270	41,157	82,747	119,748	181,415	115,406
Black non-Hispanic, female									
Never married	4,873,265	791,914	500,438	1,066,678	763,932	590,471	442,735	250,464	178,356
Married	4,664,116	5,845	11,518	179,998	433,189	662,237	693,235	660,860	548,337
Widowed	1,369,955	1,233	-	1,425	1,965	14,395	22,691	35,111	46,526
Divorced	1,454,540	-	1,355	17,029	82,817	155,622	246,875	269,234	192,752

Table K. Estimated population for ages 15 years and over, by 5-year age groups, marital status, specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, 1995

[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 non-Hispanic, male									
Never married	1,396,459	244,585	142,916	358,637	278,624	168,659	90,900	55,942	21,431
Married	2,060,114	1,542	4,455	46,344	149,892	276,226	310,852	289,723	271,561
Widowed	54,000	-	-	-	2,692	1,125	506	-	2,390
Divorced	164,061	-	-	802	11,413	18,839	32,374	36,315	20,277
Other non-Hispanic, female									
Never married	1,110,439	232,766	138,648	297,934	228,728	74,581	53,086	33,765	10,519
Married	2,386,733	2,501	5,746	109,426	228,818	377,255	393,806	358,167	284,324
Widowed	299,185	2,417	-	2,012	-	7,829	5,369	5,296	15,319
Divorced	256,594	-	-	3,027	7,286	35,580	26,281	44,247	46,243

Table K. Estimated population for ages 15 years and over, by 5-Year age groups, marital status, race, and specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, 1995

[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	13,033	10,797	6,540	443	2,667	1,374	1,492	1,316
Married	215,691	169,838	152,478	112,339	72,136	27,478	23,277	10,330
Widowed	7,435	4,208	5,330	13,565	19,613	15,628	10,942	7,433
Divorced	32,620	22,558	9,984	13,017	4,240	6,971	2,108	1,169
Mexican, female								
Never married	19,117	14,829	10,923	8,662	8,148	3,183	1,055	3,205
Married	216,305	166,481	117,679	106,910	47,547	18,006	17,154	7,557
Widowed	15,002	20,289	35,002	38,568	47,286	43,767	39,766	32,663
Divorced	37,490	23,179	20,754	11,442	17,590	4,259	510	818
Puerto Rican, male								
Never married	9,601	3,105	1,444	1,290	468	-	-	-
Married	44,131	29,314	27,958	12,638	12,511	4,286	2,867	1,430
Widowed	1,271	387	2,324	2,872	4,523	1,138	524	4,561
Divorced	9,901	4,914	2,175	2,285	618	809	-	-
Puerto Rican, female								
Never married	8,350	6,204	3,501	5,241	986	2,055	888	1,275
Married	42,335	28,874	23,653	11,895	9,724	3,185	1,337	1,087
Widowed	5,417	12,016	7,910	8,458	8,065	6,036	10,086	5,211
Divorced	8,485	13,491	7,210	1,050	3,388	764	-	-

Table K. Estimated population for ages 15 years and over, by 5-Year age groups, marital status, race, and specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, 1995

[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
Cuban, male								
Never married	2,241	5,367	405	1,585	1,659	1,410	-	1,215
Married	21,701	24,306	25,859	23,720	17,258	13,996	5,150	5,344
Widowed	-	-	333	2,747	3,330	6,082	-	2,288
Divorced	2,698	5,288	1,182	2,969	5,645	-	-	1,310
Cuban, female								
Never married	2,010	3,291	2,681	1,748	2,446	2,655	1,464	1,431
Married	14,709	16,049	29,335	17,843	8,711	6,557	3,474	2,435
Widowed	-	932	2,209	5,355	11,808	17,290	9,867	13,100
Divorced	6,347	5,319	3,225	7,917	5,780	3,878	-	480
Other Hispanic, male								
Never married	10,912	5,307	6,752	1,747	766	1,040	1,453	-
Married	79,200	60,827	41,963	43,361	21,221	17,703	9,617	5,614
Widowed	-	4,920	2,232	3,653	5,533	1,998	466	545
Divorced	10,043	5,112	5,589	2,624	4,414	2,212	1,759	-
Other Hispanic, female								
Never married	12,922	8,740	4,302	10,334	5,525	3,919	1,710	1,388
Married	86,550	56,533	48,604	33,638	15,819	8,468	4,930	1,633
Widowed	8,132	10,369	15,231	23,716	26,283	24,842	14,301	14,051
Divorced	14,797	15,418	8,189	6,937	7,471	3,188	940	-

Table K. Estimated population for ages 15 years and over, by 5-Year age groups, marital status, race, and specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, 1995

[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
White non-Hispanic, male								
Never married	265,431	191,875	150,639	165,098	132,961	66,643	50,033	41,993
Married	4,319,697	3,509,268	3,196,765	3,060,082	2,635,630	1,837,941	991,877	440,625
Widowed	57,619	73,973	128,368	242,289	302,201	339,713	316,175	364,329
Divorced	598,845	455,883	343,804	254,767	171,442	93,266	33,805	24,924
White non-Hispanic, female								
Never married	230,024	170,109	135,542	144,467	149,188	141,215	87,966	122,785
Married	4,129,325	3,286,163	2,950,324	2,684,533	2,215,955	1,344,292	606,109	271,670
Widowed	252,262	372,870	602,457	1,201,982	1,555,852	1,735,208	1,677,545	1,818,801
Divorced	825,342	645,286	500,702	373,951	257,351	156,523	98,240	56,390
Black non-Hispanic, male								
Never married	100,207	55,756	46,579	19,504	17,247	20,022	5,714	8,894
Married	368,346	342,800	268,571	245,912	185,192	108,401	58,578	43,872
Widowed	12,048	14,311	37,299	74,146	43,243	47,074	33,353	24,871
Divorced	109,319	65,935	55,880	37,643	27,031	12,865	3,779	232
Black non-Hispanic, female								
Never married	75,195	62,307	52,547	35,516	29,585	10,524	10,295	12,308
Married	394,359	341,342	266,416	207,257	143,074	73,496	29,678	13,275
Widowed	90,194	115,516	149,294	188,306	191,525	200,401	154,083	157,290
Divorced	169,182	90,957	73,729	76,135	39,544	21,079	12,100	6,130

Table K. Estimated population for ages 15 years and over, by 5-Year age groups, marital status, race, and specified Hispanic origin, race for non-Hispanic origin, and sex: Total of 49 States and the District of Columbia, 1995

[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 non-Hispanic, male								
Never married	7,512	8,008	5,454	1,658	7,442	2,509	-	2,182
Married	191,294	156,044	122,064	97,199	68,446	36,116	26,798	11,558
Widowed	2,184	2,605	2,662	9,124	8,203	14,155	4,310	4,044
Divorced	17,234	11,023	6,158	5,026	4,600	-	-	-
Other non-Hispanic, female								
Never married	12,222	6,151	2,817	6,373	3,231	5,685	3,933	-
Married	193,559	142,152	104,518	91,834	51,740	27,468	11,553	3,866
Widowed	24,677	20,167	37,256	42,250	52,450	33,290	24,900	25,953
Divorced	25,751	26,619	26,401	6,722	6,664	1,729	44	-

- Quantity zero

Table L. 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
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

Table L. 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
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 M. 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 N. 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- a=.95,D)	U(1- a =.95,D)	L(1- a =.96,D) or L(1- a =.96,D_{adj})	U(1- a =.96,D) or U(1- a =.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 N. 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- a=.95,D)	U(1- a =.95,D)	L(1- a =.96,D) or L(1- a =.96,D_{adj})	U(1- a =.96,D) or U(1- a =.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 N. 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- a=.95,D)	U(1- a =.95,D)	L(1- a =.96,D) or L(1- a =.96,D_{adj})	U(1- a =.96,D) or U(1- a =.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 N. 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- a=.95,D)	U(1- a =.95,D)	L(1- a =.96,D) or L(1- a =.96,D_{adj})	U(1- a =.96,D) or U(1- a =.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 N was generated using the SAS® code below. Users can compute other level Confidence Intervals by changing the alpha-value. Table N is a modified version of Table 40 (52).

```
* 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;
```