National Vital Statistics Reports

Volume 49, Number 8 September 21, 2001

Deaths: Final Data for 1999 (Technical Notes and References)

Donna L. Hoyert, Ph.D., Elizabeth Arias, Ph.D., Betty L. Smith, B.S. Ed.,
Sherry L. Murphy, Kenneth D. Kochanek, M.A., Division of Vital Statistics

DEPARTMENT OF HEALTH AND HUMAN SERVICES • CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL CENTER FOR HEALTH STATISTICS • NATIONAL VITAL STATISTICS SYSTEM

Technical notes

Nature and sources of data

Data in this report are based on information from all death certificates filed in the 50 States and the District of Columbia. The U.S. Standard Certificate of Death—which is used as a model by the States—was last revised in 1989; for additional details see the 1989 revision of the U.S. standard certificates and reports (21) and Technical Appendix of *Vital Statistics of the United States, 1989*, Volume II, Mortality, part A (22). Data for Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Northern Marianas are included in tables showing data by State, but are not included in U.S. totals.

Mortality statistics are based on information coded by the States and provided to the National Center for Health Statistics (NCHS) through the Vital Statistics Cooperative Program (VSCP) and from copies of the original certificates received by NCHS from the State registration offices. In 1999 all the States and the District of Columbia participated in this program and submitted part or all of the mortality data for 1999 in electronic data files to NCHS. All States provided precoded medical (cause-of-death) data to NCHS except Arizona, Illinois, Kentucky, Missouri, New Jersey, Ohio, and West Virginia, New York City, and the District of Columbia. For 1999 all States submitted precoded demographic data for all deaths.

Data for the entire United States refer to events occurring within the United States. Data shown for geographic areas are by place of residence. Beginning with 1970 mortality statistics for the United States exclude deaths of nonresidents of the United States. All data exclude fetal deaths.

Mortality statistics for Puerto Rico, Virgin Islands, American Samoa, and Northern Marianas exclude deaths of nonresidents of Puerto Rico, Virgin Islands, American Samoa, and Northern Marianas, respectively. For Guam, however, mortality statistics exclude deaths that occurred to a resident of any place other than Guam or the United States.

Cause-of-death classification

The mortality statistics presented in this report were compiled in accordance with the World Health Organization (WHO) regulations, which specify that member nations classify and code causes of death in accordance with the current revision of the *International Statistical Classification of Diseases and Related Health Problems* (ICD). The ICD provides the basic guidance used in virtually all countries to code and classify causes of death. Effective with deaths occurring in 1999, the United States began using the Tenth Revision of this classification, (ICD–10) (6); during the period 1979–98, causes were coded and classified according to the Ninth Revision (ICD–9) (8). For earlier years causes of death were classified according to the revisions then in use—1968–78, Eighth Revision, adapted for use in the United States; 1958–67, Seventh Revision; and 1949–57, Sixth Revision.

Changes in classification of causes of death due to these revisions may result in discontinuities in cause-of-death trends. Discontinuities between the Ninth and Tenth Revisions of the ICD for selected causes of death are measured using comparability ratios from a comparability study described in the section *Comparability between ICD–9 and ICD–10 for mortality*. Comparability ratios between the Eighth and Ninth Revisions, between the Seventh and Eighth Revisions, and between the Sixth and Seventh Revisions may be found in other NCHS reports (23–25).

The ICD not only details disease classification but also provides definitions, tabulation lists, the format of the death certificate, and the rules for coding cause of death. Cause-of-death data presented in this publication were coded by procedures outlined in annual issues of the *NCHS Instruction Manual* (26–28). It includes rules for selecting the underlying cause of death for tabulation purposes, definitions, tabulation lists, and regulations on the use of the Classification.

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) (29), multiple cause codes serve as inputs to the computer software that employs WHO rules to select the underlying cause. All cause-of-death data in this report are coded using ACME.

The ACME system is used to select the underlying cause of death for all death certificates in the United States. In addition, NCHS has developed two computer systems as inputs to ACME. Beginning with 1990 data, the Mortality Medical Indexing, Classification, and Retrieval system (MICAR) (30,31), was introduced to automate coding multiple causes of death. In addition, MICAR provides more detailed information on the conditions reported on death certificates than is available through the International Classification of Diseases (ICD) code structure. Beginning with data year 1993, SuperMICAR, an enhancement of the MICAR system, was introduced. SuperMICAR allows for literal entry of the multiple cause-of-death text as reported by the certifier. This information is then automatically processed by the MICAR and ACME computer systems. Records that cannot be automatically processed by MICAR or SuperMICAR are manually multiple-cause coded and then further processed through ACME.

For 1999 approximately 39 percent of the Nation's death records were multiple-cause coded using SuperMICAR, and 61 percent using MICAR only. This represents data from 27 States that were coded by SuperMICAR and data from 23 States, the District of Columbia, and New York City that were coded by MICAR.

In this report tabulations of cause-of-death statistics are based solely on the underlying cause of death. The underlying cause is defined by WHO as "the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury" (6). It is selected from the conditions entered by the physician in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the ICD, and associated selection rules and modifications. Generally, more medical information is reported on death certificates than is directly reflected in the underlying cause of death. This is captured in NCHS multiple cause-of-death statistics (32–34).

Tabulation lists and cause-of-death ranking

Tabulation lists for ICD–10 were developed to maximize continuity with ICD–9. This continuity is especially useful in trend analysis and in identifying causes of death that are of public health and

medical importance. The lists are published in the NCHS Instruction Manual, Part 9, ICD–10 Cause-of-Death Lists for Tabulating Mortality Statistics, Effective 1999 (35). For this report two tabulation lists are used, namely, the List of 113 Selected Causes of Death used for deaths of all ages, and the List of 130 Selected Causes of Infant Death used for infants. These lists are also used to rank leading causes of death for the two population groups. For the List of 113 Selected Causes of Death, the group titles Major cardiovascular diseases (ICD–10 codes I00–I78) and Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified (ICD–10 codes R00–R99), are not ranked. In addition, category titles that begin with the words "Other" and "All other" are not ranked to determine the leading causes of death. When one of the titles that represents a subtotal is ranked (for example, Tuberculosis (ICD–10 codes A16–A19)), its component parts are not ranked (in this case, Respiratory tuberculosis (ICD–10 code A16) and Other tuberculosis (ICD–10 codes A17–A19)). For the List of 130 Selected Causes of Infant Death, the same ranking procedures are used, except that the category Major cardiovascular diseases is not in the list.

Cause-of-death titles in ICD–10 differ in some cases from those in ICD–9. A comparison of cause-of-death titles for the 15 leading causes of death between ICD–9 and ICD–10 is shown in table I. For 7 of the 15 leading causes of death the titles between ICD–9 and ICD–10 are the same.

The 10 leading causes of infant death were affected by the introduction of ICD–10 as well. A comparison of cause-of-death titles for the 10 leading causes of infant death between ICD–9 and ICD–10 are shown in table II. For 4 of the 10 leading causes of infant death, the titles between ICD–9 and ICD–10 are the same.

The change in the tabulation lists and coding rules for selecting the underlying cause of death between ICD–9 and ICD–10 has implications for ranking leading causes of death (9). The top five causes of death and causes of infant death did not change in rank; however, changes in rank for causes ranked sixth and lower resulted from using ICD–10 instead of ICD–9.

Race and Hispanic origin

Race and Hispanic origin are reported separately on the death certificate. Therefore, data shown by race include persons of Hispanic or non-Hispanic origin, and data for Hispanic origin include persons of any race. In this report, unless otherwise specified, deaths of Hispanic origin are included in the totals for each race group—white, black, American Indian, and Asian or Pacific Islander (API)—according to the decedent's race as reported on the death certificate. Data shown for Hispanic persons include all persons of Hispanic origin of any race.

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

Quality of race and Hispanic origin data—Death rates for Hispanic, American Indian, and API persons should be interpreted with caution because of inconsistencies in reporting Hispanic origin or race on the death certificate as compared with race on censuses, surveys, and birth certificates. Studies have shown underreporting on death certificates of American Indians, API, and Hispanic decedents; and undercounts of these groups in the censuses (14,36).

A number of studies have been conducted on the reliability of race reported on the death certificate by comparing race on the death certificate with that reported on another data collection instrument, such as the census or a survey. Differences may arise because of differences in who provides race information on the compared records. Race information on the death certificate is reported by the funeral director as provided by an informant or in the absence of an informant, on the basis of observation. In contrast, race on the census or on the Current Population Survey (CPS) is obtained while the individual is alive and is self-reported or reported by another member of the household familiar with the individual and, therefore, may be considered more valid. A high level of agreement between the death certificate and the census or survey report is essential to assure unbiased death rates by race.

Studies (36,37) show that a person self-reported as American Indian or Asian on census or survey records was sometimes reported as white on the death certificate. The net effect of misclassification is an underestimation of deaths and death rates for races other than white and black. In addition, undercoverage of minority groups in the census and resultant population estimates introduces biases into death rates by race (5,14,38). Estimates of the approximate effect of the combined bias due to race misclassification on death certificates and underenumeration on the 1990 census are as follows: white, –1.0 percent; black, –5.0; American Indian, +20.6; Asian or Pacific Islander, +10.7 (14).

The National Longitudinal Mortality Study (NLMS) examined the reliability of Hispanic origin reported on 43,520 death certificates with that reported on a total of 12 Current Population Surveys conducted by the U.S. Bureau of the Census for the years 1979–85 (14). In this study, agreement—on a record-by-record basis— was 89.7 percent for any report of Hispanic origin. The ratio of deaths for CPS divided by deaths for death certificate was 1.07 indicating net underreporting of Hispanic origin on death certificates by 7 percent as compared with self-reports on the surveys. Death rates for the Hispanic-origin population are also affected by undercoverage of this population group in the census and resultant population estimates; the estimated net correction, taking into account both sources of bias, is 1.6 percent (14,38).

Other races and race not stated—Beginning in 1992 all records coded as "Other races" (0.02 percent of the total deaths in 1999) were assigned to the specified race of the previous record. Records for which race was unknown, not stated, or not classifiable (0.10 percent) were assigned the racial designation of the previous record.

Infant and maternal mortality rates—For 1989–99, as in previous years, infant and maternal deaths continue to be tabulated by the race of the decedent. However, beginning with the 1989 data year, the method of tabulating live births by race was changed from race of parents to race of mother as stated on the birth certificate. This change affects infant and maternal mortality rates because live births are the denominators of these rates (39,40). To improve continuity and ease of interpretation, trend data by race in this report have been retabulated by race of mother for all years beginning with the 1980 data year.

Quantitatively, the change in the basis for tabulating live births by race results in more white births and fewer black births and births of other races. Consequently, infant and maternal mortality rates under the new tabulating procedure tend to be about 2 percent lower for white infants and about 5 percent higher for black infants than when they are computed by the previous method of tabulating live births by race of

Table I. List of ICD–10 leading causes of death for 1999 and comparable ICD–9 causes of death

ICD–10	ICD–9
Diseases of heart (I00–I09,I11,I13,I20–I51)	Diseases of heart (390–398,402,404,410–429)
Malignant neoplasms (C00–C97)	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues (140–208)
Cerebrovascular diseases (I60–I69)	Cerebrovascular diseases (430–434,436–438)[1]
Chronic lower respiratory diseases (J40–J47)	Chronic obstructive pulmonary diseases and allied conditions (490–494,496)[1]
Accidents (unintentional injuries) (V01–X59,Y85–Y86)	Accidents (E800–E869,E880–E929)[1]
Diabetes mellitus (E10–E14)	Diabetes mellitus (250)
Influenza and pneumonia (J10–J18)	Pneumonia and influenza (480–487)
Alzheimer's disease (G30)	Alzheimer's disease (331.0)
Nephritis, nephrotic syndrome and nephrosis (N00–N07,N17–N19,N25–N27)	Nephritis, nephrotic syndrome and nephrosis (580–589)
Septicemia (A40–A41)	Septicemia (038)
Intentional self-harm (suicide) (X60–X84,Y87.0)	Suicide (E950–E959)
Chronic liver disease and cirrhosis (K70,K73–K74)	Chronic liver disease and cirrhosis (571)
Essential (primary) hypertension and hypertensive renal disease (I10,I12)	Hypertension with or without renal disease (401,403)
Assault (homicide) (X85–Y09,Y87.1)	Homicide (E960–E969)[1]
Aortic aneurysm and dissection (I71)	Aortic aneurysm (441)[2]

[1]ICD–9 codes do not match those of the ICD–9 List of 72 Selected Causes of Death; see Technical notes.
[2]Not a rankable cause in ICD–9; see Technical notes.

Table II. List of ICD–10 leading causes of infant death for 1999 and comparable ICD–9 causes of infant death

ICD–10	ICD–9
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	Congenital anomalies (740–759)
Disorders related to short gestation and low birthweight, not elsewhere classified (P07)	Disorders relating to short gestation and unspecified low birthweight (765)
Sudden infant death syndrome (R95)	Sudden infant death syndrome (798.0)
Newborn affected by maternal complications of pregnancy (P01)	Newborn affected by maternal complications of pregnancy (761)
Respiratory distress of newborn (P22)	Respiratory distress syndrome (769)
Newborn affected by complications of placenta, cord and membranes (P02)	Newborn affected by complications of placenta, cord and membranes (762)
Accidents (unintentional injuries) (V01–X59)	Accidents (E800–E869,E880–E929)[1]
Bacterial sepsis of newborn (P36)	Other infection specific to the perinatal period (771.8)[2]
Diseases of the circulatory system (I00–I99)	Diseases of the circulatory system (390–434,436–459)[2]
Atelectasis (P28.0–P28.1)	Primary, other, and unspecified atelectasis (770.4–770.5)[2]

[1]ICD–9 codes do not match those of the ICD–9 List of 61 Selected Causes of Infant Death; see Technical notes.
[2]Not a rankable cause in ICD–9; see Technical notes.

parents. Rates for most other minority races also are higher when computed by race of mother (22,40).

Infant mortality rates for the Hispanic-origin population are based on numbers of resident infant deaths reported to be of Hispanic origin and numbers of resident live births by Hispanic origin of mother for the United States. In computing infant mortality rates, deaths and live births of unknown origin are not distributed among the specified Hispanic and non-Hispanic groups. The percent of infant deaths of unknown origin was 1.4 and the percent of live births to mothers of unknown origin was 1.2 for the United States for 1999.

Small numbers of infant deaths for specific Hispanic-origin groups result in infant mortality rates subject to relatively large random variation (see "Random variation"). Infant mortality rates by Hispanic origin are less subject to reporting error when based on linked files of infant deaths and live births (20).

Infant mortality rates calculated from the general mortality file for specified race and/or Hispanic origin are in error because of reporting problems that affect the classification of race and Hispanic origin on the birth and death certificates for the same infant. Infant mortality rates by specified race and Hispanic origin are more accurate when based on the linked file of infant deaths and live births (20). The linked file computes infant mortality rates using the race and/or Hispanic origin of the mother from the birth certificate in both the numerator and denominator of the rate. In addition, mother's race and/or Hispanic origin from the birth certificate is considered to be more accurately reported than infant's race and/or Hispanic origin from the death certificate because, on the birth certificate, race is generally reported by the mother at the time of delivery whereas, on the death certificate, infant's race and/or Hispanic origin is reported by an informant, usually the mother but sometimes by the funeral director. Estimates of reporting errors have been made by comparing rates based on the linked files with those in which the race of infant death is based on information from the death certificate (14,22).

Life tables

The life table provides a comprehensive measure of the effect of mortality on life expectancy. It is composed of sets of values showing the mortality experience of a hypothetical group of infants born at the same time and subject throughout their lifetime to the age-specific death rates of a particular time period, usually a given year. Beginning with final data reported for 1997, the life table methodology

was changed from previous annual reports. Previously, U.S. life tables were abridged and constructed by reference to a standard table (41). In addition, the age range for these life tables was limited to 5-year age groups ending with the age group 85 years and over.

Beginning with 1997 mortality data, a revised life table methodology was used to construct complete life tables by single years of age that extend to age 100 (42) using a methodology similar to that of the decennial life tables (43). The advantages of the new over the previous methodology are its comparability with decennial life table methodology, greater accuracy, and greater age detail. A comparison of the two methods shows small differences in resulting values for life expectancy (42). Although the new method produces complete life tables, that is, life tables by single years of age, life table data shown in this report are summarized in 5-year age groupings. To calculate the probability of dying at each age, the revised methodology uses vital statistics death rates for ages under 85 years and mortality data from the Medicare program for ages over 85 years. Medicare data were used to model the probability of dying at ages 85 and over because the data are shown to be significantly more reliable than vital statistics data at the oldest ages (44).

Causes of death contributing to changes in life expectancy

Causes of death contributing to changes in life expectancy were estimated using a life table partitioning technique. The method partitions changes into component additive parts. This method identifies the causes of death having the greatest influence, positive or negative, on changes in life expectancy (15,45).

Comparability between ICD–9 and ICD–10 for mortality

One of the efforts to maintain the tradition of progress in the classification of diseases has been the practice, begun in 1900, to revise about every 10–20 years what is now the International Classification of Diseases (ICD). Each of these revisions has produced some break in the comparability of cause-of-death statistics. ICD–10 has many changes from ICD–9, including considerably greater detail, shifts of inclusion terms and titles from one category, section, or chapter to another; regroupings of diseases; new titles and sections; and modifications in coding rules (6). As a result, serious breaks occur in comparability for a number of causes of death. Measures of this discontinuity are essential to the interpretation of mortality trends. Ratios of comparability between ICD–9 and ICD–10 have been computed for this purpose.

The method followed by the United States for constructing comparability ratios for mortality data is that recommended by the International Conference for the Sixth Revision of the International List of Diseases and Causes of Death, which convened in France in 1948. The Conference recommended that deaths for a country as a whole in 1949 or in 1950 be coded according to the Detailed List of Causes of Death of the Fifth Revision, and that dual tabulations of these data be published in such a way as to indicate the changes resulting from the application of the new revision. The dual coding method to measure discontinuities in mortality data resulting from the introduction of a new revision was used in this study between ICD–9 and ICD–10. This makes the fifth time since the recommendation of the International Conference for the Sixth Revision that the United States used this method (7).

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

A comparability ratio of 1.00 indicates that the same number of deaths was assigned to a particular cause or combination of causes whether the Ninth or Tenth Revision was used. A ratio showing perfect correspondence (1.00) between the two revisions does not necessarily indicate that the cause was unaffected by changes in classification and coding procedures but merely that there was no net change.

A ratio of less than 1.00 results from a decrease in assignments of death to a cause in ICD–10 compared with ICD–9. A ratio of more than 1.00 results from an increase in assignments of deaths to a cause in ICD–10 compared with the comparable ICD–9 cause.

One of the major objectives of the comparability study was to furnish ratios that measure the degree of discontinuity between data tabulated by the cause lists published under ICD–10 and data tabulated by the most nearly comparable cause lists published under ICD–9.

Ratios are presented for the cause lists presented in this report. The list of selected causes for which final data are published has been expanded from the 72 causes plus HIV infection and Alzheimer's disease published under ICD–9, to 113 causes under ICD–10. The list of selected causes of infant death was expanded from 61 plus HIV disease to 130 causes. The lists are as follows:

ICD–10	ICD–9
1. List of 113 Selected Causes of Death	1. List of 72 Selected Causes of Death, HIV infection and Alzheimer's disease
2. List of 130 Selected Causes of Infant Death	2. List of 61 Selected Causes of Infant Death and HIV infection

The data used in the ICD–10 Comparability Study are cause-of-death information from a large sample of death certificates for deaths occurring in 1996 filed in the 50 States and the District of Columbia. Table III shows comparability ratios and their standard errors for the List of 113 Selected Causes of Death. Table IV shows the same information for the List of 130 Selected Causes of Infant Death. The cause-of-death information in the sample is based on death records in which the underlying cause of death is classified by ICD–9 and ICD–10. The sample comprises 1,852,651 (80 percent) out of the total 2,314,690 resident deaths that occurred in the United States during 1996. The sample is treated as if it were random. As a result, standard errors associated with comparability ratios are based on sampling and stochastic (random) variation (9). Most of the records in the study were processed using the NCHS automated systems for

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

Cause of death (Based on the *Tenth Revision, International Classification of Diseases*, 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Salmonella infections	A01–A02	002–003	30	37	0.8108	0.0644	7.9	0.6846	0.9370
Shigellosis and amebiasis	A03,A06	004,006	*	*	*	*	*	*	*
Certain other intestinal infections	A04,A07–A09	007–009	*	*	*	*	*	*	*
Tuberculosis	A16–A19	010–018	653	764	0.8547	0.0172	2.0	0.8209	0.8885
Respiratory tuberculosis	A16	010–012	518	572	0.9056	0.0201	2.2	0.8662	0.9450
Other tuberculosis	A17–A19	013–018	135	192	0.7031	0.0407	5.8	0.6233	0.7830
Whooping cough	A37	033	*	*	*	*	*	*	*
Scarlet fever and erysipelas	A38,A46	034.1–035	*	*	*	*	*	*	*
Meningococcal infection	A39	036	221	222	0.9955	0.0149	1.5	0.9663	1.0247
Septicemia	A40–A41	038	21,258	17,791	1.1949	0.0042	0.3	1.1867	1.2030
Syphilis	A50–A53	090–097	21	33	0.6364	0.1184	18.6	0.4043	0.8685
Acute poliomyelitis	A80	045	*	*	*	*	*	*	*
Arthropod-borne viral encephalitis	A83–A84,A85.2	062–064	*	*	*	*	*	*	*
Measles	B05	055	*	*	*	*	*	*	*
Viral hepatitis	B15–B19	070	1,123	1,346	0.8343	0.0120	1.4	0.8109	0.8578
Human immunodeficiency virus (HIV) disease	B20–B24	*042–*044	12,765	11,150	1.1448	0.0045	0.4	1.1360	1.1536
Malaria	B50–B54	084	*	*	*	*	*	*	*
Other and unspecified infectious and parasitic diseases and their sequelae	A00,A05,A20–A36,A42–A44,A48–A49, A54–A79,A81–A82,A85.0–A85.1,A85.8 A86–B04,B06–B09,B25–B49,B55–B99	001,005,020–032,037,039–041,046–054, 056–061,065–066,071–083,085–088, 098–134,136–139,771.3	2,865	2,607	1.0990	0.0154	1.4	1.0688	1.1291
Malignant neoplasms	C00–C97	140–208	464,688	461,544	1.0068	0.0002	0.0	1.0064	1.0072
Malignant neoplasms of lip, oral cavity and pharynx	C00–C14	140–149	5,927	6,172	0.9603	0.0040	0.4	0.9525	0.9681
Malignant neoplasm of esophagus	C15	150	9,596	9,630	0.9965	0.0020	0.2	0.9926	1.0003
Malignant neoplasm of stomach	C16	151	11,480	11,408	1.0063	0.0019	0.2	1.0025	1.0101
Malignant neoplasms of colon, rectum and anus	C18–C21	153–154	48,583	48,619	0.9993	0.0009	0.1	0.9975	1.0010
Malignant neoplasms of liver and intrahepatic bile ducts	C22	155	9,732	10,102	0.9634	0.0023	0.2	0.9588	0.9679
Malignant neoplasm of pancreas	C25	157	24,313	24,361	0.9980	0.0009	0.1	0.9963	0.9997
Malignant neoplasm of larynx	C32	161	3,209	3,194	1.0047	0.0053	0.5	0.9943	1.0150
Malignant neoplasms of trachea, bronchus and lung	C33–C34	162	131,750	133,936	0.9837	0.0005	0.1	0.9827	0.9846
Malignant melanoma of skin	C43	172	5,941	6,139	0.9677	0.0032	0.3	0.9614	0.9741
Malignant neoplasm of breast	C50	174–175	38,102	37,891	1.0056	0.0010	0.1	1.0036	1.0075
Malignant neoplasm of cervix uteri	C53	180	3,753	3,802	0.9871	0.0034	0.3	0.9805	0.9938
Malignant neoplasms of corpus uteri and uterus, part unspecified	C54–C55	179,182	5,318	5,183	1.0260	0.0040	0.4	1.0182	1.0339
Malignant neoplasm of ovary	C56	183.0	11,292	11,344	0.9954	0.0016	0.2	0.9923	0.9985
Malignant neoplasm of prostate	C61	185	30,672	30,267	1.0134	0.0015	0.1	1.0105	1.0162
Malignant neoplasms of kidney and renal pelvis	C64–C65	189.0,189.1	9,521	9,521	1.0000	0.0022	0.2	0.9957	1.0043
Malignant neoplasm of bladder	C67	188	9,563	9,594	0.9968	0.0026	0.3	0.9916	1.0019
Malignant neoplasms of meninges, brain and other parts of central nervous system	C70–C72	191–192	10,039	10,359	0.9691	0.0025	0.3	0.9642	0.9740
Malignant neoplasms of lymphoid, hematopoietic and related tissue	C81–C96	200–208	44,715	44,530	1.0042	0.0012	0.1	1.0019	1.0064
Hodgkin's disease	C81	201	1,021	1,036	0.9855	0.0089	0.9	0.9680	1.0030
Non-Hodgkin's lymphoma	C82–C85	200,202	17,924	18,326	0.9781	0.0018	0.2	0.9745	0.9817
Leukemia	C91–C95	204–208	16,600	16,405	1.0119	0.0019	0.2	1.0083	1.0155

See footnotes at end of table.

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

Cause of death (Based on the *Tenth Revision, International Classification of Diseases*, 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Multiple myeloma and immunoproliferative neoplasms	C88,C90	203	9,099	8,763	1.0383	0.0030	0.3	1.0324	1.0443
Other and unspecified malignant neoplasms of lymphoid, hematopoietic and related tissue	C96	- - -	*	*	*	*	*	*	*
All other and unspecified malignant neoplasms	C17,C23–C24,C26–C31,C37–C41, C44–C49,C51–C52,C57–C60, C66,C68–C69,C73–C80,C97	152, 156,158–160,163–171,173,181, 183.2–184,186–187,189.2–190,193–199	51,182	45,492	1.1251	0.0021	0.2	1.1210	1.1292
In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior	D00–D48	210–239	9,263	5,532	1.6744	0.0164	1.0	1.6422	1.7067
Anemias	D50–D64	280–285	3,059	3,200	0.9559	0.0077	0.8	0.9409	0.9710
Diabetes mellitus	E10–E14	250	48,636	48,242	1.0082	0.0011	0.1	1.0060	1.0103
Nutritional deficiencies	E40–E64	260–269	3,215	2,763	1.1636	0.0165	1.4	1.1312	1.1960
Malnutrition	E40–E46	260–263	2,607	2,665	0.9782	0.0151	1.5	0.9487	1.0078
Other nutritional deficiencies	E50–E64	264–269	608	98	6.2041	0.5961	9.6	5.0358	7.3724
Meningitis	G00,G03	320–322	592	584	1.0137	0.0136	1.3	0.9871	1.0403
Parkinson's disease	G20–G21	332	10,404	10,392	1.0012	0.0028	0.3	0.9956	1.0067
Alzheimer's disease	G30	331.0	29,707	19,121	1.5536	0.0071	0.5	1.5398	1.5675
Major cardiovascular diseases	I00–I78	390–434,436–448	796,919	798,435	0.9981	0.0002	0.0	0.9977	0.9985
Diseases of heart	I00–I09,I11,I13,I20–I51	390–398,402,404,410–429	615,564	624,405	0.9858	0.0002	0.0	0.9854	0.9863
Acute rheumatic fever and chronic rheumatic heart diseases	I00–I09	390–398	2,446	2,980	0.8208	0.0089	1.1	0.8034	0.8382
Hypertensive heart disease	I11	402	17,322	21,577	0.8028	0.0028	0.3	0.7973	0.8083
Hypertensive heart and renal disease	I13	404	2,170	2,027	1.0705	0.0160	1.5	1.0392	1.1019
Ischemic heart diseases	I20–I25	410–414,429.2	466,459	466,935	0.9990	0.0002	0.0	0.9985	0.9994
Acute myocardial infarction	I21–I22	410	178,125	180,169	0.9887	0.0003	0.0	0.9880	0.9893
Other acute ischemic heart diseases	I24	411	2,667	2,638	1.0110	0.0117	1.2	0.9880	1.0340
Other forms of chronic ischemic heart disease	I20,I25	412–414,429.2	285,667	284,128	1.0054	0.0004	0.0	1.0046	1.0062
Atherosclerotic cardiovascular disease, so described	I25.0	429.2	64,354	61,362	1.0488	0.0016	0.2	1.0456	1.0519
All other forms of chronic ischemic heart disease	I20,I25.1–I25.9	412–414	221,313	222,766	0.9935	0.0004	0.0	0.9927	0.9942
Other heart diseases	I26–I51	415–429.1,429.3–429.9	127,167	130,886	0.9716	0.0010	0.1	0.9696	0.9736
Acute and subacute endocarditis	I33	421	552	554	0.9964	0.0137	1.4	0.9695	1.0233
Diseases of pericardium and acute myocarditis	I30–I31,I40	420,422–423	489	475	1.0295	0.0160	1.6	0.9981	1.0608
Heart failure	I50	428	44,297	42,554	1.0410	0.0013	0.1	1.0384	1.0435
All other forms of heart disease	I26–I28,I34–I38,I42–I49,151	415–417,424–427,429.0–429.1,429.3–429.9	81,829	87,303	0.9373	0.0014	0.2	0.9345	0.9401
Essential (primary) hypertension and hypertensive renal disease	I10,I12	401,403	11,958	10,684	1.1192	0.0050	0.4	1.1094	1.1291
Cerebrovascular diseases	I60–I69	430–434,436–438	137,264	129,640	1.0588	0.0008	0.1	1.0572	1.0604
Atherosclerosis	I70	440	13,894	14,417	0.9637	0.0025	0.3	0.9588	0.9686
Other diseases of circulatory system	I71–I78	441–448	18,239	19,289	0.9456	0.0021	0.2	0.9414	0.9498
Aortic aneurysm and dissection	I71	441	12,216	12,201	1.0012	0.0010	0.1	0.9992	1.0032
Other diseases of arteries, arterioles and capillaries	I72–I78	442–448	6,023	7,088	0.8497	0.0053	0.6	0.8394	0.8601
Other disorders of circulatory system	I80–I99	451–459	2,984	2,899	1.0293	0.0172	1.7	0.9956	1.0631
Influenza and pneumonia	J10–J18	480–487	50,526	72,371	0.6982	0.0018	0.3	0.6947	0.7016
Influenza	J10–J11	487	572	567	1.0088	0.0073	0.7	0.9945	1.0231
Pneumonia	J12–J18	480–486	49,954	71,804	0.6957	0.0018	0.3	0.6922	0.6992
Other acute lower respiratory infections	J20–J22	466	346	355	0.9746	0.0392	4.0	0.8978	1.0515
Acute bronchitis and bronchiolitis	J20–J21	466	265	355	0.7465	0.0264	3.5	0.6947	0.7983

See footnotes at end of table.

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

Cause of death (Based on the *Tenth Revision, International Classification of Diseases*, 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Unspecified acute lower respiratory infection	J22	- - -	*	*	*	*	*	*	*
Chronic lower respiratory diseases	J40–J47	490–494,496	94,326	90,022	1.0478	0.0009	0.1	1.0460	1.0496
Bronchitis, chronic and unspecified	J40–J42	490–491	913	2,320	0.3935	0.0107	2.7	0.3726	0.4145
Emphysema	J43	492	14,369	14,774	0.9726	0.0031	0.3	0.9666	0.9786
Asthma	J45–J46	493	4,217	4,718	0.8938	0.0061	0.7	0.8819	0.9057
Other chronic lower respiratory diseases	J44,J47	494,496	74,827	68,210	1.0970	0.0014	0.1	1.0943	1.0998
Pneumoconioses and chemical effects	J60–J66,J68	500–506	860	845	1.0178	0.0099	1.0	0.9983	1.0372
Pneumonitis due to solids and liquids	J69	507	10,183	9,104	1.1185	0.0048	0.4	1.1092	1.1279
Other diseases of respiratory system	J00–J06,J30–J39,J67,J70–J98	034.0,460–465,470–478,495,508–519	16,656	14,269	1.1673	0.0052	0.4	1.1572	1.1774
Peptic ulcer	K25–K28	531–534	3,574	3,686	0.9696	0.0045	0.5	0.9608	0.9784
Diseases of appendix	K35–K38	540–543	209	202	1.0347	0.0242	2.3	0.9873	1.0820
Hernia	K40–K46	550–553	658	633	1.0395	0.0154	1.5	1.0094	1.0696
Chronic liver disease and cirrhosis	K70,K73–K74	571	21,688	20,920	1.0367	0.0027	0.3	1.0314	1.0420
Alcoholic liver disease	K70	571.0–571.3	10,147	9,965	1.0183	0.0050	0.5	1.0085	1.0281
Other chronic liver disease and cirrhosis	K73–K74	571.4–571.9	11,541	10,955	1.0535	0.0041	0.4	1.0454	1.0615
Cholelithiasis and other disorders of gallbladder	K80–K82	574–575	1,725	1,803	0.9567	0.0060	0.6	0.9450	0.9685
Nephritis, nephrotic syndrome and nephrosis	N00–N07,N17–N19,N25–N27	580–589	24,939	20,242	1.2320	0.0044	0.4	1.2234	1.2407
Acute and rapidly progressive nephritic and nephrotic syndrome	N00–N01,N04	580–581	161	249	0.6466	0.0342	5.3	0.5796	0.7136
Chronic glomerulonephritis, nephritis and nephropathy not specified as acute or chronic, and renal sclerosis unspecified	N02–N03,N05–N07,N26	582–583,587	468	1,213	0.3858	0.0144	3.7	0.3575	0.4141
Renal failure	N17–N19	584–586	24,290	18,758	1.2949	0.0050	0.4	1.2852	1.3047
Other disorders of kidney	N25,N27	588–589	20	22	0.9091	0.0867	9.5	0.7392	1.0790
Infections of kidney	N10–N12,N13.6,N15.1	590	731	726	1.0069	0.0144	1.4	0.9786	1.0352
Hyperplasia of prostate	N40	600	326	327	0.9969	0.0159	1.6	0.9658	1.0280
Inflammatory diseases of female pelvic organs	N70–N76	614–616	63	64	0.9844	0.0410	4.2	0.9040	1.0648
Pregnancy, childbirth and the puerperium	O00–099	630–676	*	*	*	*	*	*	*
Pregnancy with abortive outcome	O00–O07	630–639	*	*	*	*	*	*	*
Other complications of pregnancy, childbirth and the puerperium	O10–O99	640–676	*	*	*	*	*	*	*
Certain conditions originating in the perinatal period	P00–P96	760–771.2,771.4–779	10,184	9,555	1.0658	0.0033	0.3	1.0593	1.0724
Congenital malformations, deformations and chromosomal abnormalities	Q00–Q99	740–759	5,950	7,025	0.8470	0.0055	0.6	0.8362	0.8577
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00–R99	780–799	16,940	17,732	0.9553	0.0034	0.4	0.9487	0.9620
All other diseases (Residual)	Residual	Residual	109,853	122,107	0.8996	0.0015	0.2	0.8968	0.9025
Accidents (unintentional injuries)	V01–X59,Y85–Y86	E800–E869,E880–E929	31,084	30,163	1.0305	0.0014	0.1	1.0278	1.0333
Transport accidents	V01–V99,Y85	E800–E848,E929.0,E929.1	17,547	17,586	0.9978	0.0006	0.1	0.9966	0.9990
Motor vehicle accidents	V02–V04,V09.0,V09.2,V12–V14, V19.0–V19.2,V19.4–V19.6,V20–V79, V80.3–V80.5,V81.0–V81.1,V82.0–V82.1, V83–V86,V87.0–V87.8,V88.0–V88.8, V89.0,V89.2	E810–E825	16,632	17,051	0.9754	0.0006	0.1	0.9742	0.9766

See footnotes at end of table.

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

Cause of death (Based on the *Tenth Revision, International Classification of Diseases*, 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Other land transport accidents	V01,V05–V06,V09.1,V09.3–V09.9, V10–V11,V15–V18,V19.3,V19.8–V19.9, V80.0–V80.2,V80.6–V80.9,V81.2–V81.9, V82.2–V82.9,V87.8,V88.9,V89.1,V89.3, V89.9	E800–E807,E826–E829	*	*	*	*	*	*	*
Water, air and space, and other and unspecified transport accidents and their sequelae	V90–V99,Y85	E830–E848,E929.0,E929.1	351	347	1.0115	0.0209	2.1	0.9706	1.0525
Nontransport accidents	W00–X59,Y86	E850–E869,E880–E928,E929.2–E929.9	13,537	12,577	1.0763	0.0035	0.3	1.0696	1.0831
Falls	W00–W19	E880–E888	5,173	6,152	0.8409	0.0049	0.6	0.8313	0.8505
Accidental discharge of firearms	W32–W34	E922	493	466	1.0579	0.0127	1.2	1.0331	1.0828
Accidental drowning and submersion	W65–W74	E910	283	284	0.9965	0.0127	1.3	0.9716	1.0213
Accidental exposure to smoke, fire and flames	X00–X09	E890–E899	493	506	0.9743	0.0089	0.9	0.9568	0.9918
Accidental poisoning and exposure to noxious substance	X40–X49	E850–E869,E924.1	*	*	*	*	*	*	*
Other and unspecified nontransport accidents and their sequelae	W20–W31,W35–W64,W75–W99, X10–X39,X50–X59,Y86	E900–E909,E911–E921,E923–E924.0, E924.8–E928,E929.2–E929.9	6,698	4,721	1.4188	0.0123	0.9	1.3947	1.4428
Intentional self-harm (suicide)	X60–X84,Y87.0	E950–E959	18,352	18,422	0.9962	0.0005	0.0	0.9952	0.9972
Intentional self-harm (suicide) by discharge of firearms	X72–X74	E955.0–E955.4	14,157	14,183	0.9982	0.0007	0.1	0.9968	0.9996
Intentional self-harm (suicide) by other and unspecified means and their sequelae	X60–X71,X75–X84,Y87.0	E950–E954,E955.5–E959	4,195	4,239	0.9896	0.0023	0.2	0.9850	0.9942
Assault (homicide)	X85–Y09,Y87.1	E960–E969	12,287	12,308	0.9983	0.0006	0.1	0.9972	0.9994
Assault (homicide) by discharge of firearms	X93–X95	E965.0–E965.4	8,718	8,745	0.9969	0.0008	0.1	0.9953	0.9985
Assault (homicide) by other and unspecified means and their sequelae	X85–X92,X96–Y09,Y87.1	E960–E964,E965.5–E969	3,569	3,563	1.0017	0.0024	0.2	0.9969	1.0064
Legal intervention	Y35,Y89.0	E970–E978	*	*	*	*	*	*	*
Events of undetermined intent	Y10–Y34,Y87.2,Y89.9	E980–E989	*	*	*	*	*	*	*
Discharge of firearms, undetermined intent	Y22–Y24	E985.0–E985.4	*	*	*	*	*	*	*
Other and unspecified events of undetermined intent and their sequelae	Y10–Y21,Y25–Y34,Y87.2,Y89.9	E980–E984,E985.5–E989	*	*	*	*	*	*	*
Operations of war and their sequelae	Y36,Y89.1	E990–E999	*	*	*	*	*	*	*
Complications of medical and surgical care	Y40–Y84,Y88	E870–E879,E930–E949	*	*	*	*	*	*	*
Injury by firearms[1]	W32–W34,X72–X74,X93–X95, Y22–Y24,Y35.0	E922,E955.0–E955.4,E965.0–E965.4, E970,E985.0–E985.4	23,355	23,418	0.9973	0.0006	0.1	0.9961	0.9985
Drug-induced deaths[1]	F11.0–F11.5,F11.7–F11.9,F12.0–F12.5, F12.7–F12.9,F13.0–F13.5,F13.7–F13.9, F14.0–F14.5,F14.7–F14.9,F15.0–F15.5, F15.7–F15.9,F16.0–F16.5,F16.7–F16.9, F17.0,F17.3–F17.5,F17.7–F17.9, F18.0–F18.5,F18.7–F18.9,F19.0–F19.5, F19.7–F19.9,X40–X44,X60–X64,X85, Y10–Y14	292,304,305.2–305.9,E850–E858, E950.0–E950.5,E962.0,E980.0–E980.5	1,158	969	1.1950	0.0225	1.9	1.1509	1.2391
Alcohol-induced deaths[1]	F10,G31.2,G62.1,I42.6,K29.2,K70, R78.0,X45,X65,Y15	291,303,305.0,357.5,425.5,535.3, 571.0–571.3,790.3,E860	14,783	15,269	0.9682	0.0025	0.3	0.9633	0.9731

* Figure does not meet standards of reliability or precision; see Technical notes.

- - - Category not applicable.

0.0 Quantity more than zero but less than 0.05.

[1]Included in selected categories.

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

Cause of death (Based on the *Tenth Revision, International Classification of Diseases,* 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Certain infectious and parasitic diseases	A00–B99	001–033,034.1–134,136–139,771.3	284	387	0.7339	0.0339	4.6	0.6673	0.8004
Certain intestinal infectious diseases	A00–A08	001–008	*	*	*	*	*	*	*
Diarrhea and gastroenteritis of infectious origin	A09	009	0	144	0.0000	0.0000	0.0	0.0000	0.0000
Tuberculosis	A16–A19	010–018	*	*	*	*	*	*	*
Tetanus	A33,A35	037,771.3	*	*	*	*	*	*	*
Diptheria	A36	032	*	*	*	*	*	*	*
Whooping cough	A37	033	*	*	*	*	*	*	*
Meningococcal infection	A39	036	25	26	0.9615	0.0377	3.9	0.8876	1.0355
Septicemia	A40–A41	038	167	121	1.3802	0.0713	5.2	1.2403	1.5200
Congenital syphillis	A50	090	*	*	*	*	*	*	*
Gonococcal infection	A54	098	*	*	*	*	*	*	*
Viral diseases	A80–B34	042–079	62	62	1.0000	0.0757	7.6	0.8517	1.1483
Acute poliomyelitis	A80	045	*	*	*	*	*	*	*
Varicella (chickenpox)	B01	052	*	*	*	*	*	*	*
Measles	B05	055	*	*	*	*	*	*	*
Human immunodeficiency virus (HIV) disease	B20–B24	042–044	*	*	*	*	*	*	*
Mumps	B26	072	*	*	*	*	*	*	*
Other and unspecified viral diseases	A81–B00,B02–B04,B06–B19,B25, B27–B34	046–051,053–054,056–071,073–079	35	36	0.9722	0.1255	12.9	0.7262	1.2182
Candidiasis	B37	112	*	*	*	*	*	*	*
Malaria	B50–B54	084	*	*	*	*	*	*	*
Pneumocystosis	B59	136.3	*	*	*	*	*	*	*
All other and unspecified infectious and parasitic diseases	A20–A32,A38,A42–A49,A51–A53, A55–A79,B35–B36,B38–B49, B55–B58,B60–B99	020–031,034.1–035,039–041,080–083, 085–088,091–097,099–111,114–134, 136.0–136.2,136.4–139	*	*	*	*	*	*	*
Neoplasms	C00–D48	140–239	73	72	1.0139	0.0420	4.1	0.9317	1.0961
Malignant neoplasms	C00–C97	140–208	48	46	1.0435	0.0544	5.2	0.9369	1.1501
Hodgkin's disease and non-Hodgkin's lymphomas	C81–C85	200–202	*	*	*	*	*	*	*
Leukemia	C91–C95	204–208	*	*	*	*	*	*	*
Other and unspecified malignant neoplasms	C00–C80,C88–C90,C96–C97	140–199,203	30	28	1.0714	0.0906	8.5	0.8939	1.2489
In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior	D00–D48	210–239	25	26	0.9615	0.1131	11.8	0.7398	1.1833
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50–D89	135, 279–289	35	50	0.7000	0.0803	11.5	0.5427	0.8573
Anemias	D50–D64	280–285	*	*	*	*	*	*	*
Other diseases of blood and blood-forming organs	D65–D76	286–289	*	*	*	*	*	*	*
Certain disorders involving the immune mechanism	D80–D89	135,279	*	*	*	*	*	*	*
Endocrine, nutritional and metabolic diseases	E00–E88	240–278	112	129	0.8682	0.0555	6.4	0.7595	0.9770
Short stature, not elsewhere classified	E34.3	259.4	*	*	*	*	*	*	*
Malnutrition and other nutritional deficiencies	E40–E64	260–269	*	*	*	*	*	*	*
Cystic fibrosis	E84	277.0	*	*	*	*	*	*	*
Volume depletion, disorders of fluid, electrolyte and acid-base balance	E86–E87	276	40	53	0.7547	0.0852	11.3	0.5878	0.9217

See footnotes at end of table.

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

Cause of death (Based on the *Tenth Revision, International Classification of Diseases,* 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
All other endocrine, nutritional and metabolic diseases	E00–E32,E34.0–E34.2,E34.4–E34.9, E65–E83,E85,E88	240–259.3,259.8–259.9,270–275, 277.1–278	64	55	1.1636	0.0809	6.9	1.0051	1.3221
Diseases of the nervous system	G00–G98	320–359,435	305	286	1.0664	0.0263	2.5	1.0149	1.1180
Meningitis	G00,G03	320–322	70	70	1.0000	0.0404	4.0	0.9208	1.0792
Infantile spinal muscular atrophy, type I (Werdnig-Hoffman)	G12.0	335.0	47	47	1.0000	0.0521	5.2	0.8978	1.1022
Infantile cerebral palsy	G80	343	*	*	*	*	*	*	*
Anoxic brain damage, not elsewhere classified	G93.1	348.1	29	30	0.9667	0.1269	13.1	0.7179	1.2155
Other diseases of nervous system	G04,G06–G11,G12.1–G12.9, G20–G72,G81–G92,G93.0, G93.2–G93.9,G95–G98	323–334,335.1–342,344–348.0, 348.2–359,435	145	126	1.1508	0.0532	4.6	1.0466	1.2550
Diseases of the ear and mastoid process	H60–H93	380–389	*	*	*	*	*	*	*
Diseases of the circulatory system	I00–I99	390–434,436–459	419	587	0.7138	0.0244	3.4	0.6659	0.7617
Pulmonary heart disease and diseases of pulmonary circulation	I26–I28	415–417	138	123	1.1220	0.0447	4.0	1.0342	1.2097
Pericarditis, endocarditis and myocarditis	I30,I33,I40	420–422	*	*	*	*	*	*	*
Cardiomyopathy	I42	425	82	84	0.9762	0.0166	1.7	0.9436	1.0088
Cardiac arrest	I46	427.5	25	87	0.2874	0.0508	17.7	0.1878	0.3869
Cerebrovascular diseases	I60–I69	430–434,436–438	77	163	0.4724	0.0510	10.8	0.3725	0.5723
All other diseases of circulatory system	I00–I25,I31,I34–I38,I44–I45, I47–I51,I70–I99	390–414,423–424,426–427.4, 427.6–429,440–459	88	123	0.7154	0.0519	7.3	0.6137	0.8172
Disease of the respiratory system	J00–J98	034.0,460–519	420	516	0.8140	0.0220	2.7	0.7709	0.8570
Acute upper respiratory infections	J00–J06	034.0,460–465	*	*	*	*	*	*	*
Influenza and pneumonia	J10–J18	480–487	231	303	0.7624	0.0261	3.4	0.7112	0.8135
Influenza	J10–J11	487	*	*	*	*	*	*	*
Pneumonia	J12–J18	480–486	224	295	0.7593	0.0266	3.5	0.7072	0.8114
Acute bronchitis and acute bronchiolitis	J20–J21	466	33	41	0.8049	0.0758	9.4	0.6563	0.9534
Bronchitis, chronic and unspecified	J40–J42	490–491	*	*	*	*	*	*	*
Asthma	J45–J46	493	*	*	*	*	*	*	*
Pneumonitis due to solids and liquids	J69	507	*	*	*	*	*	*	*
Other and unspecified diseases of respiratory system	J22,J30–J39,J43–J44,J47–J68,J70–J98	470–479,492,494–506,508–519	117	127	0.9213	0.0632	6.9	0.7973	1.0452
Diseases of the digestive system	K00–K92	520–579	278	167	1.6647	0.1084	6.5	1.4521	1.8772
Gastritis, duodenitis, and noninfective enteritis and colitis	K29,K50–K55	535, 555–558	137	47	2.9149	0.3879	13.3	2.1547	3.6751
Hernia of abdominal cavity and intestinal obstruction without hernia	K40–K46,K56	550–553,560	*	*	*	*	*	*	*
All other and unspecified diseases of digestive system	K00–K28,K30–K38,K57–K92	520–534,536–543,562–579	84	86	0.9767	0.0708	7.3	0.8379	1.1156
Diseases of the genitourinary system	N00–N98	580–629	117	117	1.0000	0.0567	5.7	0.8889	1.1111
Renal failure and other disorders of kidney	N17–N19,N25,N27	584–589	102	98	1.0408	0.0658	6.3	0.9118	1.1699
Other and unspecified diseases of genitourinary system	N00–N15,N20–N23,N26,N28–N98	580–583,590–629	*	*	*	*	*	*	*
Certain conditions originating in the perinatal period	P00–P96	760–771.2,771.4–779	10,047	9,495	1.0581	0.0032	0.3	1.0519	1.0643

See footnotes at end of table.

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

Cause of death (Based on the *Tenth Revision, International Classification of Diseases,* 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Newborn affected by maternal factors and by complications of pregnancy, labor and delivery	P00–P04	760–763	1,305	1,256	1.0390	0.0099	1.0	1.0196	1.0585
Newborn affected by maternal hypertensive disorders	P00.0	760.0	23	22	1.0455	0.0465	4.4	0.9544	1.1365
Newborn affected by other maternal conditions which may be unrelated to present pregnancy	P00.1–P00.9	760.1–760.6,760.8–760.9	*	*	*	*	*	*	*
Newborn affected by maternal complications of pregnancy	P01	761	662	643	1.0295	0.0138	1.3	1.0024	1.0567
Newborn affected by incompetent cervix	P01.0	761.0	205	201	1.0199	0.0188	1.8	0.9831	1.0567
Newborn affected by premature rupture of membranes	P01.1	761.1	314	307	1.0228	0.0136	1.3	0.9962	1.0494
Newborn affected by multiple pregnancy	P01.5	761.5	104	103	1.0097	0.0507	5.0	0.9103	1.1091
Newborn affected by other maternal complications of pregnancy	P01.2–P01.4,P01.6–P01.9	761.2–761.4,761.6–761.9	39	32	1.2188	0.1655	13.6	0.8945	1.5430
Newborn affected by complications of placenta, cord and membranes	P02	762	579	553	1.0470	0.0128	1.2	1.0219	1.0721
Newborn affected by complications involving placenta	P02.0–P02.3	762.0–762.3	306	285	1.0737	0.0174	1.6	1.0395	1.1079
Newborn affected by complications involving cord	P02.4–P02.6	762.4–762.6	*	*	*	*	*	*	*
Newborn affected by chorioamnionitis	P02.7	762.7	258	255	1.0118	0.0163	1.6	0.9799	1.0436
Newborn affected by other and unspecified abnormalities of membranes	P02.8–P02.9	762.8–762.9	*	*	*	*	*	*	*
Newborn affected by other complications of labor and delivery	P03	763.0–763.4,763.6–763.9	37	20	1.8500	0.3262	17.6	1.2107	2.4893
Newborn affected by noxious influences transmitted via placenta or breast milk	P04	760.7, 763.5	*	*	*	*	*	*	*
Disorders related to length of gestation and fetal malnutrition	P05–P08	764–766	3,843	3,474	1.1062	0.0064	0.6	1.0936	1.1188
Slow fetal growth and fetal malnutrition	P05	764	34	30	1.1333	0.1004	8.9	0.9366	1.3301
Disorders related to short gestation and low birth weight, not elsewhere classified	P07	765	3,809	3,444	1.1060	0.0064	0.6	1.0934	1.1186
Extremely low birthweight or extreme immaturity	P07.0,P07.2	765.0	2,835	2,558	1.1083	0.0079	0.7	1.0927	1.1239
Other low birthweight or preterm	P07.1,P07.3	765.1	974	886	1.0993	0.0135	1.2	1.0729	1.1258
Disorders related to long gestation and high birthweight	P08	766	*	*	*	*	*	*	*
Birth trauma	P10–P15	767	5	113	0.0442	0.0197	44.5	0.0056	0.0829
Intrauterine hypoxia and birth asphyxia	P20–P21	768	401	277	1.4477	0.0599	4.1	1.3303	1.5650
Intrauterine hypoxia	P20	768.2–768.4	57	63	0.9048	0.1227	13.6	0.6643	1.1452
Birth asphyxia	P21	768.5–768.9	344	214	1.6075	0.0763	4.7	1.4579	1.7571
Respiratory distress of newborn	P22	769	917	894	1.0257	0.0131	1.3	1.0001	1.0513
Other respiratory conditions originating in the perinatal period	P23–P28	770	1,160	1,372	0.8455	0.0216	2.6	0.8032	0.8878
Congenital pneumonia	P23	770.0	57	15	3.8000	0.9004	23.7	2.0352	5.5648
Neonatal aspiration syndromes	P24	770.1	78	56	1.3929	0.1115	8.0	1.1743	1.6114
Interstitial emphysema and related conditions originating in the perinatal period	P25	770.2	146	121	1.2066	0.0595	4.9	1.0899	1.3233

See footnotes at end of table.

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

Cause of death (Based on the *Tenth Revision, International Classification of Diseases,* 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Pulmonary hemorrhage originating in the perinatal period	P26	770.3	212	145	1.4621	0.0751	5.1	1.3150	1.6092
Chronic respiratory disease originating in the perinatal period	P27	770.7	243	214	1.1355	0.0327	2.9	1.0715	1.1995
Atelectasis	P28.0–P28.1	770.4–770.5	382	185	2.0649	0.1144	5.5	1.8406	2.2891
All other respiratory conditions originating in the perinatal period	P28.2–P28.9	770.6–770.8	42	636	0.0660	0.0101	15.2	0.0463	0.0858
Infections specific to the perinatal period	P35–P39	771.0–771.2,771.4–771.8	563	552	1.0199	0.0261	2.6	0.9688	1.0710
Bacterial sepsis of newborn	P36	771.8	470	514	0.9144	0.0272	3.0	0.8611	0.9677
Omphalitis of newborn with or without mild hemorrhage	P38	771.4	*	*	*	*	*	*	*
All other infections specific to the perinatal period	P35,P37,P39	771.0–771.2,771.5–771.7	93	38	2.4474	0.3705	15.1	1.7211	3.1736
Hemorrhagic and hematological disorders of newborn	P50–P61	772–774, 776	390	274	1.4234	0.0640	4.5	1.2979	1.5488
Neonatal hemorrhage	P50–P52,P54	772	319	222	1.4369	0.0698	4.9	1.3002	1.5737
Hemorrhagic disease of newborn	P53	776.0	*	*	*	*	*	*	*
Hemolytic disease of newborn due to isoimmunization and other perinatal jaundice	P55–P59	773–774	*	*	*	*	*	*	*
Hematological disorders	P60–P61	776.1–776.9	*	*	*	*	*	*	*
Syndrome of infant of a diabetic mother and neonatal diabetes mellitus	P70.0–P70.2	775.0–775.1	*	*	*	*	*	*	*
Necrotizing enterocolitis of newborn	P77	777.5	249	203	1.2266	0.0456	3.7	1.1371	1.3161
Hydrops fetalis not due to hemolytic disease	P83.2	778.0	120	120	1.0000	0.0264	2.6	0.9483	1.0517
Other perinatal conditions	P29,P70.3–P76,P78–P81,P83.0–P83.1 P83.3–P96	775.2–775.9,777.0–777.4,777.6–777.9, 778.1–779	1,092	954	1.1447	0.0192	1.7	1.1070	1.1823
Congenital malformations, deformations and chromosomal abnormalities	Q00–Q99	740–759	3,400	3,751	0.9064	0.0057	0.6	0.8953	0.9176
Anencephaly and similar malformations	Q00	740	299	299	1.0000	0.0000	0.0	1.0000	1.0000
Congenital hydrocephalus	Q03	742.3	62	91	0.6813	0.0552	8.1	0.5732	0.7895
Spina bifida	Q05	741	24	32	0.7500	0.0765	10.2	0.6000	0.9000
Other congenital malformations of nervous system	Q01–Q02,Q04,Q06–Q07	742.0–742.2,742.4–742.9	191	177	1.0791	0.0477	4.4	0.9856	1.1725
Congenital malformations of heart	Q20–Q24	745–746	1,022	1,027	0.9951	0.0081	0.8	0.9793	1.0109
Other congenital malformations of circulatory system	Q25–Q28	747	75	121	0.6198	0.0504	8.1	0.5210	0.7186
Congenital malformations of respiratory system	Q30–Q34	748	361	571	0.6322	0.0225	3.6	0.5882	0.6762
Congenital malformations of digestive system	Q35–Q45	749–751	*	*	*	*	*	*	*
Congenital malformations of genitourinary system	Q50–Q64	752–753	216	229	0.9432	0.0244	2.6	0.8955	0.9910
Congenital malformations and deformations of musculoskeletal system, limbs and integument	Q65–Q85	754–757	269	311	0.8650	0.0319	3.7	0.8024	0.9275
Down's syndrome	Q90	758.0	57	58	0.9828	0.0705	7.2	0.8446	1.1209
Edward's syndrome	Q91.0–Q91.3	758.2	277	278	0.9964	0.0080	0.8	0.9807	1.0121
Patau's syndrome	Q91.4–Q91.7	758.1	170	173	0.9827	0.0099	1.0	0.9632	1.0021
Other congenital malformations and deformations	Q10–Q18,Q86–Q89	743–744,759	304	312	0.9744	0.0210	2.2	0.9332	1.0155
Other chromosomal abnormalities, not elsewhere classified	Q92–Q99	758.3–758.9	57	53	1.0755	0.0783	7.3	0.9221	1.2289

See footnotes at end of table.

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

Cause of death (Based on the *Tenth Revision, International Classification of Diseases,* 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00–R99	780–799	2,799	2,732	1.0245	0.0042	0.4	1.0163	1.0327
Sudden infant death syndrome	R95	798.0	2,575	2,485	1.0362	0.0040	0.4	1.0284	1.0440
Other symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00–R53,R55–R594,R96–R99	780–796,798.1–799	224	247	0.9069	0.0270	3.0	0.8540	0.9598
All other diseases	F01–F99,H00–H57,L00–M99	290–319,360–379,680–739	*	*	*	*	*	*	*
External causes of mortality	V01–Y84	E800–E999	441	444	0.9932	0.0098	1.0	0.9741	1.0124
Accidents (unintentional injuries)	V01–X59	E800–E869,E880-E929	292	285	1.0246	0.0107	1.0	1.0037	1.0454
Transport accidents	V01–V99	E800–E848,E920–E929.1	99	108	0.9167	0.0294	3.2	0.8590	0.9743
Motor vehicle accidents	V02–V04,V09.0,V09.2,V12–V14, V19.0–V19.2,V19.4–V19.6,V20–V79, V80.3–V80.5,V81.0–V81.1, V82.0–V82.1,V83–V86,V87.0–V87.8, V88.0–V88.8,V89.0,V89.2	E810–E825	95	98	0.9694	0.0176	1.8	0.9349	1.0039
Other and unspecified transport accidents	V01,V05–V06,V09.1,V09.3–V09.9, V10–V11,V15–V18,V19.3,V19.8, V19.9,V80.0–V80.2,V80.6–V80.9, V81.2–V81.9,V82.2–V82.9,V87.9, V88.9,V89.1,V89.3,V89.9,V90–V99	E800–E807,E826–E848,E929.1	*	*	*	*	*	*	*
Falls	W00–W19	E880–E888	*	*	*	*	*	*	*
Accidental discharge of firearms	W32–W34	E922	*	*	*	*	*	*	*
Accidental drowning and submersion	W65–W74	E910	*	*	*	*	*	*	*
Accidental suffocation and strangulation in bed	W75	E913.0	*	*	*	*	*	*	*
Other accidental suffocation and strangulation	W76–W77,W81–W84	E913.1–E913.9	79	69	1.1449	0.0537	4.7	1.0396	1.2502
Accidental inhalation and ingestion of food or other objects causing obstruction of respiratory tract	W78–W80	E911–E912	32	29	1.1034	0.0810	7.3	0.9447	1.2622
Accidents caused by exposure to smoke, fire and flames	X00–X09	E890–E899	*	*	*	*	*	*	*
Accidental poisoning and exposure to noxious substances	X40–X49	E850–E869,E924.1	*	*	*	*	*	*	*
Other and unspecified accidents	W20–W31,W35–W64,W85–W99, X10–X39,X50–X59	E900–E909,E914–E921,E923–E924.0, E924.8–E929	*	*	*	*	*	*	*
Assault (homicide)	X85–Y09	E960–E968	146	154	0.9481	0.0179	1.9	0.9130	0.9831
Assault (homicide) by hanging, strangulation and suffocation	X91	E963	*	*	*	*	*	*	*
Assault (homicide) by discharge of firearms	X93–X95	E965.0–E965.4	*	*	*	*	*	*	*
Neglect, abandonment and other maltreatment syndromes	Y06–Y07	E967,E968.4	*	*	*	*	*	*	*
Assault (homicide) by other and unspecified means	X85–X90,X92,X96–X99,Y00–Y05, Y08–Y09	E960–E962,E964,E965.5–E966, E968.0–E968.3, E968.8–E968.9	91	88	1.0341	0.0417	4.0	0.9524	1.1158
Complications of medical and surgical care	Y40–Y84	E870–E879,E930–E949	*	*	*	*	*	*	*
Other external causes	X60–X84,Y10–Y36	E970–E979	*	*	*	*	*	*	*

* Figure does not meet standards of reliability or precision; see Technical notes.

0.0 Quantity more than zero but less than 0.05.

selecting the underlying cause of death. Records that could not be processed were rejected for manual coding. Since the rejects are not fully representative of the complete file, the comparability ratios in this report are biased to an unknown extent. For most categories the bias is believed to be small. Tables III and IV show comparability ratios only for causes of death for which the data were deemed reliable; data not deemed reliable were replaced with an asterisk (*).

For the 15 leading causes of death in 1999 according to ICD–10, table 8 presents death rates for 1999, death rates for 1998 for the most nearly comparable ICD–9 titles (tables I and II) multiplied by the comparability ratio (comparability-modified rates), and death rates for 1998 that are not comparability modified. Comparability-modified data for 1998 uses ICD–9 codes that approximate ICD–10 categories (table III).

Selected causes of death with problems of interpretation

Changes between the comparability-modified 1998 rates and the 1999 rates for selected causes should be interpreted with caution due to concerns with the accuracy of the comparability ratio if the ratio does not accurately account for difference in the coding and classification system, changes in death rates between 1998 and 1999 will be under or overstated. Although comparability-modified 1998 rates are presented in this report for only the 15 leading causes of death (table 8), the following paragraphs attempt to explain some of the issues in interpreting these data for selected causes in the List of 113 Selected Causes of Death and the List of 130 Selected Causes of Infant Death. For further explanation of these issues, refer to the report, *Comparability of Cause of Death Between ICD–9 and ICD–10: Preliminary Estimates (9)*.

Alzheimer's disease—The comparability ratio for Alzheimer's disease (ICD–10 code G30) is 1.5536 (table III), indicating a 55 percent increase in Alzheimer's disease deaths when classified by ICD–10. In absolute terms, more than 10,000 additional deaths were classified to Alzheimer's disease in ICD–10 than in ICD–9. Nearly all of this increase (about 95 percent) comes from deaths that were classified in ICD–9 as Presenile dementia (ICD–9 code 290.1).

The application of the comparability ratio presented for Alzheimer's disease to years later than 1996 may substantially underestimate the increase in Alzheimer's disease due to ICD–10. Increases in the reporting of Alzheimer's-type dementia have occurred since 1996, resulting in substantial increases in Presenile dementia from 1996 to 1998. The number of Alzheimer's disease deaths increased by about 1,000 deaths between 1996 and 1997; slowing to an increase of about 300 between 1997 and 1998. In contrast, the increase in Presenile dementia was more substantial, about 2,000 deaths each year. If the comparability ratio were based on 1998 data it would probably be at least 1.69 (approximating the ICD–10-classified Alzheimer's disease deaths by adding the Alzheimer's disease and Presenile dementia deaths). Assuming proportionately similar increases in the ICD–9 classification of Alzheimer's disease and Presenile dementia from 1998 to 1999, the comparability ratio based on 1999 data could be as high as 1.8 or 1.9 resulting in higher rates for Alzheimer's disease in 1998. As a consequence, the reported increase in mortality for Alzheimer's disease in table C is overstated considerably.

Nephritis, nephrotic syndrome and nephrosis and Renal failure—Nephritis, nephrotic syndrome and nephrosis (ICD–10 codes N00–N07,N17–N19,N25–N27) has a comparability ratio of 1.2320 (table III). The 23 percent increase in this category is due primarily to changes in the classification of Renal failure (ICD–10 codes N17–N19) that has a comparability ratio of 1.2949. End-stage renal disease, which was classified as an unspecified disorder of the kidney in ICD–9 (ICD–9 code 593.9) (grouped with All other diseases), has been reclassified in ICD–10 as End-stage renal disease (ICD–10 code N18.0), a subcategory of Renal failure (N17–N19). This results in adding a substantial number of deaths to the Renal failure and Nephritis, nephrotic syndrome and nephrosis categories.

When applied to years later than 1996, the comparability ratios for Nephritis, nephrotic syndrome and nephrosis and Renal failure presented in this report may underestimate the increase in these causes due to ICD–10. From 1996 to 1999 reporting of End-stage renal disease increased by about 1,900 deaths. This increase disproportionately affects the numerator of the comparability ratio since End-stage renal disease is included with Renal failure in ICD–10, but not in ICD–9. Thus, the numerator of the comparability ratio should probably be larger by roughly 1,900 deaths giving a comparability ratio about 1.4 for Renal failure and about 1.3 for Nephritis, nephrotic syndrome and nephrosis.

Pregnancy, childbirth and the puerperium—The large increase in the number of deaths attributable to Pregnancy, childbirth and the puerperium (ICD–10 codes O00-O99) is due to a selection rule change in ICD–10 (26). See section entitled *Maternal mortality*.

Motor vehicle accidents and Other land transport accidents—The preliminary comparability ratio for Motor vehicle accidents shown in table III (0.9754) is different from that shown in the report, *Comparability of Cause of Death Between ICD–9 and ICD–10: Preliminary Estimates* (9). For a death to be classified as a Motor vehicle accident in ICD–10, it must be explicit that the injury involved a "motor" vehicle. In ICD–9, in the absence of the term "motor" or when a vehicle accident was reported as occurring on a highway or road, the assumption was to classify the accident as involving a motor vehicle. ICD–10 does not allow this assumption and classifies such accidents as involving unspecified vehicles (categorized in ICD–10 as Other land transport accidents). However, for U.S. data, it has been decided that, if an accident occurred on a highway or road, classification to Motor vehicle accident is appropriate. This change is made in this report. Taking into account, this change in classification results in a revised comparability ratio for Motor vehicle accidents. This ratio is only applicable to data in which the aforementioned classification change was implemented. It is possible that some States may have released data that does not include this change.

Diarrhea and gastroenteritis of infectious origin—The apparent elimination of infant deaths due to Diarrhea and gastroenteritis of infectious origin (ICD–10 code A09) occurred because in ICD–10, for developed countries, diarrhea or gastroenteritis is presumed to be noninfectious unless specified otherwise. In ICD–9 the presumption was that the disease was infectious when unspecified. Records coded in ICD–9 to ICD–9 code 009.0 (Infectious colitis, enteritis, and gastroenteritis) are reclassified in ICD–10 to noninfectious causes.

Birth trauma—For newborns, cerebral hemorrhage either unspecified or due to birth injury, anoxia, or hypoxia was classified in ICD–9 to a birth injury or trauma (ICD–9 code 767.0, Subdural and cerebral hemorrhage). In ICD–10, for the cerebral hemorrhage to be classified as birth injury (ICD–10 code P10.0, Subdural hemorrhage due to birth injury), the certifier must specify that there was a birth injury. Cerebral hemorrhages either unspecified or due to anoxia or hypoxia are classified as nontraumatic. Nearly all of the Birth trauma (ICD–10 codes

P10–P15) cases are reclassified to nontraumatic causes; thus the numerator of the comparability ratio is based on a very small number (table IV).

Atelectasis—In ICD–10, when hypoplasia or dysplasia of lung is mentioned on the death certificate with prematurity or short gestation, the appropriate classification is Primary atelectasis of newborn (ICD–10 codes P28.0–P28.1) rather than Hypoplasia and dysplasia of lung (ICD–10 code Q33.6). Due to this coding change, the number of deaths classified to Atelectasis increased substantially in 1999.

Sudden infant death syndrome (SIDS)—The large decrease in the number of deaths attributable to SIDS (ICD–10 code R95) is partially due to the change in the way SIDS is diagnosed in the medical community and reported on the death certificate. Many of these deaths have been classified to the category Other symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified.

Codes for firearm deaths

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

Codes for drug-induced deaths

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

Codes for alcohol-induced deaths

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

Marital status

Age-specific and age-adjusted death rates by marital status are shown in table 22. Mortality data by marital status is generally of high quality. A study of death certificate data using the 1986 National Mortality Followback Survey showed a high level of consistency in reporting marital status (37). Age-adjusted death rates by marital status were computed based on the age-specific rates and the standard population for ages 25 years and over. While age-specific death rates by marital status are shown for the age group 15–24 years, they are not included in the computation of the age-adjusted rate because of their high variability, particularly among the widowed population. Also, the age groups 75–84 and 85 years and over are combined due to high variability in death rates in the 85 year and over age group, particularly for the never-married population.

Educational attainment

Beginning with the 1989 data year, an item indicating decedent's educational attainment was added to the certificates of numerous States. Mortality data on educational attainment for 1999 are based on deaths to residents of the 46 States and the District of Columbia whose data were approximately 80 percent or more complete on a place-of-occurrence basis. Data for Kentucky were excluded using this criterion. Data for Georgia, Rhode Island, and South Dakota were excluded because the item was not on their certificates.

Age-specific and age-adjusted death rates by educational attainment are shown in table 23. Age-adjusted death rates by educational attainment were computed based on the age-specific rates and the standard population for ages 25–64 years. Data for age groups 65 years and over are not shown because reporting quality is poorer at older than younger ages (46).

Rates by educational attainment are affected by differences in the measuring education for the numerator and the denominator. The numerator is based on number of years of education completed as reported on the death certificate whereas the denominator is based on highest degree completed as reported on census surveys (47).

Injury at work

Information on deaths attributed to injuries at work is derived from a separate item on the death certificate that asks the medical certifier whether the death resulted from an injury sustained at work. The item is on the death certificate of all States. Number of deaths, age-specific death rates, and age-adjusted death rates for injury at work are shown in tables 24 and 25. Deaths, crude death rates, and age-adjusted death rates for injury at work are shown for ages 15 years and over. Age-adjusted death rates for injury at work were computed using age-specific death rates and the U.S. standard population based on year 2000 standard for ages 15 years and over. See section on *Computation of Rates*.

Infant mortality

Infant mortality rates are the most commonly used index for measuring the risk of dying during the first year of life. The rates presented in this report 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. For final birth figures used in the denominator for infant mortality rates, see *Births: Final Data for 1999* (48). 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 that appear in tabulations of age-specific death rates in this report are calculated by dividing the number of infant deaths by the estimated population of persons under 1 year of age on July 1, 1999, and are presented as rates per 100,000 population in this age group. Because of differences in the denominators, infant death rates may differ from infant mortality rates.

Maternal mortality

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. They are calculated by dividing the number of maternal deaths in a calendar year by the number of live births registered for the same period and are presented as rates per 100,000 live births. 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.

"Maternal deaths" are defined by the World Health Organization 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" (6). Included in these deaths are ICD–10 codes O00–O95, O98–O99, and A34.

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

Quality of reporting and processing cause of death

One index of the quality of reporting causes of death is the proportion of death certificates coded to Chapter XVIII; Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (ICD–10 codes R00–R99). Although deaths occur for which the underlying causes are impossible to determine, this proportion indicates the care and consideration given to the cause-of-death statement by the medical certifier. This proportion also may be used as a rough measure of the specificity of the medical diagnoses made by the certifier in various areas. In 1999, 1.12 percent of all reported deaths in the United States were assigned to Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified. The percent of deaths from this cause for all ages combined generally has remained stable since 1990.

Rare causes of death

Selected causes of death considered to be of public health concern are routinely confirmed by the States according to agreed upon procedures between the State vital statistics programs and the National Center for Health Statistics. These causes, termed Infrequent and rare causes of death, are listed in the NCHS instruction manuals Parts 2a, 11, and 20 (26,49,50).

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

Population bases for computing rates

The population used for computing death rates in this report (furnished by the U.S. Bureau of the Census) represents the population residing in the specified area, enumerated as of April 1 for census years and estimated as of July 1 for all other years. Death rates for the United States for 1999 are based on population estimates as of July 1, 1999, shown in table V by 10-year age groups and available by 5-year age groups on the mortality Web site at http://www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm (51). The estimates are based on the 1990 census level counts. The 1990 census level counts by race were modified to be consistent with U.S. Office of Management and Budget categories and historical categories for death data (52). The population estimates for Mexicans, Puerto Ricans, Cubans, and Other Hispanics, shown in table VI, and the population estimates by marital status, shown in table VII, are based on the Current Population Survey adjusted to resident population control totals (53) for the United States and, as such, are subject to sampling variation (see "Random variation").

Population estimates by educational attainment, shown in table VIII, are also based on the Current Population Survey (53) adjusted to resident population control totals for 46 States and the District of Columbia and are also subject to sampling variation (see "Random variation").

Population estimates for each State, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas, shown in table IX, are based on demographic analysis and, therefore, are not subject to sampling variation (54–59).

Computing rates

Except for infant and maternal mortality rates, rates are on an annual basis per 1,000 or per 100,000 estimated population residing in the specified area. Infant and maternal mortality rates are per 1,000 or per 100,000 live births. Comparisons made in the text among rates, unless otherwise specified, are statistically significant at the 0.05 level of significance. Lack of comment in the text about any two rates does not mean that the difference was tested and found not to be significant at this level.

Age-adjusted rates are used to compare relative mortality risks among groups and over time. However, they should be viewed as

Table V. Estimated population by 10-year age groups, specified race and sex: United States, 1999

Age	All races			White			Black			American Indian			Asian or Pacific Islander		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total	272,690,813	133,276,559	139,414,254	224,610,797	110,336,291	114,274,506	34,862,169	16,557,186	18,304,983	2,397,426	1,186,745	1,210,681	10,820,421	5,196,337	5,624,084
Under 1 year	3,819,903	1,952,133	1,867,770	3,027,180	1,549,389	1,477,791	568,772	289,078	279,694	42,542	21,442	21,100	181,409	92,224	89,185
1–4 years	15,122,239	7,730,542	7,391,697	12,015,456	6,155,680	5,859,776	2,226,888	1,129,687	1,097,201	159,576	80,755	78,821	720,319	364,420	355,899
5–14 years	39,495,230	20,219,664	19,275,566	31,094,794	15,940,356	15,154,438	6,232,872	3,166,617	3,066,255	467,966	237,653	230,313	1,699,598	875,038	824,560
15–24 years	37,773,512	19,334,049	18,439,463	30,014,705	15,441,143	14,573,562	5,740,422	2,881,622	2,858,800	428,979	215,783	213,196	1,589,406	795,501	793,905
25–34 years	37,935,812	18,826,288	19,109,524	30,431,393	15,273,321	15,158,072	5,286,663	2,505,284	2,781,379	374,047	191,269	182,778	1,843,709	856,414	987,295
35–44 years	44,812,649	22,254,316	22,558,333	36,946,545	18,540,240	18,406,305	5,652,358	2,653,695	2,998,663	358,769	178,119	180,650	1,854,977	882,262	972,715
45–54 years	35,802,358	17,499,088	18,303,270	30,249,529	14,954,220	15,295,309	3,928,525	1,783,710	2,144,815	256,008	123,692	132,316	1,368,296	637,466	730,830
55–64 years	23,389,085	11,150,407	12,238,678	20,133,661	9,710,115	10,423,546	2,345,099	1,014,648	1,330,451	148,113	69,600	78,513	762,212	356,044	406,168
65–74 years	18,218,248	8,198,696	10,019,552	15,958,629	7,243,777	8,714,852	1,678,493	707,523	970,970	90,511	40,756	49,755	490,615	206,640	283,975
75–84 years	12,146,695	4,871,134	7,275,561	10,965,640	4,414,172	6,551,468	889,080	333,297	555,783	50,534	21,212	29,322	241,441	102,453	138,988
85 years and over	4,175,082	1,240,242	2,934,840	3,773,265	1,113,878	2,659,387	312,997	92,025	220,972	20,381	6,464	13,917	68,439	27,875	40,564

SOURCE: Unpublished Bureau of the Census file NESTV99.

Table VI. Estimated population by 10-year age groups, according to specified Hispanic origin, race for non-Hispanic population, and sex: United States, 1999

Hispanic origin, race for non-Hispanic population, and sex	Total	Under 1 year	1–4 years	5–14 years	15–24 years	25–34 years	35–44 years	45–54 years	55–64 years	65–74 years	75–84 years	85 years and over
All origins	272,690,817	3,819,898	15,122,243	39,495,210	37,773,512	37,935,822	44,812,633	35,802,344	23,389,103	18,218,255	12,146,702	4,175,095
Male	133,276,546	1,952,129	7,730,544	20,219,645	19,334,054	18,826,296	22,254,296	17,499,079	11,150,419	8,198,701	4,871,139	1,240,244
Female	139,414,271	1,867,769	7,391,699	19,275,565	18,439,458	19,109,526	22,558,337	18,303,265	12,238,684	10,019,554	7,275,563	2,934,851
Hispanic	31,337,161	721,505	2,745,603	5,982,424	5,470,190	5,230,172	4,748,231	2,914,649	1,679,035	1,101,735	554,434	189,183
Male	15,761,486	367,917	1,401,922	3,054,760	2,839,902	2,694,460	2,423,093	1,423,924	778,134	485,849	227,993	63,532
Female	15,575,675	353,588	1,343,681	2,927,664	2,630,288	2,535,712	2,325,138	1,490,725	900,901	615,886	326,441	125,651
Mexican	20,488,782	512,263	1,982,862	4,165,118	3,787,811	3,503,948	2,925,177	1,708,153	924,033	597,836	292,282	89,299
Male	10,548,482	261,059	997,510	2,151,110	2,004,072	1,838,773	1,530,723	876,699	450,397	271,914	132,653	33,572
Female	9,940,300	251,204	985,352	2,014,008	1,783,739	1,665,175	1,394,454	831,454	473,636	325,922	159,629	55,727
Puerto Rican	2,945,172	60,495	231,465	544,553	505,575	451,306	439,630	317,737	193,064	127,288	62,256	11,803
Male	1,419,464	30,919	128,458	280,642	246,828	210,967	203,359	149,028	90,634	49,110	25,783	3,736
Female	1,525,708	29,576	103,007	263,911	258,747	240,339	236,271	168,709	102,430	78,178	36,473	8,067
Cuban	1,344,410	16,287	54,265	135,355	136,076	175,451	208,400	169,844	173,622	144,959	97,666	32,485
Male	646,862	7,260	17,640	72,174	66,202	86,250	112,076	82,361	86,336	75,189	31,530	9,844
Female	697,548	9,027	36,625	63,181	69,874	89,201	96,324	87,483	87,286	69,770	66,136	22,641
Other Hispanic[1]	6,558,797	132,460	477,011	1,137,398	1,040,728	1,099,467	1,175,024	718,915	388,316	231,652	102,230	55,596
Male	3,146,678	68,679	258,314	550,834	522,800	558,470	576,935	315,836	150,767	89,636	38,027	16,380
Female	3,412,119	63,781	218,697	586,564	517,928	540,997	598,089	403,079	237,549	142,016	64,203	39,216
Non-Hispanic[2]	241,353,656	3,098,393	12,376,640	33,512,786	32,303,322	32,705,650	40,064,402	32,887,695	21,710,068	17,116,520	11,592,268	3,985,912
Male	117,515,060	1,584,212	6,328,622	17,164,885	16,494,152	16,131,836	19,831,203	16,075,155	10,372,285	7,712,852	4,643,146	1,176,712
Female	123,838,596	1,514,181	6,048,018	16,347,901	15,809,170	16,573,814	20,233,199	16,812,540	11,337,783	9,403,668	6,949,122	2,809,200
White	196,049,405	2,366,680	9,504,139	25,662,188	25,019,655	25,667,506	32,639,082	27,600,764	18,598,444	14,945,247	10,450,220	3,595,480
Male	95,962,070	1,212,565	4,873,529	13,167,936	12,843,492	12,814,074	16,340,919	13,659,876	8,997,644	6,795,986	4,201,617	1,054,432
Female	100,087,335	1,154,115	4,630,610	12,494,252	12,176,163	12,853,432	16,298,163	13,940,888	9,600,800	8,149,261	6,248,603	2,541,048
Black	33,092,411	529,001	2,074,442	5,886,951	5,446,361	4,996,800	5,366,444	3,757,034	2,249,229	1,617,792	862,710	305,647
Male	15,674,062	268,703	1,051,490	2,988,505	2,731,741	2,360,779	2,507,837	1,699,897	971,148	681,338	322,995	89,629
Female	17,418,349	260,298	1,022,952	2,898,446	2,714,620	2,636,021	2,858,607	2,057,137	1,278,081	936,454	539,715	216,018

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

[2]Includes races other than white and black.

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

Table VII. Estimated population for ages 15 years and over by marital status, 10-year age groups, race, and sex: United States, 1999

Race, sex, and marital status	15 years and over	15–24 years	25–34 years	35–44 years	45–54 years	55–64 years	65–74 years	75 years and over
All races[1]	214,253,450	37,773,516	37,935,789	44,812,661	35,802,370	23,389,072	18,218,238	16,321,804
Never married	59,325,869	33,280,736	13,443,119	7,028,745	3,023,419	1,216,086	694,728	639,036
Ever married	154,927,581	4,492,780	24,492,670	37,783,916	32,778,951	22,172,986	17,523,510	15,682,768
Married	120,319,059	4,170,254	21,821,638	31,386,346	26,347,606	17,153,203	12,121,780	7,318,232
Widowed	14,703,589	14,013	92,354	404,593	874,824	1,818,109	3,848,043	7,651,653
Divorced	19,904,933	308,513	2,578,678	5,992,977	5,556,521	3,201,674	1,553,687	712,883
All races,[1] male	103,374,198	19,334,060	18,826,271	22,254,312	17,499,075	11,150,399	8,198,689	6,111,392
Never married	32,158,349	17,663,740	7,700,596	4,084,523	1,555,183	611,445	307,972	234,890
Ever married	71,215,849	1,670,320	11,125,675	18,169,789	15,943,892	10,538,954	7,890,717	5,876,502
Married	59,887,583	1,558,121	10,014,050	15,284,800	13,366,454	8,881,852	6,520,127	4,262,179
Widowed	2,697,871	1,205	17,991	104,440	174,507	319,701	710,507	1,369,520
Divorced	8,630,395	110,994	1,093,634	2,780,549	2,402,931	1,337,401	660,083	244,803
All races,[1] female	110,879,252	18,439,456	19,109,518	22,558,349	18,303,295	12,238,673	10,019,549	10,210,412
Never married	27,167,520	15,616,996	5,742,523	2,944,222	1,468,236	604,641	386,756	404,146
Ever married	83,711,732	2,822,460	13,366,995	19,614,127	16,835,059	11,634,032	9,632,793	9,806,266
Married	60,431,476	2,612,133	11,807,588	16,101,546	12,981,152	8,271,351	5,601,653	3,056,053
Widowed	12,005,718	12,808	74,363	300,153	700,317	1,498,408	3,137,536	6,282,133
Divorced	11,274,538	197,519	1,485,044	3,212,428	3,153,590	1,864,273	893,604	468,080
White	178,473,363	30,014,708	30,431,387	36,946,548	30,249,543	20,133,641	15,958,634	14,738,902
Never married	44,853,837	26,047,748	9,676,554	4,926,191	2,188,638	915,291	536,697	562,718
Ever married	133,619,526	3,966,960	20,754,833	32,020,357	28,060,905	19,218,350	15,421,937	14,176,184
Married	104,652,644	3,693,245	18,538,676	26,783,108	22,788,468	15,158,095	10,910,637	6,780,415
Widowed	12,439,757	8,727	66,107	315,778	662,094	1,414,227	3,190,185	6,782,639
Divorced	16,527,125	264,988	2,150,050	4,921,471	4,610,343	2,646,028	1,321,115	613,130
White male	86,690,843	15,441,144	15,273,309	18,540,233	14,954,211	9,710,105	7,243,785	5,528,056
Never married	24,941,567	13,975,201	5,786,730	3,069,701	1,190,999	481,755	236,661	200,520
Ever married	61,749,276	1,465,943	9,486,579	15,470,532	13,763,212	9,228,350	7,007,124	5,327,536
Married	52,237,112	1,366,346	8,563,878	13,068,602	11,581,204	7,856,009	5,873,623	3,927,450
Widowed	2,247,711	846	17,414	80,029	132,439	244,324	577,045	1,195,614
Divorced	7,264,453	98,751	905,287	2,321,901	2,049,569	1,128,017	556,456	204,472
White female	91,782,520	14,573,564	15,158,078	18,406,315	15,295,332	10,423,536	8,714,849	9,210,846
Never married	19,912,270	12,072,547	3,889,824	1,856,490	997,639	433,536	300,036	362,198
Ever married	71,870,250	2,501,017	11,268,254	16,549,825	14,297,693	9,990,000	8,414,813	8,848,648
Married	52,415,532	2,326,899	9,974,798	13,714,506	11,207,264	7,302,086	5,037,014	2,852,965
Widowed	10,192,046	7,881	48,693	235,749	529,655	1,169,903	2,613,140	5,587,025
Divorced	9,262,672	166,237	1,244,763	2,599,570	2,560,774	1,518,011	764,659	408,658
Black	25,833,663	5,740,427	5,286,661	5,652,362	3,928,525	2,345,107	1,678,490	1,202,091
Never married	11,191,899	5,401,212	2,830,960	1,776,005	713,843	271,582	136,849	61,448
Ever married	14,641,764	339,215	2,455,701	3,876,357	3,214,682	2,073,525	1,541,641	1,140,643
Married	9,986,018	307,153	2,093,204	2,914,336	2,237,024	1,268,666	810,750	354,885
Widowed	1,835,077	2,256	24,685	72,818	173,022	330,517	527,831	703,948
Divorced	2,820,669	29,806	337,812	889,203	804,636	474,342	203,060	81,810
Black male	11,971,816	2,881,630	2,505,282	2,653,699	1,783,711	1,014,651	707,518	425,325
Never married	5,475,863	2,750,533	1,374,466	830,959	315,717	116,805	62,027	25,356
Ever married	6,495,953	131,097	1,130,816	1,822,740	1,467,994	897,846	645,491	399,969
Married	4,962,125	122,449	975,428	1,418,674	1,128,887	659,012	441,587	216,088
Widowed	381,222	0	0	20,097	39,804	60,441	111,753	149,127
Divorced	1,152,606	8,648	155,388	383,969	299,303	178,393	92,151	34,754
Black female	13,861,847	2,858,797	2,781,379	2,998,663	2,144,814	1,330,456	970,972	776,766
Never married	5,716,036	2,650,679	1,456,494	945,046	398,126	154,777	74,822	36,092
Ever married	8,145,811	208,118	1,324,885	2,053,617	1,746,688	1,175,679	896,150	740,674
Married	5,023,893	184,704	1,117,776	1,495,662	1,108,137	609,654	369,163	138,797
Widowed	1,453,855	2,256	24,685	52,721	133,218	270,076	416,078	554,821
Divorced	1,668,063	21,158	182,424	505,234	505,333	295,949	110,909	47,056

[1]Includes races other than white and black.

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

relative indexes rather than as actual measures of mortality risk. They were computed by the direct method, that is, by applying age-specific death rates to the U.S. standard population.

Beginning with the 1999 data year, a new population standard was adopted by NCHS for use in age-adjusting death rates. Based on the year 2000 projected population of the United States, the new standard replaces the 1940 standard population that had been used for over 50 years. The new population standard affects levels of mortality and to some extent trends and group comparisons. Of particular note are the effects on race comparison of mortality. For detailed discussion see *Age Standardization of Death Rates: Implementation of the Year 2000 Standard* (7).

Table VIII. Estimated population for ages 25–64 years, by educational attainment and sex: Total of 46 reporting States and the District of Columbia, 1999

Years of school completed and sex	25-64 years	25-34 years	35-44 years	45-54 years	55-64 years
Both sexes	134,833,509	36,084,064	42,608,999	33,842,243	22,298,203
Under 12 years	17,266,667	4,433,942	4,933,222	3,819,020	4,080,483
12 years	44,118,610	11,032,314	14,373,871	10,601,169	8,111,256
13 or more years	73,448,232	20,617,808	23,301,906	19,422,054	10,106,464
Male	66,309,181	17,920,066	21,187,418	16,562,700	10,638,997
Under 12 years	8,790,283	2,371,126	2,629,132	1,855,186	1,934,839
12 years	21,261,941	5,762,296	7,282,051	4,733,429	3,484,165
13 or more years	36,256,957	9,786,644	11,276,235	9,974,085	5,219,993
Female	68,524,328	18,163,998	21,421,581	17,279,543	11,659,206
Under 12 years	8,476,384	2,062,816	2,304,090	1,963,834	2,145,644
12 years	22,856,669	5,270,018	7,091,820	5,867,740	4,627,091
13 or more years	37,191,275	10,831,164	12,025,671	9,447,969	4,886,471

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

Table IX. Estimated population for the United States, each division, each State, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas, 1999

Area	Total	Area	Total
United States	272,690,813	East South Central	16,582,841
		Kentucky	3,960,825
New England	13,495,933	Tennessee	5,483,535
Maine	1,253,040	Alabama	4,369,862
New Hampshire	1,201,134	Mississippi	2,768,619
Vermont	593,740	West South Central	30,325,593
Massachusetts	6,175,169	Arkansas	2,551,373
Rhode Island	990,819	Louisiana	4,372,035
Connecticut	3,282,031	Oklahoma	3,358,044
Middle Atlantic	38,334,029	Texas	20,044,141
New York	18,196,601	Mountain	17,127,479
New Jersey	8,143,412	Montana	882,779
Pennsylvania	11,994,016	Idaho	1,251,700
East North Central	44,442,146	Wyoming	479,602
Ohio	11,256,654	Colorado	4,056,133
Indiana	5,942,901	New Mexico	1,739,844
Illinois	12,128,370	Arizona	4,778,332
Michigan	9,863,775	Utah	2,129,836
Wisconsin	5,250,446	Nevada	1,809,253
West North Central	18,800,138	Pacific	44,022,633
Minnesota	4,775,508	Washington	5,756,361
Iowa	2,869,413	Oregon	3,316,154
Missouri	5,468,338	California	33,145,121
North Dakota	633,666	Alaska	619,500
South Dakota	733,133	Hawaii	1,185,497
Nebraska	1,666,028		
Kansas	2,654,052	Puerto Rico	3,889,507
South Atlantic	49,560,021	Virgin Islands	119,615
Delaware	753,538	Guam	151,968
Maryland	5,171,634	American Samoa	63,781
District of Columbia	519,000	Northern Marianas	69,216
Virginia	6,872,912		
West Virginia	1,806,928		
North Carolina	7,650,789		
South Carolina	3,885,736		
Georgia	7,788,240		
Florida	15,111,244		

SOURCE: Unpublished Bureau of the Census file STRES991.txt.

All age-adjusted rates shown in this report are based on the year 2000 standard population. The year 2000 standard population and corresponding weights used for computing age-adjusted rates and relative standard errors (RSEs), excluding those by marital status, education, injury at work, and the U.S. territories, are shown in table X.

Age-adjusted rates by marital status were computed by applying the age-specific death rates to the U.S. standard population for ages 25 years and over. Although age-specific death rates by marital status are shown for the age group 15-24 years, they are not included in the calculation of age-adjusted rate because of their high

Table X. United States standard population: Numbers and proportions (weights)

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

variability, particularly among the widowed population. Also, the age groups 75–84 and 85 years and over are combined because of high variability in death rates in the 85 years and over age group, particularly for the never married population. The year 2000 standard population and corresponding weights used for computing age-adjusted rates and relative standard errors by marital status are shown in table XI.

Table XI. United States standard population for ages 25 years and over: Numbers and proportions (weights)

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

Age-adjusted rates by educational attainment were computed by applying the age-specific death rates to the U.S. standard population for ages 25–64 years. Data for age groups 65 years and over are not shown because reporting quality is poorer for older than for younger ages (46). The year 2000 standard population and corresponding weights used for computing age-adjusted rates and relative standard errors by education are shown in table XII.

Table XII. United States standard population for ages 25–64 years: Numbers and proportions (weights)

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

Age-adjusted rates for injury at work were computed by applying the age-specific death rates to the U.S. standard population for ages 15 years and over. The year 2000 standard population and corresponding weights used for computing age-adjusted rates and relative standard errors for injury at work are shown in table XIII.

Table XIII. United States standard population for ages 15 years and over: Numbers and proportions (weights)

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

Age-adjusted rates for Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas were computed by applying the age-specific death rates to the U.S. standard population. Age groups for 75 years and over were combined because population counts were unavailable by age group for ages over 75 years. The year 2000 standard population and corresponding weights used for computing age-adjusted rates and relative standard errors for the territories are shown in table XIV.

Table XIV. United States standard population: Numbers and proportions (weights)

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

Using the same standard population, death rates for the total population and for each race-sex group were adjusted separately. The age-adjusted rates were based on 10-year age groups. It is important not to compare age-adjusted death rates with crude rates.

Death rates for the Hispanic population are based only on events to persons reported as Hispanic. Rates for non-Hispanic white persons are based on the sum of all events to white decedents reported as non-Hispanic and white decedents with origin not stated. Hispanic origin is not imputed if it is not reported.

Random variation

The mortality data in this report, with the exception of data for 1972, are not subject to sampling error. In 1972 mortality data were based on a 50-percent sample of deaths because of resource constraints. Mortality data, even based on complete counts, may be affected by random variation. Random variation is discussed for demographic data and cause-of-death data separately because of problems in comparing cause-of-death between ICD revisions.

Demographic data—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. For this distribution, the relative standard error (RSE) is a measure of the variability. For computing RSEs in percent, this formula may be used for all tables except for the death rates shown in tables 4, 22, and 23 (see subsection below):

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

where

D = number of deaths
R = rate

Beginning with 1989 data, an asterisk is shown in place of a rate based on fewer than 20 deaths, which is the equivalent of an RSE(R) of 23 percent or more. A RSE(R) of 23 percent is considered statistically unreliable. For age-adjusted death rates, this criterion was based on the sum of the age-specific deaths. This same procedure is used in this report except for the death rates shown in tables 4, 22, and 23 (see subsection below).

For tables showing the number of deaths (D) (where D is 100 or more) the chances are 95 in 100 that

$$2.\quad D - \left(1.96 \bullet D \bullet \frac{\mathrm{RSE}(D)}{100}\right) \text{ and } D + \left(1.96 \bullet D \bullet \frac{\mathrm{RSE}(D)}{100}\right)$$

cover the "true" number of deaths. This is referred to as a 95-percent confidence interval. For computing 95-percent confidence intervals when D is less than 100 deaths, see the NCHS Web site at http://www.cdc.gov/nchs and refer to "Technical Appendix from *Vital Statistics of United States: Mortality, 1999*."

For tables showing a crude death rate (R) or an age-specific death rate (based on 100 or more deaths) for the ith age group (R_i), except the rates in tables 4, 22, and 23, the chances are 95 in 100 that the actual rate falls within the confidence interval as computed using the following formula:

$$3.\quad R - \left(1.96 \bullet R \bullet \frac{\mathrm{RSE}(R)}{100}\right) \text{ and } R + \left(1.96 \bullet R \bullet \frac{\mathrm{RSE}(R)}{100}\right)$$

For computing 95-percent confidence intervals for R when D is less than 100 deaths, see the Web site mentioned above.

For testing the difference between two rates (R_1 and R_2, each based on 100 or more deaths), the following z-test may be used to define a significance test statistic:

$$4.\quad z = \frac{R_1 - R_2}{\sqrt{R_1^2\left(\frac{\mathrm{RSE}(R_1)}{100}\right)^2 + R_2^2\left(\frac{\mathrm{RSE}(R_2)}{100}\right)^2}}$$

If $|z| \geq 1.96$, then the difference is statistically significant at the 0.05 level and if $z < 1.96$, the difference is not significant. For computing statistical tests when R_1 and/or R_2 are based on less than 100 deaths, see the Web site mentioned above.

For tables showing an age-adjusted death rate (R'), except the rates in tables 4, 22, and 23, the RSEs in formulas 3 and 4 above would be substituted by this formula:

$$5.\quad \mathrm{RSE}(R') = 100\,\frac{\sqrt{\sum\left\{w_i^2\, R_i^2\, \left(\frac{1}{D_i}\right)\right\}}}{R'}$$

where

R_i = age-specific rate for the ith age group
w_i = ith age-specific U.S. standard population such that $\sum(w_i)$ = 1.000000 (see table X and age-adjusted death rate under "Definition of terms")
D_i = number of deaths for the ith age group

For tables showing an infant mortality rate (based on live births in the denominator), IMR, the RSEs in formulas 3 and 4 would be substituted by the following formula:

$$6.\quad \mathrm{RSE}(\mathrm{IMR}) = 100\sqrt{\frac{1}{D} + \frac{1}{B}}$$

where

B = number of live births

For tables showing a maternal mortality rate (based on live births in the denominator), the RSEs in formulas 3 and 4 would be substituted with formula 6.

Tables 4, 22, and 23—Rates for Mexicans, Puerto Ricans, Cubans, and Other Hispanics in table 4, rates by marital status in table 22, and rates by educational attainment in table 23 are based on population estimates derived from the U.S. Bureau of the Census' Current Population Survey and adjusted to resident population control totals. As a result, the rates are subject to the variability of the denominator as well as the numerator. For tables 4, 22, and 23 the following RSE formulas were used to determine an RSE of 23 percent or more for the purpose of showing the rate or an asterisk.

For crude, R, and age-specific death rates, R_i,

$$7.\quad \mathrm{RSE}(R) = 100\sqrt{\left(\frac{1}{D}\right) + 0.67\left(a + \frac{b}{P}\right)}$$

and for age-adjusted death rates, R',

$$8.\quad \mathrm{RSE}(R') = 100\,\frac{\sqrt{\sum\left\{w_i^2\, R_i^2\left[\left(\frac{1}{D_i}\right) + 0.67\left(a + \frac{b}{P_i}\right)\right]\right\}}}{R'}$$

where

D = number of deaths
P = population estimate used for computing the rate (see table VI for population estimates used for computing rates in table 4; see table VII for population estimates used for computing rates in table 22; and see table VIII for population estimates used for computing rates in table 23)
D_i = number of deaths for the ith age group
P_i = population estimate used for computing the ith age-specific death rate (see table VI for population estimates used for computing rates in table 4; see table VII for population estimates used for computing rates in table 22; and see table VIII for population estimates used for computing rates in table 23)

w_i = age-specific U.S. standard population such that $\sum(w_i) = 1.000000$ (see table X for weights (w_i) used for computing age-adjusted rates in table 4; see table XI for weights used for computing age-adjusted rates in table 22; and see table XII for weights used for computing age-adjusted rates in table 23)

w_i^2 = the square of the age-specific U.S. standard population

In table 4, for all origins, total Hispanic, total non-Hispanic, non-Hispanic white, and non-Hispanic black populations,

$$a = 0.000000 \text{ and } b = 0$$

and for Mexican, Puerto Rican, Cuban, and Other Hispanic populations,

$$a = -0.000238 \text{ and } b = 7{,}486$$

In table 22, for all marital status groups combined for all races, white, and black populations,

$$a = 0.000000 \text{ and } b = 0,$$

for each marital status group for all races and the white population,

$$a = -0.000019 \text{ and } b = 5{,}211,$$

and for each marital status group for the black population,

$$a = -0.000213 \text{ and } b = 7{,}486$$

In table 23, for all education groups combined,

$$a = 0.000000 \text{ and } b = 0$$

and for each education group,

$$a = -0.000011 \text{ and } b = 2{,}369$$

The a and b parameters are averages of the 1998 and 1999 CPS standard error parameters (60,61).

To compute 95-percent confidence intervals and z-tests for the death rates (based on 100 or more deaths) shown in tables 4, 22, and 23, the RSE formulas 7 and 8 may be substituted, as appropriate, for the RSEs used in formulas 3 and 4.

Cause-of-death data—The calculation of measures of variability by cause of death take into account the variability of the comparability ratio modified 1998 data for comparison with the 1999 data. For additional information on the statistical tests below, please refer to *A Guide to State Implementation of ICD–10 for Mortality, Part II: Applying Comparability Ratios* (62) at the following Web site: http://www.cdc.gov/nchs/datawh/statab/unpubd/comp.htm.

Two issues arise in the analysis of mortality data across the boundary of two ICD revisions (ICD–9 and ICD–10):

1. data presentation and analysis
2. statistical tests to ascertain whether the change in mortality between the last year of the old revision (1998) and the first year of the new revision (1999) is a statistically significant change

Table 8 presents death rates for the 15 leading causes of death in 1999 according to ICD–10, compared with death rates for 1998 for the most nearly comparable ICD–9 titles (tables I and II) multiplied by the ICD–10:ICD–9 comparability ratios (comparability-modified death rates). Also shown are the 1998 rates that are not comparability-modified for the same 15 leading causes.

The second issue is determining whether the change in death rates between 1998 and 1999 was statistically significant, taking into account comparability. This is accomplished in a manner similar to statistical analysis of mortality trends within the same revision (8), but incorporating into the comparisons and the statistical tests explicit regard for comparability. This section focuses on presenting methods for analyzing differences in mortality *between* revisions. The key difference is that the latter analysis must take explicitly into account comparability ratios that measure the quantitative impact of the new revisions on causes of death.

Formulas shown below address the general problem of evaluating differences between two population-based death rates estimated for successive years, between revisions of the ICD. Rates used throughout the section are specific for cause of death. Rates computed using data from an initial year (R_1) are assumed to be based on ICD–9, while those for the following year (R_2) are assumed to be based on ICD–10. A comparability ratio (C) measures the level of agreement between classification systems. The cause-specific comparability ratio will be applied to R_1 to adjust for the change in the way these deaths were classified for the later revision compared with the earlier revision. In addition to 1998 mortality data, this factor (C) should also be applicable to at least 1994, 1995, 1996, and 1997. The comparability ratio needs to be considered in statistical tests that compare the changes in rates from one year to a subsequent one between revisions.

In applying the formulas, distinctions should be made for cases involving large (100 or more) and small (1–99) numbers of deaths. All formulas in this section are for cases involving large numbers of deaths (100 or more). Formulas for constructing 95 percent confidence intervals for small numbers of deaths are shown in the publication mentioned above (62).

The general formula for obtaining (estimated) RSE's for a point-estimate, θ (like a comparability ratio), is the following:

$$9.\quad \mathrm{RSE}(\hat{\theta}) = 100\,\frac{S(\hat{\theta})}{\hat{\theta}}$$

where

$S(\theta)$ = standard error of Theta

The estimated RSE for an age-specific death rate or a crude death rate is given by the formula below:

$$10.\quad \mathrm{RSE}(R) = \mathrm{RSE}(D) = 100\sqrt{\frac{1}{D}}$$

where

R = the cause-specific death rate produced by dividing the number of deaths attributed to a given cause at a given time by the population-at-risk for that same time period

D = the estimated number of deaths due to a given cause on a given time

The following procedures for constructing approximate 95 percent confidence intervals are ordered depending on whether the death rate was computed based on the recently introduced ICD–10 revision or on the previous (ICD–9) revision, respectively. The rate based on the ICD–9 revision is adjusted by the application of a cause-specific comparability ratio.

For an age-specific or crude death rate based on the ICD–10 revision, the 95 percent confidence interval may be captured as follows:

$$11.\quad \text{Lower limit: } R_2 - \left(1.96 \bullet R_2 \bullet \frac{\mathrm{RSE}(R_2)}{100}\right)$$

$$12.\quad \text{Upper limit: } R_2 + \left(1.96 \bullet R_2 \bullet \frac{\mathrm{RSE}(R_2)}{100}\right)$$

For an age-specific or crude death rate based on the ICD–9 revision, the 95 percent confidence interval may be captured as follows:

13. Lower limit: $C \bullet R_1 - \left(1.96 \bullet C \bullet R_1 \bullet \frac{\text{RSE}(C \bullet R_1)}{100}\right)$

14. Upper limit: $C \bullet R_1 + \left(1.96 \bullet C \bullet R_1 \bullet \frac{\text{RSE}(C \bullet R_1)}{100}\right)$

where

R_2 = death rate (per 100,000) computed for data year under ICD–10

C = ICD–10:ICD–9 comparability ratio specific for the cause-of-death of interest

R_1 = death rate (per 100,000) computed for data year under ICD–9

Let us suppose that the respective ICD–9 and ICD–10 death rates for a cause of death were 11.7 (R_1) and 6.2 (R_2) per 100,000 population. The ICD–10:ICD–9 comparability ratio (C) obtained for this cause was 1.0600. Its standard error, $S(C)$, is 0.0096.

Assume that the numbers of deaths for this cause were 31,130 for ICD–9 and 16,516 for ICD–10. By inserting the number of deaths (D) into formula 10, we obtain the RSEs for both yearly rates: 0.5668 for the ICD–9 rate and 0.7781 for the ICD–10 rate [RSE(R_1) and RSE(R_2), respectively].

By inserting the comparability ratio and its standard error into Formula 9, we obtain RSE(C) = (0.0096 / 1.0600) • 100 = 0.9057.

Since we wish to modify the ICD–9 rate (R_1) to compensate for the difference in classification systems, we must multiply this rate times the comparability ratio $C \bullet R_1 = 12.40$. To obtain the standard error of this modified ICD–9 rate, $S(C \bullet R_1)$, we must refer to Formula 17. This formula requires knowing the RSEs for the ICD–9 rate and for the comparability ratio. By substituting these values into the formula, we have that RSE($C \bullet R_1$) = 1.0684.

Lower 95-percent confidence interval limit for $C \bullet R_1 = 12.40 - (1.96 \bullet 0.1325) = 12.14$.

Upper 95-percent confidence interval limit for $C \bullet R_1 = 12.40 + (1.96 \bullet 0.1325) = 12.66$.

Lower 95-percent confidence interval limit for $R_2 = 6.2 - (1.96 \bullet 0.0482) = 6.10$.

Upper 95-percent confidence interval limit for $R_2 = 6.2 + (1.96 \bullet 0.0482) = 6.29$.

For testing the difference between two rates (R_1 and R_2, each based on 100 or more deaths), the following z-test that considers the use of a comparability ratio applied to ICD–9 death rates, may be used to define a significance test statistic:

15. $$z = \frac{C \bullet R_1 - R_2}{\sqrt{C^2 \bullet R_1^2 \left\{\left(\frac{\text{RSE}(R_1)}{100}\right)^2 + \left(\frac{\text{RSE}(C)}{100}\right)^2 \bullet \left[1 + \left(\frac{\text{RSE}(R_1)}{100}\right)^2\right]\right\} + R_2^2 \left(\frac{\text{RSE}(R_2)}{100}\right)^2}}$$

where

C = ICD–10:ICD–9 comparability ratio for the specific cause category

R_1, R_2 = cause-specific death rates based on ICD–9 and ICD–10 years, respectively

RSE(R_1) = relative standard error of the ICD–9 cause-specific death rate

RSE(R_2) = relative standard error of the ICD–10 cause-specific death rate

RSE(C) = relative standard error of the ICD–10:ICD–9 comparability ratio specific for the cause of death

If $|z| \geq 1.96$, then the difference is statistically significant at the 0.05 level and if $z < 1.96$, the difference is not significant. For computing statistical tests when R_1 and/or R_2 are based on less than 100 deaths, see *A Guide to State Implementation of ICD–10 for Mortality, Part II: Applying Comparability Ratios* (62).

For tables showing an age-adjusted death rate, (R'), the RSE in formula 5 above would be substituted by this formula:

16. $$\text{RSE}(R'_2) = 100 \frac{\sqrt{\sum \left[w_i^2 \bullet R_{i2}^2 \left(\frac{1}{D_{i2}}\right)\right]}}{R'_2}$$

where

R'_2 = age-adjusted death rate for a specific cause of interest, based on ICD–10

i = each age group

R_{i2} = age-specific death rate for the ith age group (ICD–10 file)

w_i = ith age-specific U.S. Standard Population weight such that $\sum w_i = 1.000000$

D_{i2} = number of deaths for the ith age group (ICD–10 file) attributed to the cause of interest

C_i's are treated as constants in this report ($C_i = C$). Assuming that we have both an age-specific rate and comparability ratio, we may proceed to compute the RSE for $C_i R_{i1}$ for each age group. This is the first of two steps necessary for obtaining the RSE of an age-adjusted rate based on ICD–9 data that has been modified through a comparability ratio, R''_1. For an age-specific comparability ratio and death rate based on the ICD–9 revision, the RSE can be calculated as follows:

17. $$\text{RSE}(C_i \bullet R_{i1}) = 100 \sqrt{\left(\frac{\text{RSE}(R_{i1})}{100}\right)^2 + \left(\frac{\text{RSE}(C_i)}{100}\right)^2 \left[1 + \left(\frac{\text{RSE}(R_{i1})}{100}\right)^2\right]}$$

where

C_i = age-specific comparability ratio for the cause of interest

R_{i1} = age-specific death rate for the ith age group (ICD–9 file)

Let $R''_1 = \sum w_i C_i R_{i1}$. The RSE for R''_1 would incorporate all 11 values (corresponding to each age group) computed through the

previous formula. For age-adjusted and comparability-modified death rates based on the ICD–9 revision, the RSE can be calculated as follows:

$$18.\quad \mathrm{RSE}(R''_1) = 100\frac{\sqrt{\sum\left[w_i^2(C_iR_{i1})^2 \bullet \left(\frac{\mathrm{RSE}(C_iR_{i1})}{100}\right)^2\right]}}{R''_1}$$

where

R''_1= age-adjusted death rate for a specific cause of interest based on ICD–9 data and modified by a comparability ratio

The following procedures for constructing approximate 95 percent confidence intervals are ordered depending on whether the age-adjusted death rate was computed based on the recently introduced ICD–10 revision or on the previous (ICD–9) revision, respectively. The rate based on the ICD–9 revision is adjusted by the application of a cause-specific comparability ratio.

For an age-adjusted death rate based on the ICD–10 revision, the 95 percent confidence interval may be captured as follows:

$$19.\quad \text{Lower limit: } R'_2 - \left(1.96 \bullet R'_2 \bullet \frac{\mathrm{RSE}(R'_2)}{100}\right)$$

$$20.\quad \text{Upper limit: } R'_2 + \left(1.96 \bullet R'_2 \bullet \frac{\mathrm{RSE}(R'_2)}{100}\right)$$

For an age-adjusted and comparability-modified death rate based on the ICD–9 revision, the 95 percent confidence interval may be captured as follows:

$$21.\quad \text{Lower limit: } R''_1 - \left(1.96 \bullet R''_1 \bullet \frac{\mathrm{RSE}(R''_1)}{100}\right)$$

$$22.\quad \text{Upper limit: } R''_1 + \left(1.96 \bullet R''_1 \bullet \frac{\mathrm{RSE}(R''_1)}{100}\right)$$

where

R'_2 = age-adjusted death rate (per 100,000) computed for data year under ICD–10

R''_1 = age-adjusted death rate (per 100,000) computed for data year under ICD–9

Availability of mortality data

Mortality data are available in publications, unpublished tables, and electronic products as described on the NCHS Web site at the following address: http://www.cdc.gov/nchs. The data are available on data tapes from the National Technical Information Service (NTIS) and on CD-ROM from NTIS and the Government Printing Office (GPO). Data are also available in the *Vital Statistics of the United States*, Mortality, and *Vital and Health Statistics*, Series 20 reports, and the *National Vital Statistics Reports* through NCHS.

Definitions of terms

Infant deaths—Deaths of infants aged under 1 year.

Neonatal deaths—Deaths of infants aged 0–27 days.

Postneonatal deaths—Deaths of infants aged 28 days–1 year.

Crude death rate—Total deaths per 100,000 population for a specified period. The crude death rate represents the average chance of dying during a specified period for persons in the entire population.

Age-specific death rate—Deaths per 100,000 population in a specified age group, such as 1–4 years or 5–9 years for a specified period.

Age-adjusted death rate—The death rate used to make comparisons of relative mortality risks across groups and over time. This rate should be viewed as a construct or an index rather than as direct or actual measure of mortality risk. Statistically, it is a weighted average of the age-specific death rates, where the weights represent the fixed population proportions by age (63).

References

1. Hoyert DL, Singh GK, Rosenberg HM. Sources of data on socioeconomic differential mortality in the United States. Journal of Official Statistics. 11(3): 233–60. 1995.
2. Kochanek KD, Smith BL, Anderson RN. Deaths: Preliminary data for 1999. National vital statistics reports; vol 49 no 3. Hyattsville, Maryland: National Center for Health Statistics. 2001.
3. Anderson RN. Deaths: Leading causes for 1999. National vital statistics reports; vol 49 no. 11. Hyattsville, Maryland: National Center for Health Statistics. 2001 (forthcoming).
4. de Turk PB. Deaths: Geographic variations in cause specific mortality, United States, 1997–99. National vital statistics reports; vol 49. Hyattsville, Maryland: National Center for Health Statistics. 2001 (forthcoming).
5. National Center for Health Statistics. Technical appendix. Vital statistics of the United States: Mortality, 1995. Available on the NCHS Web site at: www.cdc.gov/nchs and to be included on the CD-ROM entitled, "Vital Statistics of the United States, Mortality, 1995."
6. World Health Organization. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva: World Health Organization. 1992.
7. Anderson RN, Rosenberg HM. Age standardization of death rates: Implementation of the year 2000 standard. National vital statistics reports; vol 47 no 3. Hyattsville, Maryland: National Center for Health Statistics. 1998.
8. 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.
9. Anderson RN, Miniño AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD–9 and ICD–10: Preliminary estimates. National vital statistics reports; vol 49 no 2. Hyattsville, Maryland: National Center for Health Statistics. 2001.
10. Murphy SL. Deaths: Final data for 1998. National vital statistics reports; vol 48 no 11. Hyattsville, Maryland: National Center for Health Statistics. 2000.
11. Centers for Disease Control and Prevention. Update: Influenza activity—United States, 1998–99 season. Morbidity and mortality weekly report; vol 48 no 9. Washington DC: Public Health Service. 1999.
12. Centers for Disease Control and Prevention. Influenza activity—United States, 1999–2000 season. Morbidity and mortality weekly report; vol 48 no 45. Washington, DC: Public Health Service. 2000.
13. Centers for Disease Control and Prevention. Update: Influenza activity—United States, 1999–2000 season. Morbidity and mortality weekly report; vol 49 no 3. Washington, DC: Public Health Service. 2000.
14. Rosenberg HM, Maurer JD, Sorlie PD, Johnson NJ, et al. Quality of death rates by race and Hispanic origin: A summary of current research, 1999. National Center for Health Statistics. Vital Health Stat 2(128). 1999.
15. Kochanek KD, Maurer JD, Rosenberg HM. Causes of death contributing to changes in life expectancy: United States, 1984–1989. National Center for Health Statistics. Vital Health Stat 20(23). 1994.
16. Maurer JD, Rosenberg HM, Keemer JB. Deaths of Hispanic origin, 15 reporting States, 1979–81. National Center for Health Statistics. Vital Health Stat 20(18). 1990.
17. Hoyert DL, Rosenberg HM, MacDorman MF. Effect of changes in death certificate format on cause-specific mortality trends, United States, 1979–1992. Office for National Statistics. Studies on Medical and Population Subjects 64. 2000.
18. Hoyert DL, Kochanek KD, Murphy SL. Deaths: Final Data for 1997. National vital statistics reports; vol 47 no 19. Hyattsville, Maryland: National Center for Health Statistics. 1999.
19. Pamuk E, Makuc D, Heck K, Reuben C, Lochner K. Socioeconomic status and health chartbook. Health, United States, 1998. Hyattsville, Maryland: National Center for Health Statistics. 1998.
20. Mathews TJ, Curtin SC, MacDorman MF. Infant mortality statistics from the 1998 period linked birth/infant death data set. National vital statistics reports; vol 48 no 12. Hyattsville, Maryland: National Center for Health Statistics. 2000.
21. 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.
22. National Center for Health Statistics. Technical appendix. Vital statistics of the United States, 1989, vol II, mortality, part A. Washington: Public Health Service. 1993.
23. Klebba AJ, Scott JH. 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, supp. Hyattsville, Maryland: Public Health Service. 1980.

24. Klebba AJ, Dolman AB. Comparability of mortality statistics for the Seventh and Eighth Revisions of the International Classification of Diseases, United States. National Center for Health Statistics. Vital Health Stat 2(66). 1975.
25. National Center for Health Statistics. Comparability of mortality statistics for the Sixth and Seventh Revisions, United States, 1958. Vital Statistics-Special reports; vol 51 no 4. Washington, DC: Public Health Service. 1965.
26. National Center for Health Statistics. Vital statistics, instructions for classifying the underlying cause of death. NCHS instruction manual; part 2a. Hyattsville, Maryland: Public Health Service. Published annually.
27. National Center for Health Statistics. Vital statistics, instructions for classifying multiple causes of death. NCHS instruction manual; part 2b. Hyattsville, Maryland: Public Health Service. Published annually.
28. National Center for Health Statistics. Vital 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 until 1999.
29. National Center for Health Statistics. Vital statistics, ICD–9 ACME decision tables for classifying underlying causes of death. NCHS instruction manual; part 2c. Hyattsville, Maryland: Public Health Service. Published annually.
30. 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.
31. 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.
32. Chamblee RF, Evans MC. TRANSAX, the NCHS system for producing multiple cause-of-death statistics, 1968–78. National Center for Health Statistics. Vital Health Stat 1(20). 1986.
33. Israel RA, Rosenberg HM, Curtin LR. Analytical potential for multiple cause-of-death data. Am J Epidemiol 124(2): 161–79. 1986.
34. National Center for Health Statistics. Public use data file documentation: Multiple cause of death for ICD–9, 1998 data. Hyattsville, Maryland: Public Health Service. 2000.
35. National Center for Health Statistics. ICD–10 cause-of-death lists for tabulating mortality statistics, effective 1999. NCHS instruction manual: part 9. Hyattsville, Maryland: Public Health Service. 1999.
36. Sorlie PD, Rogot E, Johnson NJ. Validity of demographic characteristics on the death certificate. Epidemiology 3(2):181–4. 1992.
37. 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.
38. Hogan H. The 1990 post-enumeration survey: Operations and results. J Am Stat Assoc 48(423):1047–60. 1993.
39. National Center for Health Statistics. Technical appendix. Vital statistics of the United States, 1989, vol I, natality. Washington: Public Health Service. 1992.
40. Hoyert DL. Effect on mortality rates of the 1989 changes in tabulating race. National Center for Health Statistics. Vital Health Stat 20(25). 1994.
41. 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.
42. Anderson RN. Method for constructing complete annual U.S. life tables. National Center for Health Statistics. Vital Health Stat 2(129). 1999.
43. National Center for Health Statistics. U.S. decennial life tables for 1989–91, vol 1 no 2, methodology of the national and State life tables. Hyattsville, Maryland. 1998.
44. Kestenbaum B. A description of the extreme aged population based on improved Medicare enrollment data. Demography 29:565–80. 1992.
45. Arriaga EE. Changing trends in mortality decline during the last decades. In: Ruzicka L, Wunsch G, Kane P, eds. Differential mortality: Methodological issues and biosocial factors. Oxford: Clarendon Press. 1989.
46. Sorlie PD, Johnson NJ. Validity of education information on the death certificate. Epidemiology 7(4): 437–9. 1996.
47. Kominski R, Adams A. Educational attainment in the United States, March 1993 and 1992. U.S. Bureau of the Census. Current Population reports: series p20–476. Washington: U.S. Government Printing Office. 1994.
48. Ventura SJ, Martin JA, Curtin SC, et al. Births: Final data for 1999. National vital statistics reports; vol 49 no 1. Hyattsville, Maryland: National Center for Health Statistics. 2001.
49. National Center for Health Statistics. Vital statistics, computer edits for mortality data, effective 1999. NCHS instruction manual; part 11. Hyattsville, Maryland: Public Health Service. 1998.
50. National Center for Health Statistics. Vital statistics, ICD–10 cause-of-death querying, 1999. NCHS instruction manual; part 20. Hyattsville, Maryland: Public Health Service. 1999.
51. U.S. Bureau of the Census. Unpublished census file NESTV99. Consistent with populations published in: U.S. population estimates, by age, sex, race, and Hispanic origin: 1990–1999. Washington, DC. 2000.
52. National Center for Health Statistics. Technical appendix. Vital statistics of the United States, 1990, vol II, mortality, part A. Washington: Public Health Service. 1994.
53. U.S. Bureau of the Census. Population estimates for 1999 based on unpublished tabulations prepared by the Housing and Household Economic Statistics Division.
54. U.S. Bureau of the Census. Population estimates for the U.S. and States by single year of age and sex: July 1, 1999. Internet release date: March 9, 2000. http://www.census.gov/population/estimates/state/stats/st-99–10.txt.
55. U.S. Bureau of the Census. Unpublished Census file PUERTO99.
56. U.S. Bureau of the Census. Unpublished Census file USVI99.WK1.
57. U.S. Bureau of the Census. Unpublished Census file GUAM99.WK1.
58. U.S. Bureau of the Census. Unpublished Census file ASAMOA99.WK1.
59. U.S. Bureau of the Census. Unpublished Census file CNMI99.WK1.
60. U.S. Bureau of the Census. Money income in the United States: 1998. Current population reports, consumer income. Series P60–206. Washington: U.S. Government Printing Office. 1999.
61. U.S. Bureau of the Census. Money income in the United States: 1999. Current population reports, consumer income. Series P60–209. Washington: U.S. Government Printing Office. 2000.
62. Minino AM. A guide to State implementation of ICD–10 for mortality, part II: Applying comparability ratios. Hyattsville, Maryland: National Center for Health Statistics. 2000.
63. Feinleib M, Zarate AO, eds. Reconsidering age adjustment procedures: Workshop proceedings. National Center for Health Statistics. Vital Health Stat 4(29). 1992.