Appendix II–Definitions and Methods Ÿ

Following is an alphabetical listing of the definitions of key terms and methods used in this chartbook.

Accident—The term accident is used in this chartbook to mean an unintentional injury death or an unintentional nonfatal event. The word is used sparingly because of its history of being considered by some to be inappropriate to describe events that are preventable. See the introduction for the chartbook.

Activity—An activity is used to describe what the injured person was doing when the injury occurred. The data source is the National Health Interview Survey. Categories include driving, working at paid job, working around house or yard, attending school, sports, leisure activities (excluding sports), and other. More than one activity can be checked for the same episode (Figure 24).

Age—A person's age is reported as age at last birthday, that is, age in completed years. Presenting the data by single year of age rather than predetermined age groups provides a level of detail that traditional 5- or 10-year age groupings of fatal and nonfatal injuries can obscure. For example, the commonly used age group, 15–19 years, is a poor choice for motor vehicle traffic death rates and other causes of injury; the rate at 19 years of age is three times the rate at 15 years of age. Combining the ages makes this higher rate less obvious.

Age adjustment—Age adjustment is used to compare risks of two or more populations at one point in time or one population at two or more points in time. Age-adjusted rates are computed by the direct method of applying age-specific rates in a population of interest to a standardized age distribution to eliminate differences in observed rates that result from age differences in population composition. Age-adjusted rates should be viewed as relative indexes rather than actual measures of risk. Age-adjusted rates for two different outcome measures at the same point in time should not be compared (Figures 4, 6, and 11).

Age-adjusted rates (R′) are calculated by the direct method by applying unrounded age-specific rates (R_i) to the U.S. standard population (w_i).

$$R' = \sum_i w_i R_i$$

The application of unrounded age-specific rates to the standard population differs from the current method used to calculate death rates in other reports published by the National Center for Health Statistics. In very few instances do the final age-adjusted rates differ, but when they do, they differ by no more than 0.1 per 100,000. For example, in comparing homicide rates from 1984 through 2004 shown in Figure 4, only data year 2003 differs from what is published in *National Vital Statistics Reports* (6.1 compared with 6.0 per 100,000 population).

Mortality

Beginning with 2003 data, the traditional standard million population, along with corresponding standard weights to six decimal places based on the projected year 2000 population, were replaced by the unrounded projected year 2000 population age distribution (see Table VII). The effect of the change is negligible and does not significantly affect comparability with age-adjusted rates calculated using the previous method (Figures 4, 6, and 11).

Appendix II–Definitions and Methods Ÿ

Table VII. United States standard population and age groups used to age adjust mortality data

Age group	Population
Total	274,633,642
Under 1 year	3,794,901
1–4 years	15,191,619
5–14 years	39,976,619
15–24 years	38,076,743
25–34 years	37,233,437
35–44 years	44,659,185
45–54 years	37,030,152
55–64 years	23,961,506
65–74 years	18,135,514
75–84 years	12,314,793
85 years and over	4,259,173

SOURCE: National Institutes of Health, National Cancer Institute. Surveillance, Epidemiology, and End Results (SEER), Standard population in single year of age. Available from: http://seer.cancer.gov/stdpopulations/stdpop.singleages.html.

National Health Interview Survey—Estimates based on the National Health Interview Survey are age adjusted to the same 2000 U.S. standard population. Adjustment is based on 4 age groups as shown below with their corresponding standard population (see data tables for Figures 22 and 23). (See Table VIII.)

Table VIII. United States standard population and age groups used to age adjust National Health Interview Survey data

Age group	Population
Total	274,633,642
Under 15 years	58,963,139
15–24 years	38,076,743
25–64 years	142,884,280
65 years and over	34,709,480

SOURCE: National Institutes of Health, National Cancer Institute. Surveillance, Epidemiology, and End Results (SEER), Standard population in single year of age. Available from: http://seer.cancer.gov/stdpopulations/stdpop.singleages.html.

Alcohol-impaired driving—Alcohol-impaired driving is defined as operating a motor vehicle when legally intoxicated. Legally intoxicated drivers have a measurable or estimated blood alcohol concentration (BAC) of 0.08 grams per deciliter (g/dl) or above. Trends in alcohol impaired driving are tracked using the proportion of fatally injured drivers who were legally intoxicated among all fatally injured drivers. The Insurance Institute for Highway Safety calculates the proportion using the Fatality Analysis Reporting System (FARS), which captures the number of fatally injured drivers on public roads from all 50 states and the District of Columbia. Multiple imputation is used for estimating the BACs for those with missing values using the U.S. Department of Transportation's multiple imputation model.

References:

Insurance Institute for Highway Safety. IIHS fatality facts 2005, alcohol. Available from: http://www.iihs.org/research/fatality_facts/alcohol.html). 2007.

Subramanian, R. Transitioning to multiple imputation—A new method to impute missing blood alcohol concentration (BAC) values in FARS. Technical report no. DOT HS-809-403. Washington, DC: U.S. Department of Transportation. 2002.

Average percent change and test of trends— Joinpoint software, developed by the National Cancer Institute, was used to estimate the annual percent change in death rates and in hospital discharge rates. The software uses trend data and fits the simplest joinpoint model that the data allow. The user supplies the minimum and maximum number of joinpoints. The program starts with the minimum number of joinpoints (i.e., 0 joinpoints, which is a straight line) and tests whether more joinpoints are statistically significant and must be added to the model (up to the specified maximum number). This enables the user to test that an apparent change in trend is statistically significant. The tests of significance use a Monte Carlo Permutation method. The models used in these figures incorporate estimates of both the data points as well as the standard error of each point. Estimates were included and calculated using only one decimal place unless the standard error was greater than 0.0 but less than 0.5; in those cases, two decimal places were used

for the standard errors. In addition, the models are linear on the log of the response (i.e., for calculating annual percentage rate change). Models used for the figures were the ones determined by Joinpoint to best fit the data (Figures 4, 6, 13, 15-1, and 15-2).

For details see:
http://srab.cancer.gov/joinpoint/.

Reference:

Kim HJ, Fay MP, Feuer EJ, Midthune DN. Permutation tests for joinpoint regression with applications to cancer rates [published correction appeared in Stat Med 20(4):655. 2001]. Stat Med 19(3):335–51. 2000.

Barell Injury Diagnosis Matrix (Barell Matrix)—The matrix is a two-dimensional array of *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD–9–CM) diagnosis codes for injury (updated as of 2002) grouped by body region of the injury and the nature of the injury. This matrix provides a standard format for reporting injury data. This injury diagnosis matrix is a product of the participants in the International Collaborative Effort (ICE) on Injury Statistics. For more information about the Barell Matrix, refer to http://www.cdc.gov/nchs/about/otheract/ice/barellmatrix.htm. The matrix was adopted for use by the State and Territorial Injury Prevention Directors Association and recommended as the basis for defining injury hospitalizations. The matrix is included in Table I (see Figures 17-1, 17-2, 18, 21, and 26).

References:

Barell V, Aharonson-Daniel L, Fingerhut LA, MacKenzie EJ, et al. An introduction to the Barell body region by nature of injury diagnosis matrix. Inj Prev 8:91–6. 2002.

Injury Surveillance Workgroup. Consensus recommendations for using hospital discharge data for injury surveillance. Marietta, GA: State and Territorial Injury Prevention Directors Association. 2003.

Blood alcohol concentration (BAC)—A BAC describes the amount of alcohol in a person's blood, expressed as weight of alcohol per unit of volume of blood. For example, 0.08% BAC indicates 80 mg of alcohol per 100 ml of blood. For most legal purposes, however, a blood sample is not necessary to determine a person's BAC. It can be measured more simply by analyzing exhaled breath. All 50 states and the District of Columbia (D.C.) have laws defining it as a crime to drive with a BAC at or above the proscribed level of 0.08%. The data in Figure 13 are based on data from all 50 states and D.C. with imputations for missing BACs provided by the U.S. Department of Transportation's multiple imputation model.

Reference:

Subramanian R. Transitioning to multiple imputation—A new method to impute missing blood alcohol concentration (BAC) values in FARS. Technical report no. DOT HS-809-403. Washington, DC: U.S. Department of Transportation. 2002.

Body region—Body region refers to one of the two dimensions of the Barell Injury Diagnosis Matrix and the Injury Mortality Diagnosis matrix. This dimension classifies the part of the body that was injured and is based on ICD–9–CM codes in the Barell Matrix and ICD–10 codes in the Injury Mortality Diagnosis Matrix. For a detailed listing of the body regions see Table I.

Cause of death—For the purpose of national mortality statistics, every death is attributed to one underlying condition, based on information reported on the death certificate and using the international rules for selecting the underlying cause of death from the conditions stated on the death certificate. For injury deaths, the underlying cause is defined by the World Health Organization (WHO) as the circumstances of the accident or violence that produced the fatal injury. Generally more medical information is reported on death certificates than is directly reflected in the underlying cause of death. The conditions that are not selected as underlying cause of death constitute the nonunderlying cause(s) of death, also known as multiple causes of death.

Cause of death is coded according to the appropriate revision of the ICD. Effective with deaths occurring in 1999, the United States began using the Tenth Revision of the ICD (ICD–10) to code cause of death. During 1979–1998, causes of death were coded and

classified according to the Ninth Revision (ICD–9). Each of these ICD revisions has produced discontinuities in cause-of-death trends. These discontinuities are measured using comparability ratios. These ratios are essential to the interpretation of mortality trends.

For more information, see Comparability ratio. See also Multiple-cause-of death data and injury diagnoses.

Reference:

Miniño AM, Anderson RN, Fingerhut LA, Boudreault MA, Warner M. Deaths: Injuries, 2002. National vital statistics reports; vol 54 no 10. Hyattsville, MD: National Center for Health Statistics. 2006.

Cause-of-death ranking—Selected causes of death of public health and medical importance are ranked according to the number of deaths assigned to these causes. The top-ranking causes are the leading causes of death. For deaths from injuries in 2004, 3 causes ranked in the top 15 rankable causes based on ICD–10. They are accidents (unintentional injuries), intentional self-harm (suicide), and assault (homicide). Causes that are tied receive the same rank; the next cause is assigned the rank it would have received had the lower-ranked causes not been tied, that is, it skips a rank. See ICD.

References:

Heron MP, Smith BL. Deaths: Leading causes for 2003. National vital statistics reports; vol 55 no 10. Hyattsville, MD: National Center for Health Statistics. 2007.

NCHS. ICD–10 cause-of-death lists for tabulating mortality statistics (updated October 2002). NCHS instruction manual; part 9. Hyattsville, MD: National Center for Health Statistics; 2002.

Cause-of-death ranking for leading mechanisms of injury death—Leading mechanisms of injury death are ranked according to the number of deaths assigned to rankable mechanisms in the external cause of injury mortality matrix; rankable mechanisms are indicated by the number symbol (#) using a procedure consistent with that used to rank leading causes of death. Vaguely defined categories are summarily excluded from selection as rankable mechanisms. These include all categories beginning with the words "other" or "unspecified." Among the remaining mechanism categories, decisions were made to select as rankable the mechanism of injury considered most useful from a public health perspective with the following condition: the rankable mechanisms must be mutually exclusive. If a category representing a subtotal (such as motor vehicle traffic or fire or hot object or substance) is selected as a rankable mechanism, its component parts are not selected as rankable. The external cause of injury mortality matrices for ICD–9 and ICD–10 are shown in Tables II and III.

Civilian population, civilian noninstitutionalized population—See Population.

Comparability ratio—About every 10 to 20 years, the ICD is revised to stay abreast of advances in medical science and changes in medical terminology. Each of these revisions produces breaks in the continuity of cause-of-death statistics. Discontinuities across revisions are due to changes in classification and rules for selecting underlying cause of death. Classification and rule changes affect cause-of-death trend data by shifting deaths away from some cause-of-death categories and into others.

Comparability ratios are based on a comparability study in which the same deaths were coded by both the Ninth and Tenth Revisions. The comparability ratio was calculated by dividing the number of deaths classified by ICD–10 by the number of deaths classified by ICD–9. The resulting ratios represent the net effect of the Tenth Revision on cause-of-death statistics and can be used to adjust mortality statistics for causes of death classified by the Ninth Revision in 1998 to be comparable with cause-specific mortality statistics classified by the Tenth Revision in 1999.

The application of comparability ratios to mortality statistics helps make the analysis of change between 1998 and 1999 more accurate and complete. The 1998

comparability-modified death rate is calculated by multiplying the comparability ratio by the 1998 death rate. Comparability-modified rates should be used to estimate mortality change between 1998 and 1999.

Comparability ratios measure the effect of changes in classification and coding rules. For all external causes of injury based on the external cause of injury mortality matrix, comparability ratios are shown in Table VI.

For selected causes of death, the ICD–9 codes used to calculate death rates for 1985 through 1998 differ from the ICD–9 codes most nearly comparable with the corresponding ICD–10 cause-of-death category, which also affects the ability to compare death rates across ICD revisions. In this chartbook, rates for unintentional injuries and homicide in Figure 4 and motor vehicle traffic fatalities and drowning in Figure 6 for 1985–1998 were recalculated using ICD–9 codes that are more comparable with codes for corresponding ICD–10 categories. The codes used can be found in Table VI.

Final and preliminary comparability ratios for 113 selected causes of death are available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Datasets/Comparability/icd9_icd10/.

Reference:

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, MD: National Center for Health Statistics. Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr49/nvsr49_02.pdf. 2001.

Death rate: See Rate: Death and related rates.

Diagnosis—Diagnosis is the act or process of identifying or determining the nature and cause of a disease or injury through evaluation of patient history, examination, and review of laboratory data. Diagnoses in the National Hospital Discharge Survey, and the National Hospital Ambulatory Medical Care Survey are abstracted from medical records and coded to the ICD–9–CM. For a given medical care encounter, the first-listed diagnosis can be used to categorize the hospital discharge, or if more than one diagnosis is recorded on the survey abstraction form, the discharge can be categorized based on all diagnoses recorded. The first-listed diagnosis is often, but not always, considered the most important or dominant condition among all comorbid conditions. For example, a hospital discharge would be considered a first-listed injury discharge if an ICD–9–CM diagnosis code for injury was recorded in the first diagnosis field on the NHDS abstract form. Other discharges may have an injury diagnosis in one or more of the remaining second through seventh diagnosis fields on this abstract form.

See related External cause of injury, Initial injury emergency department visit, and Multiple cause-of-death data and injury diagnoses.

Education—In survey data, educational categories are based on information about educational credentials, such as diplomas and degrees. In vital statistics, educational attainment is based on years of school completed. This chartbook does not include death rates by educational attainment because of a change in the way the data are collected in states that have implemented the 2003 revised death certificate. See http://www.cdc.gov/nchs/vital_certs_rev.htm.

National Health Interview Survey (NHIS)—Beginning in 1997, the NHIS questionnaire was changed to ask "What is the highest level of school _____ has completed or the highest degree received?" Responses were used to categorize adults according to educational credentials (i.e., no high school diploma or general educational development [GED] high school equivalency diploma; high school diploma or GED; some college, no bachelor's degree; or bachelor's degree or higher).

Emergency department—According to the National Hospital Ambulatory Medical Care Survey, an emergency department is a hospital facility that is

staffed 24 hours a day and provides unscheduled outpatient services to patients whose conditions require immediate care. Offsite emergency departments that are open less than 24 hours are included if staffed by the hospital's emergency department.

Emergency department visit—In the National Hospital Ambulatory Medical Care Survey, an emergency department visit is a direct personal exchange between a patient and a physician or other health care providers working under the physician's supervision, for the purpose of seeking care and receiving personal health services. See related Initial injury emergency department visit.

Episode of injury—See Injury or poisoning episode.

Ethnicity—See Race and Hispanic origin.

External cause of injury—The external cause of injury is used for classifying the circumstances in which injuries occur. The external cause is comprised of two axes, the mechanism or cause (e.g. firearm or motor vehicle) and the manner or intent (e.g. homicide or suicide).

External cause of injury matrix—The matrix is a two-dimensional array describing both the mechanism or external cause of the injury (e.g., fall, cut, or struck) and the manner or intent of the injury (e.g., unintentional or accidental, suicide or self inflicted, or homicide or assault). There are three versions of the external cause of injury matrix: two matrices for injury deaths—one that uses ICD–9 codes and one for ICD–10 codes—and one matrix for injury morbidity that uses ICD–9–CM codes. Each of the matrices can be found in Tables II, III, and V. For more information, see http://www.cdc.gov/nchs/about/otheract/injury/tools.htm.

The first matrix was developed for the ICD–9 external cause codes. It was jointly developed by the Injury Control and Emergency Health Services section of the American Public Health Association and the International Collaborative Effort (ICE) on Injury Statistics. The World Health Organization has reviewed the external cause matrix for international use and is now considering its inclusion as one of its standard cause-of-death lists.

The ICD–9 matrix was later modified to be consistent with ICD–10 codes. Table VI shows ICD–9 and ICD–10 codes and the comparability ratios for each cell of the external cause matrix.

The external cause matrix was developed as a standard framework specifically to facilitate national and international comparability in the presentation of injury mortality statistics. The mechanism describes the vector that transfers the energy to the body (e.g., fall, motor vehicle traffic accident, or poisoning). The intent of the injury describes whether or not the injury was inflicted purposefully (in some cases, intent cannot be determined) and, when purposefully, whether the injury was self-inflicted (suicide or self-harm) or inflicted upon another person (homicide or assault).

Classification of intent can be more difficult to assign than mechanism. That is, for mortality, whether or not a person was intentionally harming themselves or another is determined by the medical examiner or coroner. In the United States, there are instructions for classification of intent (http://www.cdc.gov/nchs/data/dvs/2a-Final.pdf); however, no centralized system exists for assuring that these instructions are followed uniformly. Guidelines also exist for the classification of ICD–9–CM (http://www.cdc.gov/nchs/datawh/ftpserv/ftpifcd9/icdguide07.pdf). The six categories of intent in ICD–9 and ICD–10 are unintentional (i.e., accident), homicide, suicide, undetermined, legal intervention and operations of war.

References:

CDC. Recommended framework for presenting injury mortality data. MMWR 46 (RR-14) Centers for Disease Control and Prevention. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/00049162.htm. 1997.

Fingerhut LA, editor. Proceedings of the international collaborative effort on injury statistics: Volume I. DHHS Pub. No. 95–1252. Hyattsville, MD: National Center for Health Statistics. 1995.

Fingerhut L, Cox C, Warner M, et al. International comparative analysis of injury mortality: Findings from the ICE on injury statistics. Advance data from vital and health statistics; no 303. Hyattsville, MD: National Center for Health Statistics. 1998.

World Health Organization. Executive summary of the WHO Family of International Classifications Network Meeting; Reykjavik, Iceland. October 2004. Available from: http://www.who.int/classifications/network/en/icelandexecutifsummary.pdf. 2004.

NCHS. ICD–10 framework: External cause-of-injury mortality matrix [online]. Available from: http://www.cdc.gov/nchs/about/otheract/ice/matrix10.htm. 2002.

See reference under Cause of death, National Vital Statistics Reports, "Deaths: Injuries 2002" for additional references.

Extremity injury—An injury to one of the following body parts: shoulder, upper arm, forearm, elbow, wrist, hand, fingers, hip, upper leg, thigh, knees, lower leg, foot, ankle, or toes. See Barell Injury Diagnosis Matrix and Table I as well as the Injury Mortality Diagnosis Matrix and Table IV.

Hospital discharge for injury—The National Hospital Discharge Survey defines a discharge as a completed inpatient hospitalization. A hospitalization may be completed by death or by releasing the patient to the customary place of residence, a nursing home, another hospital, or other locations. Injury discharges are those for which the first-listed diagnosis is defined by the ICD–9–CM codes in the Barell Injury Diagnosis Matrix. See Table I for the codes; see related Barell Injury Diagnosis Matrix

ICD; ICD codes—See Cause of death; *International Classification of Diseases.*

Initial injury emergency department visit—In the 2001–2005 National Hospital Ambulatory Medical Care Surveys, an initial injury visit is the first visit to an emergency department for an injury that is characterized by either the first-listed diagnosis being a valid injury diagnosis or by a valid first-listed external cause of injury code regardless of the diagnosis code (see Tables I, V). There are visits, for example, that could have been associated with another condition, such as a mental health disorder or a musculoskeletal condition, or that could have been assigned a V code that would be included if there was a valid first-listed external cause of injury code. Visits for which the first-listed diagnosis or the first-listed external cause code was for a complication of medical care or for an adverse event are not counted as injury visits. For data years 2001–2004, the patient record form had a specific question on whether or not the visit was the initial one for that condition. In 2005 (and again in 2006), the variable was dropped, and in its place, an imputed variable indicating that the visit was or was not the initial visit was included on the public use file. For an explanation of the methodology used to create the initial visit variable, see http://www.cdc.gov/nchs/data/ahcd/initialvisit.pdf. Also, see http://www.cdc.gov/nchs/products/pubs/pubd/hestats/injury/injury.htm.

Advance Data from Vital and Health Statistics reports from the National Hospital Ambulatory Medical Care Survey—Emergency Department do not use the definition described above. For the definition used by the Ambulatory Care Statistics branch of NCHS, see http://www.cdc.gov/nchs/data/ad/ad386.pdf.

Injury—According to the Injury Surveillance Guidelines, an injury is the physical damage that results when a human body is suddenly or briefly subjected to intolerable levels of energy. Injury can be a bodily lesion resulting from acute exposure to energy in amounts that exceed the threshold of physiological tolerance, or it can be an impairment of function resulting from a lack of one or more vital elements (i.e., air, water, or warmth), as in strangulation, drowning, or freezing. The time between exposure to the energy and the appearance of an injury is short.

The energy causing an injury may be one of the following:

- Mechanical (e.g., an impact with a moving or stationary object, such as a surface, knife, or

vehicle)
- Radiant (e.g., a blinding light or a shock wave from an explosion)
- Thermal (e.g., air or water that is too hot or too cold)
- Electrical
- Chemical (e.g., a poison or an intoxicating or mind-altering substance such as alcohol or a drug)

In other words, injuries are the acute, physical conditions listed in Chapter XIX ("Injury, poisoning, and certain other consequences of external causes") and the circumstances under which they were caused as defined in Chapter XX ("External causes of morbidity and mortality") in ICD–10.

Whereas the above definition of an injury includes drowning (lack of oxygen), hypothermia (lack of heat), strangulation (lack of oxygen), decompression sickness or "the bends" (excess nitrogen compounds), and poisonings (by toxic substances), it does NOT include conditions that result from continual stress, such as carpal tunnel syndrome, chronic back pain, and poisoning due to infections. Mental disorders and chronic disability, although these may be eventual consequences of physical injury, are also excluded by the above definition. Also excluded from the definition of injury by international consensus are complications of medical or surgical care and adverse events.

Reference:

Holder Y, Peden M, Krug E, et al., editors. Injury surveillance guidelines. Geneva: World Health Organization. 2001.

Injury mortality classification changes from ICD–9 to ICD–10—Fundamental changes in the classification of injury occurred with the introduction of ICD–10, implemented beginning with 1999 mortality data. In ICD–9, codes were numeric with external causes of injury classified to a supplementary chapter in which codes were given the prefix E, hence the use of the term E codes to denote those used for external causes. Nature of injury codes were often referred to as N codes. In ICD–10, the terms E code and N code are no longer appropriate to describe injury mortality because all ICD–10 codes are alphanumeric, each beginning with a letter of the alphabet followed by numbers (E codes in ICD–10 would include endocrine, nutritional, and metabolic diseases found in Chapter IV of the ICD; N codes would refer to diseases of the genitourinary system found in Chapter XIV). External cause-of-death codes in ICD–10 begin with letters: *U, V, W, X or Y. Nature-of injury and poisoning codes begin with letters S or T.

Another important difference in the classification of injury mortality introduced with ICD–10 involves changes in the way the codes are organized. In ICD–10, transport accidents are grouped by the characteristics of the injured person (e.g., pedestrian [V01–V09], pedal cyclist [V10–V19], or car occupant [V40–V49]). In ICD–9, transport accidents were grouped by the type of vehicle involved in the accident (e.g., railway accidents [E800–E807], motor vehicle traffic [E810–E819], and water transport accidents [E830–E838]. Nature-of-injury codes are also organized differently in ICD–10 and are grouped according to the site of the injury (e.g., head [S00–S09], neck [S10–S19], and ankle and foot [S90–S99]). In ICD–9, nature-of-injury codes were grouped according to the type of injury, (e.g., fractures [800–829], intracranial injury [850–854], and open wound [870–897]).

Although ICD–10 is generally more detailed, some external cause categories have less specificity in ICD–10. ICD–10 codes for unintentional poisonings (X40–X49) are substantially less detailed than they were in ICD–9 (E850–E869). For example, ICD–10 code X41 (accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, anti-Parkinsonism, and psychotropic drugs) would be roughly comparable to ICD–9 codes E851 (barbiturates), E852.0–E852.9 (various other sedatives and hypnotics), E853.0–E853.9 (various tranquilizers), E854.0 (antidepressants), E854.2 (psychostimulants), E854.3 (central nervous

system stimulants), and E855.0 (anticonvulsant and anti-Parkinsonism drugs). In ICD–10, carbon monoxide cannot be uniquely identified using the assigned external cause code X47 (accidental poisoning by and exposure to other gases and vapors). In ICD–9, codes E868.0–E868.9 involve categories of carbon monoxide poisoning. Fortunately, much of the poisoning detail lost in the external cause codes in ICD–10 can be regained by using multiple-cause poisoning codes (in Chapter XIX, "Injury and Poisoning") in combination with the external cause codes. For example, an underlying cause coded to X47 with T58 in the multiple cause data would indicate poisoning by carbon monoxide. Unintentional firearm categories (W32–W34) are also somewhat less detailed in ICD–10 than in ICD–9 (E922.0–E922.9).

In some cases, comparable ICD–10 codes do not exist for categories in ICD–9. For example, E887 (fracture, cause unspecified) is assigned in ICD–9 when a fracture is specified on the death certificate without specificity regarding the external cause of the fracture. This category was often grouped in ICD–9 with unintentional falls, assuming that the unspecified external cause would be, in most instances, a fall. In ICD–10, no such category exists and these deaths would be classified to X59 (exposure to unspecified factor), a much less specific category and one not amenable to grouping with unintentional falls.

More detailed analysis of changes in injury mortality coding between ICD–9 and ICD–10 is possible using the comparability data file published by NCHS and available on the NCHS website. This data file contains individual 1996 mortality records coded by both ICD–9 and ICD–10.

References:

World Health Organization. Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, Ninth Revision. Geneva: World Health Organization. 1977.

World Health Organization. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva: World Health Organization. 1992.

NCHS. Comparability of cause-of-death between ICD revisions. Data Warehouse. Hyattsville, MD: National Center for Health Statistics. Available from: http://www.cdc.gov/nchs/datawh/statab/unpubd/comp.htm#A%20guide%20 to20state%20implementation%20of%20ICD–10. 2007.

Injury Mortality Diagnosis (IMD) Matrix—The IMD matrix categorizes the nearly 1,200 injury diagnosis codes from ICD–10's Chapter XIX (S and T codes, excluding adverse effects and complications of medical and surgical care [T79, T80–T88, T98.3]) by body region and nature of the injury. At its most detailed level, the ICD–10 matrix has 19 nature-of-injury categories and 43 body-region categories. For most analyses of mortality data, similar categories can be aggregated to reduce the categories to those most meaningful for mortality. For purposes of this report, 16 nature-of-injury categories and 17 body-region categories are presented. The body regions can be further combined into five groups; this is often useful for analyses using additional dimensions, such as external cause or age (see Table IV).

The ICD–10 IMD Matrix is similar in structure to the Barell Injury Diagnosis Matrix that categorizes ICD–9–CM injury morbidity codes by body region and nature of injury. However, the ICD–10 matrix is adapted for use with mortality data, which tend to be less detailed than morbidity data, and also takes into account important changes related to the revision of the ICD classification scheme. See http://www.cdc.gov/nchs/about/otheract/ice/injury_matrix10.htm. See also Multiple-cause-of-death data and injury diagnoses.

Reference:

Fingerhut LA, Warner M. ICD–10 Injury Mortality Diagnosis Matrix. Inj Prev 2006 12(1):24–9.

Injury or poisoning episode—An injury episode in the National Health Interview Survey refers to the traumatic event in which a person was injured one or more times from an external cause (e.g., a fall or a motor vehicle traffic accident). A poisoning episode refers to the event resulting from ingestion of or contact with harmful substances, as well as overdoses or wrong use of any drug or medication.

Appendix II–Definitions and Methods Ÿ

Injury severity for hospital discharges—The injury severity measure used in Figure 15-2 was empirically derived based on threat to life. Survival risk ratios (SRRs) were calculated for Figure 15-2 by dividing the number of alive discharges with a given ICD–9–CM injury diagnosis code by the number of discharges with that diagnosis code. Discharges from the National Hospital Discharge Survey for 1988–2005 with a first-listed diagnosis of injury and no other injury diagnoses (i.e., isolated injury diagnoses) were used in the calculations. The resulting SRRs are referred to as independent SRRs. The reason for using independent SRRs instead of traditional SRRs (i.e., both isolated and multiple injury diagnoses) is to avoid the problem that patients with multiple injuries could have more serious injuries contributing to the calculation of the SRRs of minor injuries. This would cause minor injuries to appear more serious than if they occurred alone. For diagnoses that were never isolated (i.e., only occurred with other diagnoses), SRRs could not be calculated.

For discharges with multiple injury diagnoses, the diagnosis with the lowest SRR (i.e., lowest probability of survival) was used to determine severity. The choice of the lowest SRR as the indicator of severity is based on the work of Kilgo et al., which compared summary measures of severity and found that the worst injury (i.e., lowest SRR) best predicted mortality.

The categorization of injury severity shown in Figure 15-2 was developed for this figure. Least severe include injury discharges where all injury diagnoses have a SRR of less than 0.995 (i.e. probability of survival of more than 99.5%). Moderately severe include injury discharges where the lowest SRR among the injury diagnoses is between 0.995 and 0.95. Most severe include injury discharges where the lowest SRR among the injury diagnoses is 0.95 or lower. In addition to the likelihood of survival, the proportions of hospitalized patients in each group were considered. Currently no standard set of SRRs for injury severity levels has been developed.

References:

Meredith JW, Kilgo PD, Osler TM. Independently derived survival risk ratios yield better estimates of survival than traditional survival risk ratios when using the ICISS. J Trauma. 55(5):933–8. 2003.

Kilgo PD, Osler TM, Meredith JW. The worst injury predicts mortality outcome the best: Rethinking the role of multiple injuries in trauma outcome scoring. J Trauma. 55(4):599–607. 2003.

Intent of injury—Intent refers to one of the two dimensions of the external cause of injury matrix. This dimension classifies manner of the injury (e.g., unintentional or accidental, suicide or self inflicted, homicide or assault, or undetermined) in three versions of the external cause of injury matrix: two for injury deaths—one that uses ICD–9 codes and one that uses ICD–10 codes—and one matrix for injury morbidity that uses ICD–9–CM codes. For a detailed listing of the intent ICD codes, see Tables II, III, and V.

***International Classification of Diseases* (ICD)—**The ICD provides the ground rules for coding and classifying cause-of-death data. The ICD is developed collaboratively by the World Health Organization and 10 international centers, one of which is housed at NCHS. The purpose of the ICD is to promote international comparability in the collection, classification, processing, and presentation of health statistics. Since 1900, the ICD has been modified about once every 10 years, except for the 20-year interval between ICD–9 and ICD–10. The purpose of the revisions is to stay abreast with advances in medical science. New revisions can introduce major disruptions in time series of mortality statistics, but in general, this has not been the case for injury deaths. For more information, see http://www.cdc.gov/nchs/about/major/dvs/icd10des.htm. See related Cause of death; Comparability ratio; ICD–9–CM.

ICD–9–CM—The ICD–9–CM is based on and is compatible with the World Health Organization's ICD–9. The United States currently uses ICD–9–CM to code morbidity diagnoses and inpatient procedures. ICD–9–CM consists of three volumes. Volumes 1 and 2 contain the diagnosis tabular list and index. Volume 3 contains the procedure classification (tabular and index combined).

Appendix II–Definitions and Methods Ÿ

ICD–9–CM is divided into 17 chapters and 2 supplemental classifications. The chapters are arranged primarily by body system. There is a chapter for injuries that is arranged by nature of injury rather than by body region of injury. One of the two supplemental classifications is external causes of injury and poisoning (E Codes).

ICD–9–CM is used for coding of patient diagnoses in the National Ambulatory Medical Care Survey, the National Hospital Ambulatory Medical Care Survey, the National Hospital Discharge Survey, and for coding the respondent's verbatim responses in the National Health Interview Survey.

International Collaborative Effort (ICE) on Injury Statistics—This is one of several international activities sponsored by NCHS. The goal is to provide a forum for international exchange and collaboration among injury researchers who develop and promote international standards in injury data collection and analysis. A secondary goal is to produce products of the highest quality to facilitate the comparability and improved quality of injury data. The mission of the Injury ICE is to improve international comparability and quality of injury data. The ultimate aim is to provide the data needed to better assess the causes and consequences of injury, differences in injury occurrence over time and place, and the most effective means of prevention and control. See http://www.cdc.gov/nchs/advice.htm.

Lifetime medical treatment costs— Medical treatment costs are calculated differently for fatalities, hospitalized injuries, and nonhospitalized injuries. Fatality costs take into account where the death occurred and can include costs for the coroner or medical examiner, transport of the victim, emergency department treatment, hospital treatment, and nursing home care. Hospitalized injury costs can include inpatient facility charges, nonfacility costs of an inpatient stay, hospital readmission costs, hospital rehabilitation costs, nursing home costs, short-to-medium term noninpatient costs, costs beyond 18 months, and transport costs. Nonhospitalized injury costs are based on primary treatment location and include medical and transport costs. Estimates for mental health and psychological treatment due to injury are not available and are therefore not included in this cost.

Reference:

Finkelstein E, Corso P, Miller T. The Incidence and Economic Burden of Injuries in the United States. New York, NY: Oxford University Press. 2006.

Lifetime productivity costs—These costs include lost wages, lost fringe benefits, and the lost ability to perform household responsibilities. Calculations differ for nonfatal and fatal injuries. For nonfatal injuries, there are two categories of productivity losses: short-term, which are losses during the first six months after injury, and long-term, which are the losses occurring after the first six months. Fatal productivity costs are estimated by calculating expected lifetime earnings by age and sex. This cost also includes an imputed value for lost household services.

Reference:

Finkelstein E, Corso P, Miller, T. The Incidence and Economic Burden of Injuries in the United States. New York, NY: Oxford University Press. 2006.

Logarithmic scale—A logarithmic scale is a scale used to emphasize relative changes in numbers. The choice of a linear or logarithmic (log) scale depends on what the analyst or author wants to emphasize about the graph for the audience—either the absolute or the relative changes in numbers. The absolute change is the arithmetic difference between two values. The relative change is the percent difference between two values. The linear scale is the scale most frequently used and recognized, and it emphasizes the absolute changes between data points over time. Logarithmic scales, on the other hand, emphasize the relative or percentage change between data points. Equal distances on a log scale represent an equal percentage change. This

feature makes a log graph particularly useful for showing rates of change in data. In addition, trends can be shown on a log scale to enable measures with large differences in magnitude to be shown on the same chart. One potential disadvantage to using the log scale is that the absolute magnitude of changes may appear less dramatic.

To properly interpret data on a log scale, the following points should be kept in mind:
1. A sloping straight line indicates a constant rate (not amount) of increase or decrease in the values.
2. A horizontal line indicates no change.
3. The slope of the line indicates the rate of increase or decrease.
4. Parallel lines, regardless of their magnitude, depict similar rates of change.

References:

Page RM, Cole GE, Timmreck TC. Basic Epidemiological Methods and Biostatistics: A Practical Guidebook. Sudbury, Massachusetts: Jones and Bartlett Publishers. 1995.

Jekel JF, Elmore JG, Katz DL. Epidemiology biostatistics and preventive medicine. Philadelphia, PA: W.B. Saunders Company. 1996.

Mechanism of injury—This refers to one of the two dimensions of the external cause of injury matrix. This dimension classifies external cause of the injury (e.g., fall, cut, or struck) in three versions of the external cause of injury matrix: two for injury deaths—one that uses ICD–9 codes and one that uses ICD–10 codes—and one matrix for injury morbidity that uses ICD–9–CM codes. For a detailed listing of the codes used to classify mechanism see Tables II, III, and V.

Multiple-cause-of-death data and injury diagnoses- Injury mortality diagnosis data that are found in the multiple-cause fields of each record are presented using the ICD–10 Injury Mortality Diagnosis Matrix. Multiple-cause-of-death data allow for more than one injury diagnosis code per death. Multiple-cause-of-death data can be summarized in several ways; in this report, multiple-cause-of-death data are shown as weighted total mentions. Using this method, each injury diagnosis is given equal weight within a death and each death is counted equally. For example, if the death includes mention of a superficial injury and a traumatic brain injury, each is given a weight of one-half.

References:

Miniño AM, Anderson RN, Fingerhut LA, Boudreault MA, Warner M. Deaths: Injuries, 2002. National vital statistics reports; vol 54 no 10. Hyattsville, MD: National Center for Health Statistics. 2006.

Fingerhut LA, Warner M. ICD–10 Injury Mortality Diagnosis Matrix. Inj Prev 12(1):24–9. 2006.

Finkelstein E, Corso P, Miller T. The Incidence and Economic Burden of Injuries in the United States. New York, NY: Oxford University Press. 2006.

Nature of injury—Nature of injury refers to one of the two dimensions of the Barell Injury Diagnosis Matrix and of the Injury Mortality Diagnosis (IMD) Matrix. This dimension classifies the nature of injury and is based on ICD–9–CM codes in the Barell matrix and ICD–10 codes in the IMD Matrix. For a detailed listing of the codes used in both matrices, see Tables I and IV.

Occupational injury fatality rates—The Census of Fatal Occupational Injuries (CFOI) publishes annual fatality rates for persons 16 years of age and over to be consistent with the employment data (the denominator of the rates) from the Current Population Survey. However, the number of deaths is published for all persons regardless of age because of CFOI disclosure rules. Thus, in order to calculate a 2-year average annual rate for the population 16 years of age and over (as shown in Figure 12), deaths for persons 16 years of age and over for the 2-year period had to be derived by weighting the published annual rates by the population of employed workers.

Outpatient visit—In the National Hospital Ambulatory Medical Care Survey (NHAMCS), an outpatient department visit is a direct personal exchange between a patient and a physician or other health care provider working under the physician's supervision for the purpose of seeking care and receiving personal health services. Beginning with data year 2005, the outpatient department component

of the NHAMCS no longer collects information on the external cause of injury. See related Emergency department visit.

Place of occurrence—In the National Health Interview Survey, place of occurrence refers to the place where the injury occurred. Categories include home (inside), home (outside), school/child care center/preschool, hospital/residential institution, street/highway/parking lot, sport facility/recreation area/lake/river/ocean, industrial/construction area, trade/service area, other public building, and other (Figure 24).

Population—The U.S. Census Bureau collects and publishes data on populations in the United States according to several different definitions. Various statistical systems then use the appropriate population for calculating rates.

Resident population—This population is used as the denominator for death rates. It includes persons whose usual place of residence (i.e., the place where one usually lives and sleeps) is in one of the 50 states or the District of Columbia. It includes members of the Armed Forces stationed in the United States and their families. It excludes international military, naval, and diplomatic personnel and their families located in this country and residing in embassies or similar quarters. Also excluded are international workers and international students in this country and U.S. citizens living abroad. Populations for 2003 and 2004, used for many of the figures, are shown in Table IX.

Civilian population—The civilian population is the resident population excluding members of the Armed Forces. However, families of members of the Armed Forces are included. This population is the denominator in rates calculated for the National Hospital Discharge Survey as used in this chartbook. Emergency department (ED) visit rates are also based on this population rather than the civilian noninstitutionalized population because institutionalized populations (such as those in nursing homes or in prisons) use EDs. Populations for 2004 and 2005, used for many of the figures, are shown in Table X.

Civilian noninstitutionalized population—This is the civilian population not residing in institutions such as correctional institutions, detention homes, and training schools for juvenile delinquents; homes for aged and dependent persons (e.g., nursing homes and convalescent homes); homes for dependent and neglected children; homes and schools for mentally or physically handicapped persons; homes for unwed mothers; psychiatric, tuberculosis, and chronic disease hospitals; and residential treatment centers. The National Health Interview Survey samples this population. Populations for 2004 and 2005, used for many of the figures, are shown in Table XI.

For additional detail on populations as denominators, see Appendix I, Population Census and Population Estimates and *Health, United States, Appendix* at http://www.cdc.gov/nchs/hus.htm.

Table IX. United States resident population by age group, 2003–2004

Age group	2003–2004 combined populations
Total	584,466,193
Under 1 year	8,080,793
1–4 years	31,759,754
5–14 years	81,719,365
15–24 years	82,907,268
25–34 years	79,904,535
35–44 years	88,479,246
45–54 years	82,423,404
55–64 years	56,978,659
65–74 years	36,800,517
75–84 years	25,839,554
85 years and over	9,573,098

SOURCE: National Center for Health Statistics. Bridged-race vintage 2004 postcensal population estimates of the resident population of the United States for July 1, 2000, through July 1, 2004, by year, county, single-year of age, bridged-race, Hispanic origin, and sex (pcen_v2004.txt), prepared under a collaborative agreement with the U.S. Census Bureau. Available from: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm. 2005.

National Center for Health Statistics. Bridged-race vintage 2003 postcensal estimates of the resident population of the United States for July 1, 2000–July 1, 2003, by year, county, single year of age, bridged-race, Hispanic origin and sex (pcen_v2003.txt), prepared under a collaborative arrangement with the U.S. Census Bureau. Available from: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm. 2004.

Table X. United States civilian population by age group, 2004–2005

Age group	2004–2005 combined populations
Total	587,608,640
Less than 15 years	121,522,256
15–24 years	82,769,245
25–44 years	166,784,057
45–64 years	143,448,984
65–74 years	37,103,285
75 years and over	35,980,813

SOURCE: Population data are from unpublished tabulations of the U.S. Census Bureau, which can be found on CD-ROMs released by CDC/NCHS, National Hospital Discharge Survey.

Table XI. United States civilian, noninstitutionalized population by age group, 2004–2005

Age group	2004–2005 combined populations
Total	579,395,708
Less than 15 years	121,423,927
15–24 years	81,626,002
25–44 years	164,233,264
45–64 years	142,475,064
65–74 years	36,696,535
75 years and over	32,940,916

SOURCE: Population data are derived from the National Health Interview Survey. See Appendix I.

Race and Hispanic origin—Federal data systems have different methods for assigning race and Hispanic origin. In this chartbook, two figures include these variables, one from the National Vital Statistics System and one from the National Health Interview Survey.

National Vital Statistics System—Mortality data
Most states are in the process of revising their death certificates to conform to the most recent standards on race and ethnicity. These 1997 Office of Management and Budget (OMB) standards for classification of individuals by race within the federal government's data systems have five racial groups: American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and White (Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity. Federal Register 62:58781-90. 30 Oct 1997). During the transition to full implementation of the 1997 standards, vital statistics data will continue to be presented for the four major race groups—white, black or African American, American Indian or Alaska Native, and Asian or Pacific Islander—in accordance with the original 1977 standards.

Data in Figure 10 and the accompanying data table are reported as Hispanic, non-Hispanic white, black, American Indian or Alaska Native, and Asian or Pacific Islander. Hispanic or Latino origin includes persons of Mexican, Puerto Rican, Cuban, Central and South American, and other or unknown Latin American or Spanish origins. Persons of Hispanic origin may be of any race. Starting in 1997, Hispanic origin of decedent was reported by all 50 states and the District of Columbia.

Quality of race and Hispanic origin data in mortality statistics—Information about the race and Hispanic ethnicity of the decedent is reported by the funeral director as provided by an informant, often the surviving next of kin, or, in the absence of an informant, on the basis of observation. Death rates by race and Hispanic origin are based on information from death certificates (numerators of the rates) and on population estimates from the U.S. Census Bureau (denominators). Race and ethnicity information from the census is by self-report. To the extent that race and Hispanic origin are inconsistent between these two data sources, death rates will be biased. Studies have shown that persons self-reported as American Indian, Asian, or Hispanic on census and survey records may sometimes be reported as white or non-Hispanic on the death certificate, resulting in an underestimation of deaths and death rates for the

American Indian, Asian, and Hispanic groups. Bias also results from undercounts of some population groups in the census, particularly young black males, young white males, and elderly persons, resulting in an overestimation of death rates. The net effects of misclassification and undercover age result in overstated death rates for the white population and black population estimated at 1% and 5%, respectively; understated death rates for other population groups are estimated as follows: American Indians, 21%; Asian or Pacific Islanders, 11%; and Hispanics, 2%.

For more information, see Rosenberg HM, Maurer JD, Sorlie PD, 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.

For more information on coding race using vital statistics, see National Center for Health Statistics, Technical Appendix. Vital Statistics of the United States, Vol. I, Natality, and Vol. II, Mortaltity, Part A, available from http://www.cdc.gov/nchs/nvss.htm. See related Appendix I, Population Census and Population Estimates.

National Health Interview Survey—The categories for race are consistent with 1997 OMB federal standards as discussed above. Hispanic refers to all persons who are of Hispanic or Latino origin and may be of any race or combination of races. In the NHIS, questions on Hispanic origin precede questions on race. Figure 23 and its accompanying data table report Hispanic, non-Hispanic white, and non-Hispanic black. Non-Hispanic persons of a given race (in this instance, white or black) indicated that they were not of Hispanic or Latino origin and only indicated the single race group.

In addition, Appendix II of Health, United States, 2007 has more detailed information on the history of race and Hispanic origin classification in all NCHS data systems; see http://www.cdc.gov/nchs/data/hus/hus07.pdf#tocappii.

Rate—A rate is a measure of some event, disease, or condition in relation to a unit of population, along with some specification of time. See related Age adjustment; Population.

Death rate—This is calculated by dividing the number of deaths in a population in a year by the midyear resident population. For census years 1990 and 2000, death rates are based on the enumerated census counts of the resident population as of April 1. For the noncensus years 1985–1989 and 1991–1999, rates were based on national intercensal estimates of the resident population as of July 1. For the noncensus years 2001–2004, rates were based on national postcensal estimates of the resident population as of July 1. Death rates are expressed as the number of deaths per 100,000 population. Annual percent changes in death rates shown in Figures 4 and 6 are based on rounded rates as necessitated by the software used to calculate change. See related, Average percent change and test of trends.

Relative standard error—The relative standard error (RSE) is a measure of an estimate's reliability. The RSE of an estimate is obtained by dividing the standard error of the estimate (SE(r)) by the estimate itself (r). This quantity is expressed as a percentage of the estimate and is calculated as follows:

$$RSE = 100 \times (SE(r)/r)$$

Estimates with large RSEs are considered unreliable. In this chartbook, the following guidelines were followed.

For mortality data, the following rules were applied based on the number of deaths.

Number of deaths < 20	Show asterisk in place of number or rate.
Number of deaths ≥ 20	Show number or rate with no asterisk.

This criterion corresponds to an approximate RSE of 22%.

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For the National Health Interview Survey, National Hospital Discharge Survey, National Hospital Ambulatory Medical Care Survey, and National Ambulatory Medical Care Survey, the following rules were applied based on the RSE of estimates:

RSE > 30%	Show asterisk in place of number or rate.
20% ≤ RSE ≤ 30%	Show number or rate with an asterik.
RSE < 20%	Show number or rate with no asterisk.

Rounding of estimates—Data shown in text are sometimes rounded to the nearest whole number, whereas the data table shows numbers rounded to 1 decimal place. The whole number in the text is based on the unrounded estimate. For example, if the data table shows 10.5, that may be the result of an estimate of 10.476. The whole number in the text would be 10. The only exceptions to data tables showing more than 1 decimal place occur when the standard error (SE) is greater than 0.0 but less than 0.5; those SEs are shown to 2 decimal places.

Significance testing—When testing the difference between two rates, R_1 and R_2, the normal approximation may be used to calculate a test statistic, Z, such that

$$Z = (R_1 - R_2)/SQRT\ (SE(R_1)^2 + SE(R_2)^2)$$

If $|Z| \geq 1.96$, then the difference between the rates is considered statistically significant at the 0.05 level. If $|Z| < 1.96$, then the difference is not considered statistically significant.

Standard error—Standard error is a measure of an estimate's random variability. For each figure in this chartbook, the accompanying data table includes the data point graphed as well as the standard error (SE) of the data point. The SE associated with crude and age-specific death rates assumes that the population denominator is a constant. The SE of a death rate is calculated as

$$\frac{R}{\sqrt{D}}$$

where D is the number of deaths and R is the rate. In some figures, standard errors are shown for percents of deaths; these are calculated as $SQRT(p*(1-p)/n)$, where p is the percent and n is the number of deaths in the denominator. For age-adjusted death rates, the SE is calculated as

$$\sqrt{\sum_i \left\{ w_i^2 \left(\frac{R_i^2}{D_i} \right) \right\}}$$

See "Deaths: Injuries, 2002" reference below.
See Age adjustment and Table VII.

SEs from each of the sample surveys were calculated using SUDAAN software, which uses a first-order Taylor series approximation of the deviation of the estimates from their expected values.

References:

Miniño AM, Anderson RN, Fingerhut LA, Boudreault MA, Warner M. Deaths: Injuries, 2002. National vital statistics reports; vol 54 no 10. Hyattsville, MD: National Center for Health Statistics. http://www.cdc.gov/nchs/data/nvsr/nvsr54/nvsr54_10.pdf. 2006.

Research Triangle Institute. SUDAAN (Release 9.0.1) [computer software]. Research Triangle Park, NC: Research Triangle Institute. 2005

Urbanization—Urbanization is the degree of urban (city-like) character of a particular geographic area. This report uses the 2006 Urban-Rural Classification Scheme for Counties, which is a six-level classification scheme developed by NCHS to categorize the 3,141 U.S. counties and county-equivalents based on their urban and rural characteristics. The classification scheme includes four metropolitan (or urban) categories and two nonmetropolitan (or rural) categories. The county classifications are based on the following information: 1) the 2003 OMB definitions of metropolitan and nonmetropolitan counties (with revisions through 2005); 2) the 2003 Rural-Urban Continuum Codes developed by the Economic Research Service of the U.S. Department of Agriculture; 3) 2004 postcensal county population

estimates; and 4) county-level data on several settlement density, socioeconomic, and demographic variables from census 2000. The six categories of the 2006 NCHS Urban-Rural Classification Scheme for Counties are large central metro (central counties of metro areas of 1 million or more population), large fringe metro (outlying counties of metro areas of 1 million or more population), medium metro (metro areas of 250,000 to 999,999 population), small metro (metro areas of 50,000 to 249,999 population), nonmetropolitan micropolitan, and nonmetropolitan noncore. For more information on this classification scheme, see http://www.cdc.gov/nchs/r&d/rdc_urbanrural.htm.