

Chapter 9.

Occupational Safety and Health Statistics

Data on safety and health conditions for workers on the job have been produced by the Bureau of Labor Statistics (BLS) since before World War I. The first report issued by the BLS summarized industrial accidents in the iron and steel industries during the war period, presenting information on the frequency and severity of injuries, the occupation of the injured workers, and the nature of their injuries.¹ Work-related illnesses also were the subject of BLS studies conducted in the early 1900s, such as pioneering research on lead poisoning in the workplace by Dr. Alice Hamilton.²

It was not until the passage of the [Occupational Safety and Health Act of 1970](#) that the BLS was delegated responsibility for developing a comprehensive statistical system covering work-related injuries, illnesses, and fatalities in private industry. In 1972, the BLS, in cooperation with many State governments, designed the annual Survey of Occupational Injuries and Illnesses (SOII) to estimate the number and frequency of work-related injuries and illnesses by detailed industry for the Nation and for States participating in the SOII. This survey information continues to be of value to the safety and health community in allocating prevention resources among several hundred diverse industries, across which workers' risks of injury and illness vary widely.

As originally designed, however, the SOII had its shortcomings. Although it pinpointed dangerous work settings, the survey shed little light on the circumstances of an injury or illness; for example, the manner in which an incident occurred and which occupations were involved.³ The SOII also failed to produce a reliable count of workplace fatalities or profiles depicting the victims' demographics and the circumstances surrounding their deaths.

In 1987, a National Academy of Sciences study recommended that these deficiencies be corrected by collecting detailed data on severe, nonfatal occupational injuries and illnesses reported in the SOII and by compiling complete accounts of occupational fatalities from administrative records, such as death certificates and workers'

compensation reports.⁴ This critical review of the SOII, which spotlighted longstanding deficiencies, provided the impetus for its redesign.

With congressional funding, technical support from the safety and health community, and assistance from some 40 participating States, the BLS began a multi-year effort to redesign and test an improved safety and health statistical system, which was fully implemented in 1992. Beginning that year, SOII estimates of nonfatal workplace injuries and illnesses were expanded to profile detailed case characteristics and worker demographics for cases that involved days away from work and a separate Census of Fatal Occupational Injuries (CFOI) program was established to capture counts and profiles of work-related fatalities. (For more information on case characteristics and worker demographics, see discussion of the [Occupational Injury and Illness Classification System](#) and the [Standard Occupation Classification](#) system in *Part 1. Common Coding Systems*, which follows this section.)

The changes implemented in 1992 resulted in separate [news releases](#) published annually for each of the three BLS safety and health statistics programs:

- *National Census of Fatal Occupational Injuries* – includes detailed case characteristics and worker demographics for work-related fatalities.
- *Workplace Injuries and Illnesses* – includes industry level estimates of nonfatal work-related injuries and illnesses from the Survey of Occupational Injuries and Illnesses.
- *Nonfatal Occupational Injuries and Illnesses Requiring Days Away From Work* – includes detailed case characteristics and worker demographics for cases involving days away from work from the Survey of Occupational Injuries and Illnesses.

Several recent changes that have had significant impacts on data from BLS safety and health statistics programs, including updated recordkeeping requirements, new industry and occupation classification systems, and changes in race and ethnicity standards, are discussed in *Part 1. Common Coding Systems*.

Part I. Common Coding Systems

The Survey of Occupational Injuries and Illnesses and the Census of Fatal Occupational Injuries (CFOI) programs share several systems to classify industry, occupation, and case and worker characteristics. Changes among these systems over the past several years have significantly impacted SOII and CFOI outputs, as described below.

North American Industry Classification System (NAICS)

The SOII and CFOI programs adopted a new industry classification system beginning with reference year 2003 statistics. The Standard Industrial Classification ([SIC](#)) system served as the foundation for SOII and CFOI statistics since the inception of each program—1972 and 1992, respectively. The SIC system was revised numerous times during its life-cycle (most recently in 1987) to account for changes in the composition of the U.S. economy. However, despite periodic updates to the SIC system, increasing criticism led to the development of a new, more comprehensive system that reflects more recent and rapid economic changes. Recent developments in information services, new forms of health care provision, expansion of the services sector, and high tech manufacturing are examples of industrial changes that were unaccounted for under the SIC system.

The North American Industry Classification System ([NAICS](#)) was developed in cooperation with Canada and Mexico to replace the SIC system and represents one of the most profound changes for statistical programs focused on measuring economic activities. NAICS uses a production-oriented conceptual framework to group establishments into industries based on the activity in which they are primarily engaged. Establishments using similar raw material inputs, similar capital equipment, and similar labor are classified in the same industry. In other words, establishments that do similar things in similar ways are classified together.

As far as BLS' safety and health statistics are concerned, NAICS provides a new tool to ensure that SOII and CFOI statistics accurately reflect changes in a dynamic U.S. economy. The downside of this change is that these improved statistics resulted in time series breaks due to the significant differences between SIC and NAICS. Every sector of the economy was restructured and redefined under NAICS. A new *Information* sector combined

communications, publishing, motion picture and sound recording, and online services, recognizing our information-based economy. NAICS restructured *Manufacturing* to recognize new high-tech industries. A new sub-sector was devoted to computers and electronics, including reproduction of software. *Retail trade* was redefined. In addition, eating and drinking places were transferred to a new *Accommodation and food services* sector. The difference between *Retail trade* and *Wholesale trade* is now based on how each store conducts business. For example, many computer stores were reclassified from wholesale to retail. Nine new service sectors and 250 new service-providing industries were recognized with the adoption of NAICS.

NAICS uses a six-digit hierarchical coding system to classify economic activities into 20 industry sectors—4 sectors are mainly goods-producing sectors and 16 are entirely services-providing sectors. This six-digit hierarchical structure allows greater coding flexibility than the four-digit structure of the SIC. NAICS allows for the identification of 1,170 industries compared to the 1,004 found in the SIC system. The following list identifies the individual goods-producing and service-providing sectors according to 2002 NAICS classifications:

- **Goods-producing NAICS sectors**
 - Agriculture, forestry, fishing and hunting (NAICS 11)
 - Mining (NAICS 21)
 - Construction (NAICS 23)
 - Manufacturing (NAICS 31-33)
- **Service-providing NAICS sectors**
 - Wholesale trade (NAICS 42)
 - Retail trade (NAICS 44-45)
 - Transportation and warehousing (NAICS 48-49)
 - Utilities (NAICS 22)
 - Information (NAICS 51)
 - Finance and insurance (NAICS 52)
 - Real estate and rental and leasing (NAICS 53)
 - Professional, scientific, and technical services (NAICS 54)
 - Management of companies and enterprises (NAICS 55)
 - Administrative and support and waste management and remediation services (NAICS 56)

- Education services (NAICS 61)
- Health care and social assistance (NAICS 62)
- Arts, entertainment, and recreation (NAICS 71)
- Accommodation and food services (NAICS 72)
- Other services (except Public administration) (NAICS 81)
- Public administration (NAICS 92)

In addition to the aforementioned NAICS sectors, SOII and CFOI statistics are tabulated for several additional [NAICS aggregations](#) that are unique to the BLS, including:

- Natural resources and mining—combining Agriculture, forestry, fishing and hunting (NAICS 11), and Mining (NAICS 21)
- Trade, transportation, and utilities—combining Wholesale (NAICS 42) and Retail trade (NAICS 44-45), Transportation and warehousing (NAICS 48-49), and Utilities (NAICS 22)
- Financial activities—combining Finance and insurance (NAICS 52) and Real estate and rental and leasing (NAICS 53)
- Professional and business services—combining Professional, scientific, and technical services (NAICS 54); Management of companies and enterprises (NAICS 55); and Administrative and support and waste management and remediation services (NAICS 56)
- Education and health services—combining Education services (NAICS 61) and Health care and social assistance (NAICS 62)
- Leisure and hospitality—combining Arts, entertainment, and recreation (NAICS 71) and Accommodation and food services (NAICS 72)

In September 2004, the BLS published 2003 CFOI data, followed in December by 2003 summary estimates from the SOII, each using NAICS for the first time. In March 2005, the BLS published detailed case and demographic estimates from the 2003 SOII using NAICS. Because of the substantial differences between the NAICS and SIC systems, the results by industry since 2003 constitute a break in series, and users are advised against making comparisons between the 2003 industry categories and the results for previous years.

NAICS 2002 has recently been revised on a planned 5-year schedule. [NAICS 2007](#) coding will be reflected in 2009 SOII estimates and CFOI counts to be published in 2010. For additional information regarding differences between NAICS 2002 and NAICS 2007, visit the Bureau of the Census' [NAICS webpage](#).

Standard Occupational Classification (SOC)

Beginning with the 2003 reference year, the CFOI and the SOII began using the 2000 Standard Occupational Classification system ([SOC](#)) for occupations. Prior to 2003, these programs used the Bureau of the Census occupational classification system. Because of the substantial differences between the current and previous systems, CFOI and SOII results by occupation in 2003 constitute a break in series, and users are advised against making comparisons between the 2003 occupation categories and the results for previous years.

The 2000 SOC system classifies workers at four levels of aggregation including:

- Major group
- Minor group
- Broad occupation
- Detailed occupation

All occupations are clustered into one of 23 major groups, within which are 96 minor groups, 449 broad occupations, and 821 detailed occupations. Occupations with similar skills or work activities are grouped at each of the four levels of hierarchy to facilitate comparisons. For example, "Life, Physical and Social Science Occupations" (19-0000) is divided into four minor groups, "Life Scientists" (19-1000), "Physical Scientists" (19-2000), "Social Scientists and Related Workers" (19-3000), and "Life, Physical and Social Science Technicians" (19-4000). Life Scientists contains broad occupations such as "Agriculture and Food Scientists" (19-1010), and "Biological Scientists" (19-1020). The broad occupation Biological Scientists includes detailed occupations such as "Biochemists and Biophysicists" (19-1021) and "Microbiologists" (19-1022).

Each item in the hierarchy is designated by a six-digit code. The first two digits of the SOC code represent the major group; the third digit represents the minor group; the fourth and fifth digits represent the broad occupation; and the detailed occupation is represented by the sixth digit. Major group codes end with 0000 (e.g., 33-0000,

Protective Service Occupations), minor groups end with 000 (e.g., 33-2000, Fire Fighting Workers), and broad occupations end with 0 (e.g., 33-2020, Fire Inspectors). All residuals ("Other," "Miscellaneous," or "All Other"), whether at the detailed or broad occupation or minor group level, contain a 9 at the level of the residual. Detailed residual occupations end in 9 (e.g., 33-9199, Protective Service Workers, All Other); broad occupations which are minor group residuals end in 90 (e.g., 33-9190, Miscellaneous Protective Service Workers); and minor groups which are major group residuals end in 9000 (e.g., 33-9000, Other Protective Service Workers):

- 33-0000 Protective Service Occupations
 - 33-9000 Other Protective Service Workers
 - 33-9190 Miscellaneous Protective Service Workers
 - 33-9199 Protective Service Workers, All Other

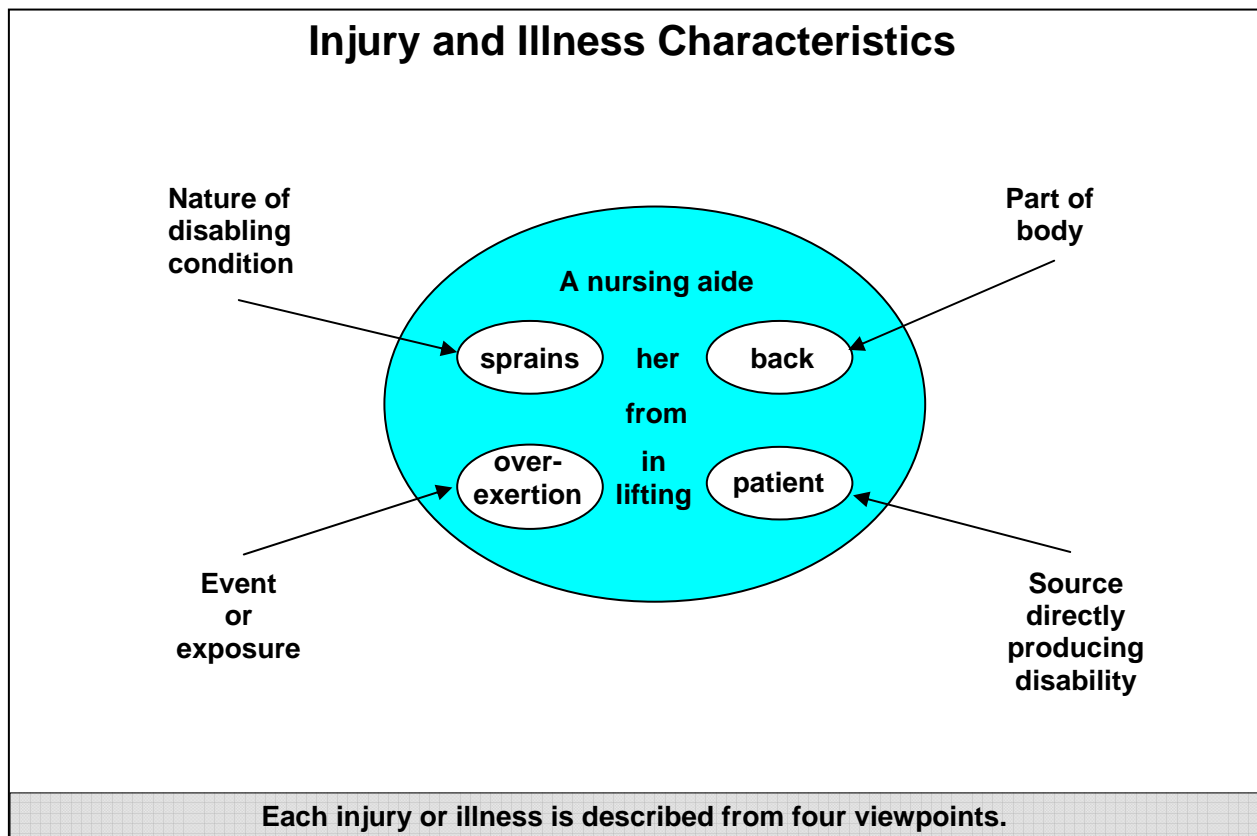
In September 2004, the BLS published 2003 CFOI data, followed in March 2005 by detailed case and demographic estimates from the SOII, each using SOC for the first time to classify occupation. Because of the substantial differences in the SOC system, the results by occupation since 2003 constitute a break in series, and users are advised against making comparisons between the 2003 occupation categories and the results for previous years.

Occupational Injury and Illness Classification System (OIICS)

The Occupational Injury and Illness Classification System (OIICS) was developed by the BLS to provide a consistent set of procedures for recording the characteristics associated with workplace injuries, illnesses, and fatalities. The circumstances of each case are classified based on the [BLS OIICS manual](#). The SOII uses four case characteristics to describe each incident that led to an injury or illness that involved one or more days away from work (see illustrative example below), while the CFOI also captures a fifth characteristic (secondary source) to describe a fatal workplace injury. These characteristics include:

- *Nature* – the physical characteristics of the disabling injury or illness, such as cuts/lacerations, fractures, sprains/strains, or electrocution;

- *Part of body affected* – the part of body directly linked to the nature of injury or illness cited, such as finger, arm, back, or body systems;
- *Event or exposure* – the manner in which the injury or illness was produced or inflicted, such as caught in running equipment; slips, trips, or falls; overexertion; or contact with electric current;
- *Source* – the object, substance, exposure, or bodily motion that directly produced or inflicted the disabling condition, such as machinery, ground, patient, or electrical wiring;
- *Secondary source* – identifies the object, substance, or person that generated the source of injury or illness or that contributed to the event or exposure, such as ice or water.



Race and Ethnicity Standards

Both the Census of Fatal Occupational Injuries (CFOI) program and the Survey of Occupational Injuries and Illnesses (SOII) Case and Demographics (C&D) program were implemented in 1992 following recommendations of a National Academies of Science review highlighting the need to capture detailed case and worker characteristics of fatal and nonfatal workplace incidents, respectively. At their inception, each of these programs used separate methods to categorize the race or ethnicity of injured or ill workers. The C&D program categorized Hispanics separately, while the CFOI categorized Hispanics by race (i.e., black or white) and also provided a total count of Hispanics. The remaining race and ethnicity categories for both programs included:

- White
- Black
- Asian or Pacific Islander
- American Indian or Native Alaskan

In 1999, the CFOI amended race categories to no longer count Hispanics within their race but solely on their ethnicity. Additional changes were also incorporated to race and ethnicity categories including:

- Asian became a separate category.
- Native Hawaiian was combined with Pacific Islander to form a new category.
- A “Multi-race” category was added.

To provide consistency among fatal and nonfatal data, the C&D program incorporated in 2002 the same race categories used by the CFOI. The classification of workers by race and ethnicity for the CFOI and the SOII is based on the [*1997 Standards for Federal Data on Race and Ethnicity*](#) as defined by the Office of Management and Budget. One result of this revision is that individuals may be categorized in more than one race or ethnic group. Race and ethnicity is the only data element whose reporting is not mandatory in the SOII. This resulted in 32 percent of the cases involving days away from work for which race and ethnicity were not reported in the 2006 SOII.

Part II. Survey of Occupational Injuries and Illnesses

Background

The current BLS Survey of Occupational Injuries and Illnesses (SOII) evolved from annual BLS surveys first conducted in the 1940s, when injury recordkeeping standards became sufficiently uniform to permit the collection of nationwide work injury data. Spanning three decades, those nationwide surveys proved useful in measuring and monitoring injury frequency and severity, but they had two major limitations. First, the survey data were compiled from and represented only employers who *volunteered* to record and report work injuries. Second, work injuries were limited to those that resulted in death, permanent impairment, or temporary disability, defined as unable to perform regular job duties beyond the day of injury. Thus, survey estimates excluded many employers and, by definition, numerous cases that required medical treatment (beyond first aid) or restricted work duties but not lost worktime.

These and other limitations were addressed in a landmark piece of safety legislation passed by the Congress: The Occupational Safety and Health Act of 1970. The 1970 act and its implementing regulations required that most private industry employers regularly maintain records (logs) and prepare reports on work-related injuries and illnesses, which include all disabling, serious, or significant injuries and illnesses, whether or not involving time away from work.⁵

Clearly, the 1970 act called for a wider statistical net to gather work injury and illness data and to measure their numbers and incidence rates. The current mandatory survey, modified on several occasions to incorporate various changes discussed in later sections, still meets the basic requirements of the 1970 act for counts and rates covering a broad spectrum of work injuries and illnesses in various work settings. Beginning with the 1992 calendar year, the SOII began to collect information on the characteristics of the most serious of its nonfatal cases—those involving days away from work—and the demographics of workers sustaining such injuries and illnesses.

The SOII estimates the number and frequency (incidence rates) of workplace injuries and illnesses based on logs kept by employers during the year. These records reflect not only the year's injury and illness experience, but also the employer's understanding of which cases are work-related under recordkeeping guidelines promulgated by the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor. Effective January 1, 2002,

OSHA revised its requirements for recording occupational injuries and illnesses. These requirements were further refined to include guidelines for recording of hearing loss cases as a separate category of illness, SOII estimates for which are available beginning with the 2004 survey year. Details about the revised requirements, including a summary of the revisions and a [comparison](#) between the old and new requirements, are available from the OSHA Internet site at <http://www.osha.gov/recordkeeping/index.html> or from OSHA's Office of Public Affairs at 202-693-1999.

Due to the revised recordkeeping requirements, SOII estimates for 2002 are not comparable with those from prior years. Similarly, SOII estimates for 2003 forward are not comparable to prior years due to changes in industry and occupation coding systems. (See *Part 1. Common Coding Systems* for discussion of NAICS and SOC.) The SOII was not designed to be able to determine the impact of these revisions on the estimates of nonfatal occupational injuries and illnesses. (New recordkeeping definitions are reflected in the *SOII Definitions* section.)

SOII Definitions

The following definitions of nonfatal occupational injuries and illnesses used in the SOII are the same as those established in the Occupational Safety and Health Administration's (OSHA) recordkeeping guidelines, effective January 1, 2002 and used by employers to keep logs of such incidents throughout the survey (calendar) year. (See *Technical References* for citations of instructional materials useful in understanding the types of cases recorded under current recordkeeping guidelines.)

Recording criteria. Nonfatal recordable work-place injuries and illnesses are those that result in any one or more of the following:

- Loss of consciousness
- Days away from work
- Restricted work activity or job transfer
- Medical treatment beyond first aid

In addition to these four criteria, employers must also record any significant work-related injuries or illnesses that are diagnosed by a physician or other licensed health care professional or other instances that meet additional criteria discussed below. Significant work-related injuries or illnesses include cancers, chronic irreversible diseases, fractured or cracked bones (including teeth), or punctured eardrums. Additional cases that must be recorded as work-place injuries or illnesses include:

- Any needlestick injury or cut from a sharp object that is contaminated with another person's blood or other potentially infectious material,
- Any case requiring an employee to be medically removed under the requirements of an OSHA health standard,
- Tuberculosis infection as evidenced by a positive skin test or diagnosis by a physician or other licensed health care professional after exposure to a known case of active tuberculosis,
- An employee's hearing test (audiogram) reveals 1) that the employee has experienced a Standard Threshold Shift (STS) in hearing in one or both ears (averaged at 2kHz, 3kHz, and 4kHz) and 2) the employee's total hearing level is 25 decibels (dB) or more above audiometric zero (also averaged at 2kHz, 3kHz, and 4kHz) in the same ear(s) as the STS.

Additional details regarding recordability of nonfatal work-related injuries and illnesses can be found in [The OSHA Recordkeeping Handbook](#).

Injuries and illnesses. The distinction between occupational *injury* and occupational *illness* was eliminated from OSHA recordkeeping guidelines with revisions implemented in 2002. The OSHA guidelines now define an injury or illness as an abnormal condition or disorder. For purposes of clarification for the SOII, these terms are defined separately below. Nature codes from the [OIICS manual](#) are used to code distinct injuries and illnesses for cases that involve days away from work. (See discussion of OIICS in *Part I. Common Coding Systems*.)

- *Occupational injury* is any injury such as a cut, fracture, sprain, amputation, etc., which results from a work-related event or from a single instantaneous exposure in the work environment.
- *Occupational illness* is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to factors associated with employment. It includes acute and chronic illnesses or diseases which may be caused by inhalation, absorption, ingestion, or

direct contact. Five categories of occupational illnesses and disorders are used to classify recordable illnesses, as described below. Examples of each category are provided, but are not to be considered a complete listing of the types of illnesses and disorders that are to be counted under each category. (See the OIICS manual for a more comprehensive list of injuries and illnesses and their associated codes.)

- *Occupational skin diseases or disorders* are illnesses involving the worker's skin that are caused by work exposure to chemicals, plants, or other substances. Examples: Contact dermatitis, eczema, or rash caused by primary irritants and sensitizers or poisonous plants; oil acne; friction blisters; chrome ulcers; or inflammation of the skin.
- *Respiratory conditions* are illnesses associated with breathing hazardous biological agents, chemicals, dusts, gases, vapors, or fumes in the workplace. Examples: Silicosis; asbestosis; pneumonitis; pharyngitis; rhinitis or acute congestion; farmer's lung; beryllium disease; tuberculosis; occupational asthma; reactive airways dysfunction syndrome (RADS); chronic obstructive pulmonary disease (COPD); hypersensitivity pneumonitis; toxic inhalation injury, such as metal fume fever; chronic obstructive bronchitis; and other pneumoconioses
- *Poisoning* includes disorders evidenced by abnormal concentrations of toxic substances in blood, other tissues, other bodily fluids, or the breath that are caused by the ingestion or absorption of toxic substances into the body. Examples: Poisoning by lead, mercury, cadmium, arsenic, or other metals; poisoning by carbon monoxide, hydrogen sulfide, or other gases; poisoning by benzol, carbon tetrachloride, or other organic solvents; poisoning by insecticide sprays, such as parathion or lead arsenate; poisoning by other chemicals, such as formaldehyde.
- *Hearing loss.* Noise-induced hearing loss is defined for recordkeeping purposes as a change in hearing threshold relative to a baseline audiogram of an average of 10 dB or more in either ear at 2kHz, 3kHz, and 4kHz, and the employee's total hearing level is 25 dB or more above audiometric zero (also averaged at 2kHz, 3kHz, and 4kHz) in the same ear(s).
- *All other occupational illnesses.* Includes all other occupational illnesses not covered in the preceding categories. Examples: Heatstroke, sunstroke, heat exhaustion, heat stress, and other

effects of environmental heat; freezing, frostbite, and other effects of exposure to low temperatures; decompression sickness; effects of ionizing radiation (isotopes, X rays, radium); effects of nonionizing radiation (welding flash, ultraviolet rays, lasers); anthrax; bloodborne pathogenic diseases, such as AIDS, HIV, hepatitis B or hepatitis C; brucellosis; malignant or benign tumors; histoplasmosis; coccidioidomycosis; conditions due to repeated motion, vibration, or pressure, such as carpal tunnel syndrome; synovitis, tenosynovitis, and bursitis; and Raynaud's phenomena.

Case types. Nonfatal injury and illness estimates are tabulated from SOII data for several types of cases, including:

- *Days-away-from-work, job transfer, or restriction (DART) cases* are those which involve days away from work (beyond the day of injury or onset of illness), or days of job transfer or restricted work activity, or both.
 - *Days-away-from-work cases* are those which result in days away from work (beyond the day of injury or onset of illness). These cases may also include days of job transfer or restricted work activity in addition to days away from work. For example, an employee suffers a work-related injury resulting in 5 days away from work. Upon returning to work, the employee was unable for an additional 3 days to perform normal duties associated with the job (i.e., the employee was on restricted work activity). In this example, the case would be recorded as a days-away-from-work case with 5 days away from work and 3 days of restricted work activity.
 - *Job transfer or restriction cases* are those which result *only* in job transfer or restricted work activity. This occurs when, as the result of a work-related injury or illness, an employer or health care professional keeps, or recommends keeping, an employee from doing the routine functions of his or her job or from working the full workday that the employee would have been scheduled to work before the injury or illness occurred. This may include instances where:
 - an employee is assigned to another job on a temporary basis; or
 - an employee works at a permanent job less than full-time; or

- an employee works at a permanently assigned job but is unable to perform all duties normally connected with it.
- *Other recordable cases* are those which are recordable injuries or illnesses under OSHA recordkeeping guidelines, but which do not result in any days away from work, nor job transfer or restriction, beyond the day of the injury or onset of illness. For example, John cut his finger on machinery during his Wednesday afternoon workshift. The injury required medical attention, for which John received sutures at the local emergency room. John was able to return to his normally scheduled workday on the following day (Thursday) and performed his typical work duties without any restrictions.

Case characteristics. The following case characteristics are used in the SOII to profile injuries and illnesses involving days away from work from four different perspectives. The characteristics are based on definitions and rules of selection stipulated in the 2007 *BLS Occupational Injury and Illness Classification System (OIICS)* manual, cited among technical references at the end of this chapter. (See discussion of OIICS in *Part 1. Common Coding Systems* for additional details on these four characteristics.)

- *Nature of injury or illness*
- *Part of body affected*
- *Source of injury or illness*
- *Event or exposure*

Worker demographics. In addition to the aforementioned case characteristics, several worker demographics are used in the SOII to profile injuries and illnesses for cases involving days away from work. Worker demographics coded from information supplied by the employer, supplemented at times by employer descriptions (narratives) of how the incident occurred include:

- *Occupation* (See *Part 1. Common Coding Systems* for discussion of SOC.)
- *Age and age groups*
- *Race or ethnic origin* (See *Part 1. Common Coding Systems* for discussion race and ethnicity.)
- *Sex*

- *Length of service*
- *Day of week and time of day*
- *Hours on the job*

SOII Measures

The number and incidence rate of nonfatal workplace injuries and illnesses are reported nationwide by industry (NAICS) for the following types of cases (see *SOII Definitions* section for additional details):

- Total recordable cases
- Days-away-from-work, job transfer, or restriction cases
 - Days-away-from-work cases
 - Days of job transfer or restriction cases
- Other recordable cases.

Days-away-from-work cases, which may also involve job transfer or restricted workdays, are a subset of days away from work, job transfer, or restriction (DART) cases. For cases involving days away from work, the SOII presents:

- Case counts and percent distributions by occupation
- Time of event
- Hours worked before the incident
- Day of the week of the incident
- Worker demographic characteristics
- Case characteristics—nature, part of body, source, and event or exposure—defined in the *SOII Definitions* section.

The SOII also includes two *measures of severity* for days-away-from-work cases:

- Median number of lost workdays

- Number and percent distribution by their duration

These severity measures are presented nationwide by industry, by occupation, by the four aforementioned case characteristics (nature, part, source, and event), and for select worker characteristics (including gender, age group, length of service, and race or ethnic origin).

The *median* number of workdays lost and a number and percent distribution of days-away-from-work cases by their duration (see below) are provided for cases involving days away from work. The median number of days away from work provides the middle observation of the number of days missed associated with the particular characteristic that is being measured (i.e., half of the cases involved more days away from work and half of the cases involved fewer days away from work than the median.). The percent distribution measures are presented nationwide, by industry, and for the aforementioned case characteristics and worker demographics for cases involving:

- 1 day away from work
- 2 days away from work
- 3-5 days away from work
- 6-10 days away from work
- 11-20 days away from work
- 21-30 days away from work
- 31 or more days away from work

In addition to injury and illness counts, the SOII also reports on the frequency (incidence rate) of such cases. Incidence rates permit comparison among industries and establishments of varying sizes. They express various measures of injuries and illnesses in terms of a constant reflecting exposure hours in the work environment—for example, 200,000 employee hours or the equivalent of 100 full-time employees working for 1 year—thus allowing for a common statistical base regardless of the number of employees. In this way, a firm with 5 cases recorded for 70 employees can compare its injury and illness experience to that of an entire industry with 12,000 cases for 150,000 employees. (The method of calculating incidence rates is discussed in the *SOII Estimation Procedures* section.)

Incidence rates also are useful in evaluating the safety performance of a particular industry over time or in comparing State-to-State variations in an industry's safety record. Such comparisons are possible using the total recordable case incidence rate or the incidence rate for days-away-from-work, job transfer, or restriction cases, or other recordable cases (i.e., those that do not result in days away from work). Incidence rates are available for injuries and illnesses combined by the aforementioned case types and for total recordable cases of injuries only. For illnesses, incidence rates are available for total illness cases and separately for the five illness categories defined in the *SOII Definitions* section. Incidence rates for injury and illness cases involving days away from work also are available for the various categories of the four case characteristics studied; for example, the incidence rates associated with carpal tunnel syndrome, back cases, injuries inflicted by health care patients, or disabling falls to a lower level.

Beginning with survey year 2006, incidence rates are also available for selected worker demographics, including age groups, gender, detailed occupation, and occupation groups for national estimates and by age group, gender, and occupation group for State estimates. (See section on *State Participation in the SOII* below for description of availability of State estimates.) These demographic rates for both national and State estimates are available cross-tabulated by the aforementioned case characteristics—nature, part, source, and event.

Scope of the SOII

The sample of workplaces selected by the BLS for participation in the Survey of Occupational Injuries and Illnesses consists of approximately 230,000 private industry establishments each year. SOII data are solicited from employers having 11 employees or more in agricultural production, and from all employers in all other industries (except public administration).

Data for employees covered by other Federal safety and health legislation are provided by the Mine Safety and Health Administration of the U.S. Department of Labor and the Federal Railroad Administration of the U.S. Department of Transportation. Although State and local government agencies currently are not surveyed for national estimates, several States have legislation which enables them to collect these data for which State-level estimates are tabulated.

Self-employed persons are not considered to be employees under the 1970 act and private households (NAICS 814), the United States Postal Service (NAICS 491), and Federal Government workers are out-of-scope for the SOII and are excluded from possibility of selection.

State Participation in the SOII

Federal grants covering a portion of the operating cost permit States to develop estimates of occupational injuries and illnesses and to collect the data from which the BLS produces national results. Data for States which do not have operational grants are collected directly by the BLS for national estimates. The participating State agencies collect and process the data from which State and national estimates are tabulated using standardized procedures and systems established by the BLS to insure uniformity and consistency among the States. To further insure comparability and reliability of SOII estimates, the BLS designs and identifies the survey sample for each State and, through its regional offices, validates the SOII results, and provides technical assistance to the State agencies on a continuing basis.

State participation in the SOII may vary by year. In 2006, nonfatal workplace injuries and illnesses estimates for private industry were tabulated separately for 43 States (including the District of Columbia) that participate in the SOII program. Estimates of injuries and illnesses to State and local government workers were available for 26 of these States. The level of industry detail for which State estimates are tabulated varies widely and is based on the needs determined by each State office. Additionally, estimates are tabulated for three U.S. territories—Guam, Puerto Rico, and the Virgin Islands—but data from these territories are not included in the tabulation of national estimates. There were eight States which did not participate in the SOII in 2006 for which estimates are not available separately. Estimates for the 46 participating States and U.S. territories for the 2006 survey year and can be accessed electronically at <http://www.bls.gov/iif/oshstate.htm>.

SOII Sample Design

A two-stage process is used to select a sample from which estimates are generated for the Survey of Occupational Injuries and Illnesses (SOII). The first stage involves the selection from a frame including all in-scope establishments that will be required to participate in the SOII (i.e., sample units). The second stage is the selection of sample cases involving days away from work from the establishments that have been selected. All cases involving days away from work are collected from most establishments. However, as a way to reduce respondent burden, establishments that are predicted to have a large number of cases are instructed to provide only a *subsample* of their cases by reporting only those cases that occurred in specified months, rather than all cases that occurred during the survey year.

Because the SOII is a Federal-State cooperative program and the data must meet the needs of participating State agencies, an independent sample is selected for each State or territory. The sample is selected to represent all private industries in the States and territories. The sample size for the SOII is dependent upon the:

- characteristics for which estimates are needed
- industries for which estimates are desired
- characteristics of the population being sampled
- target reliability of the estimates, and
- survey design employed.

One criterion of the SOII design is defining target estimation industries (TEIs). A TEI is a North American Industry Classification System (NAICS) industry or group of industries for which a State wishes to produce an estimate. For example, a State may select to target estimates for NAICS 622 (Hospitals). This TEI would include establishments in NAICS 622110 (General medical and surgical hospitals), NAICS 622210 (Psychiatric and substance abuse hospitals), and NAICS 622310 (Specialty hospitals, except psychiatric and substance abuse). TEIs are defined by each State based on the industries for which estimates are desired. A sampling cell is defined by State, ownership, TEI, and size class for which an estimate will be tabulated. Size classes are based on an establishment's average annual employment, as defined below:

- Size class 1 = establishments with 1-10 employees
- Size class 2 = establishments with 11-49 employees
- Size class 3 = establishments with 50-249 employees
- Size class 4 = establishments with 250-999 employees

- Size class 5 = establishments with 1,000 or more employees

In the SOII, the variability of the incidence rate for Total Recordable Cases (TRC) of injuries and illnesses is used as the primary variable for determining allocation of the sample, since there is a high correlation between these cases and other important characteristics of the data being estimated. Historical State TRC rates are used to calculate the variance which is used in the optimal sample allocation procedure.

The optimal allocation procedure distributes the sample to the industries in a manner intended to minimize the variance of the total number of recordable cases in the universe or, alternatively, the incidence rate of recordable cases in the universe. In strata with higher variability of the data, a larger sampling rate is allocated.

Another criterion of the survey design is to apply optimal sample sizes. Sample selection sometimes occurs with certainty among sampling cells where it is necessary to select all frame units in the cell in order to meet minimum sampling requirements or to ensure that an adequate number of units are sampled to produce accurate and reliable estimates for the cell.

Once sampling is complete and all necessary reviews and adjustments have been made, sampling weights are calculated for units selected in each sampling cell. A maximum weight threshold is applied to sample units. Sampling weights are calculated by dividing the number of frame units in the sampling cell by the number of sample units in that cell as follows:

$$\text{SampleWeight} = \frac{N_U}{n_S}$$

where: N_U = the number of frame units available for selection in the sampling cell
 n_S = the number of units sampled

For example, if there are 100 frame units in a sampling cell from which 10 units are selected for the sample, then the weight assigned to each of the sample units would be 100 divided by 10, or 10.00.

SOII Data Collection

The Survey of Occupational Injuries and Illnesses began as an entirely mail-based survey. State agencies mailed a printed survey form to selected employers early in the year following the year for which employers were required to report on their injury and illness experience. For establishments in those States not participating in the program (see section on *State Participation in the SOII*), survey forms were mailed by the BLS. Each employer completed and mailed back its survey form which was manually keyed into a survey collection system, data from which were used for both national and State estimates of occupational injuries and illnesses. This procedure eliminated duplicate reporting by respondents and, together with the use of identical survey techniques at the national and State levels, insured maximum comparability of estimates. (Links to SOII forms and their related instructions are included in the section on *SOII Forms*.)

Collection methods for the SOII have evolved significantly in recent years in response to BLS goals to collect data more efficiently and to provide more timely and accurate data to its users. Use of new technology—namely the Internet and other electronic resources as alternative means for responding to the SOII—has aided in the reduction of data collection and processing times. The end result has been more timely publication of SOII estimates. Options that are available to employers to meet their requirement to respond to the SOII include:

- Internet
- Email form
- Fax form
- Telephone
- Mail

Establishments selected to participate in the SOII are pre-notified by the BLS in writing in advance of the year for which they will be required to provide data. This prenotification process ensures that even those establishments not normally required to maintain injury and illness logs will do so for the survey year.

The Internet Data Collection Facility (IDCF) is the BLS' centralized data collection facility used by the SOII and other BLS programs as a platform for Internet data collection. The facility provides a uniform, manageable, and secure environment for BLS survey collection via the Internet. The BLS first used the Internet Data Collection Facility for the 2002 survey year. The IDCF survey instrument is a web-based tool that provides employers who were selected to participate in the SOII with the ability to fulfill their requirement to respond to the SOII using on-line capabilities. Employers can enter their injury and illness data, along with employment and hours

worked, using an Internet-based system that is designed to resemble as closely as possible the hard copy survey forms that employers have received and traditionally responded to by mail. Employer use of the IDCF as a means for responding to the SOII increased seven-fold between its first use in 2002 and the 2006 survey year.

In addition to the IDCF, employers have the option to request, receive, and respond to the SOII via Email using a fillable PDF survey form. Other alternative methods for satisfying the requirement to respond to the SOII include a standardized fax form, telephone, and mail. Regardless of which option an employer chooses for responding to the SOII, each form has been designed to resemble employer OSHA recordkeeping forms to allow for easy transcription.

On the SOII form, *Section 1: Establishment Information* contains questions about the number of employee hours worked (needed in the calculation of incidence rates) and the reporting unit's average employment. *Section 2: Summary of Work-Related Injuries and Illnesses* asks employers to report information on the number of injuries and illnesses by type of case, which can be copied directly from employer injury and illness logs. *Section 3: Reporting Cases with Days Away from Work* requests detailed information on the worker and the injury or illness for cases that resulted in the employee being away from work. State agency and BLS personnel edit the summary data (Section 2) and code the characteristics (see discussion of OIICS in *Part 1. Common Coding Systems*) of cases with days away from work (Section 3), verifying and correcting apparent inconsistencies through phone calls, correspondence, or visits with the employer. *Section 4: Contact Information* asks the employer to provide contact information for the individual who completed the survey form in case that there are discrepancies in the reported data that require correction. *Section 5: If You Need Help* provides employers with contact phone numbers within each State should employers have questions or require assistance in completing the survey form.

Survey responses received in the mail are manually keyed into the SOII data collection system and electronically edited, while Internet responses remove this manual processing since data are entered directly by the employer in the data collection facility (IDCF) and then uploaded into the SOII data collection system. Therefore, Internet responses using IDCF reduce processing time and remove the risk of errors associated with the manual keying of data required of SOII responses received in hardcopy format (e.g., by mail). Similarly for the fillable Email form, data that employers have entered into the form are loaded directly to the SOII data collection system. All reports that are received, regardless of which reporting option was used, are electronically edited. Reports which do not meet the computer screening criteria or senior staff review are verified with the employer.

Successes in achieving recent BLS goals to improve the timeliness of SOII estimates have resulted in earlier releases of both summary and case and demographic estimates from the SOII. By mid-summer, the active data collection phase of the SOII is completed and the preparation of data for both national and State estimates of occupational injuries and illnesses begins. Summary estimates on injury and illness incidence rates and counts by detailed industry and type of case are published in mid-October, compared to mid-December in past years. A subsequent release covering more detailed estimates of the case and worker characteristics for injuries and illnesses that involved days away from work follows in early-November, compared to the following March or April in past years.

SOII Estimation Procedures

Nonfatal workplace injury and illness data collected for the SOII are used to tabulate estimates for two separate data series—summary (industry-level) estimates and more detailed case and demographic estimates for cases that involved days away from work. Part of the estimation process involves weighting sample units and cases to represent all units on the frame from which the sample was selected. Sample unit and case weighting and calculation of incidence rates are described in the sections that follow.

Weighting for Summary Estimates

Original summary weight. By means of a weighting procedure, sample units represent all units in their size class for a particular industry. An original summary weight for each sample unit is determined by the inverse of the sampling ratio (number of units selected relative to the number of frame units available for selection) for the industry/employment size class from which the unit was selected. (See example in *SOII Sample Design* section.)

Final summary weight. Prior to the tabulation of summary estimates, the original weight for a sample unit may require adjustment to account for several factors, including nonresponse from some sample units, benchmarking the sampling frame to the current survey year, and occasional inability for some sample units to report data for the unit

as it was sampled. A final summary weight used in the tabulation of estimates is determined by applying several factors to the original weight, as follows:

- *Unit nonresponse* – Because a small proportion of SOII forms are not returned, weights of responding employers in a sampling stratum (target estimation industry and employment size class) are adjusted to account for nonrespondents by applying a nonresponse adjustment factor (NRAF). Data for each responding sample unit are multiplied by the unit's original weight and the nonresponse adjustment factor within the respective estimating cell (industry and employment size class). The products are then aggregated to obtain a total for the estimating cell.
- *Benchmarking* – The sample for a particular survey year must be drawn prior to that year, so that selected establishments may be prenotified of their obligation to maintain logs throughout the year. As a result, the universe file from which the sampling frame was developed is not current to the reference year of the survey, making it is necessary to adjust the data before publication to reflect current employment levels. This procedure is known as benchmarking. For the SOII, all estimates of totals are adjusted by the benchmark factor (BMF) at the industry level. The benchmarking procedure requires a source of accurate employment data which can be converted into annual average employment figures at the industry level for which separate estimates are desired. The SOII uses employment data primarily derived from the BLS Quarterly Census of Employment and Wages.
- *Reaggregation* – Because there are occasional instances where a sample unit may be unable to report data for the unit as it was sampled, adjustments are made to account for these situations by applying a reaggregation factor (REAG) to the unit's original summary weight. For example, a sample unit that was involved in a merger may report data covering both the original sample unit and the unit or units with which it merged, necessitating an adjustment to the weight to account for the additional unit included in the reported data.

Therefore, the final summary weight for a sample unit is determined by the product of the original summary weight and these three factors, or:

$$\text{Final sample weight} = \text{Original summary weight} \times \text{NRAF} \times \text{BMF} \times \text{REAG}$$

Weighting for Case and Demographic Estimates

Days away from work cases. Each case involving days away from work is weighted by the respective sample unit's final summary weight with which it is associated. In addition, the final summary weight that is applied to each case is adjusted for several factors to ensure that the number of usable cases that have been submitted are equal to the days away from work cases used in the tabulation of summary estimates. These factors are used to adjust for case subsampling (see section on *SOII Sample Design* for discussion of subsampling) and case nonresponse for those establishments which did not provide information on all cases involving days away from work which occurred in their establishment in the survey year.

- Case Subsampling Factor (CSSF) – The CSSF is applied at the establishment level to adjust for instances in which the number of usable days away from work (DAFW) case forms that are submitted differ from the number of DAFW cases that are reported on the summary. For example, 15 case forms are submitted and are usable, but 39 DAFW cases are reported on the sample unit's summary. This CSSF attempts to weight the number of DAFW cases for which usable data were reported to equal the total number of DAFW cases indicated on the summary (that is, the number of DAFW cases that the establishment experienced). A maximum threshold is applied to this factor, beyond which further adjustments are accomplished through other factors described below. The CSSF is the ratio of DAFW cases reported on the summary to the number of DAFW cases for which data were submitted, or

$$\text{CSSF} = \frac{\text{DAFW cases (summary)}}{\text{DAFW cases submitted}}$$

- Case Nonresponse Adjustment Factor (CNRAF) –The CNRAF is applied at the sampling cell level. This factor is applied after the CSSF in instances where the CSSF failed to adequately adjust reported summary DAFW cases to equal the submitted usable DAFW cases. CNRAF

attempts to adjust for cases that were not reported as a result of nonresponse within the sampling cell. A maximum threshold is applied to this factor, beyond which further adjustments are accomplished through the CRAF discussed below. The CNRAF is calculated as:

$$CNRAF = \frac{\sum \left(\frac{FSW}{BMF} \right) \times DAFW \text{ cases (summary)}}{\sum \left(\frac{FSW}{BMF} \right) \times CSSF \times DAFW \text{ cases (usable)}}$$

Where:

FSW = Final summary weight

BMF = Benchmark factor

CSSF = Case Subsampling Factor

- Case Ratio Adjustment Factor (CRAF) – The CRAF is applied after both the CSSF and CNRAF factors have been applied but have failed to adjust for missing cases. The CRAF is applied at the estimation cell level (target estimation industry and size class). The CRAF is calculated as:

$$CRAF = \frac{FSW \times DAFW \text{ cases (summary)}}{FSW \times CSSF \times CNRAF \times DAFW \text{ cases (usable)}}$$

Where:

FSW = Final Summary Weight

CSSF = Case Subsampling Factor

CNRAF - Case Nonresponse Adjustment Factor

Incidence rate calculation

Incidence rates are calculated using the total case counts obtained through the weighting and benchmarking procedures described above. The adjusted estimates for a particular characteristic, for example injury and illness cases involving days away from work, are aggregated to the appropriate level of industry detail. The total is multiplied by 200,000 for injuries and illnesses combined and for injuries only (that is, 40 hours per week X 50 weeks—the base of hours commonly regarded as worked by 100 full-time employees during a calendar year). The product is then divided by the weighted and benchmarked estimate of hours worked as reported in the SOII for the industry segment. The formula for calculating the incidence rate at the lowest level of industry detail is:

$$\text{Incidence Rate} = \frac{(\text{Sum of characteristic reported}) \times 200,000}{\text{Sum of number of hours worked}}$$

Incidence rates for higher levels of industry detail are produced using aggregated weighted and benchmarked totals. Incidence rates may be computed by industry, employment size, State, and various case characteristics and select worker demographics. Incidence rates for illnesses and for case and worker characteristic categories are published per 10,000 fulltime employees, using 20,000,000 hours instead of 200,000 hours in the formula shown above (the 20,000,000 hours refers to 10,000 full-time employees working 40 hours per week, 50 weeks per year). Incidence rates per 10,000 workers can be converted to rates per 100 workers by moving the decimal point left two places and rounding the resulting rate to the nearest tenth.

Reliability of SOII Estimates

Estimates from the Survey of Occupational Injuries and Illnesses are based on a scientifically selected probability sample, rather than a census of the entire population. (See section on SOII Sample Design.) Sampling methodology makes it possible to collect data from a sample from which inferences can be made regarding the characteristics of the population from which the sample was selected. These sample-based estimates may differ from the results obtained from a census of the population. The sample used for the SOII was one of many possible samples, each of which could have produced different estimates. The variation in the sample estimates across all

possible samples that could have been drawn is measured by the relative standard error (RSE), which is used to calculate a "confidence interval" around a sample estimate.

The 95-percent confidence interval is the interval centered on the sample estimate and includes all values within 1.96 times the estimate's standard error. If several different samples were selected and used to estimate a population value (e.g., injury and illness incidence rates), the 95-percent confidence interval would include the true population value approximately 95 percent of the time.

For example, the total injury and illness case incidence rate of 9.8 cases per 100 full-time workers for Nursing care facilities (NAICS 6231) in 2006 had an estimated RSE of 2 percent. Hence, we are 95-percent confident that the interval between 9.4 and 10.2 (or $9.8 \pm (1.96 \times 9.8 \times 0.02)$) includes the true value of the incidence rate for total recordable injury and illness cases in Nursing care facilities in 2006.

All estimates derived from a sample survey are subject to *sampling* and *nonsampling errors*. *Sampling errors* occur because observations are made on a sample, not on the entire population. Percent relative standard errors, which are a measure of the sampling error in the estimates, are calculated as part of the SOII estimation process. Both the estimates and the percent relative standard errors of the estimates (or statistical models for approximating those relating to case characteristics and worker demographics) are published in appendix A to the annual BLS bulletin, *Occupational Injuries and Illnesses: Counts, Rates, and Characteristics*.

Nonsampling errors in the estimates can be attributed to many sources, e.g., inability to obtain information about all cases in the sample, mistakes in recording or coding the data, definitional difficulties, and so forth. Although not measured, nonsampling errors will always occur when statistics are gathered. To minimize the nonsampling errors in the estimates, the completed survey forms are systematically edited and apparent inconsistencies are verified with the employer.

Publication Guidelines for SOII Estimates

Nonfatal occupational injury and illness estimates were published for more than 1,200 NAICS industries (including aggregates) in 2006. Data for the Survey of Occupational Injuries and Illnesses (SOII) are collected under a strict pledge of confidentiality that these data will be used solely for statistical purposes and will not be

disclosed for other purposes. The number of publishable industries may vary from year to year, depending on the number of industries that fail to meet publication guidelines. Industry estimates may *not be published* if one of the following situations exists:

- Publication might disclose confidential information.
- The relative standard error of the estimate for days away from work, job transfer, or restriction cases for the industry exceeds a specified limit.
- The benchmark factor for the industry falls outside an acceptable range.

Data for an unpublished industry are included in the total for the aggregate industry level of which it is a part. Also, selected estimates are suppressed within publishable industries if the relative standard error for the estimate exceeds a specified limit.

For case and demographic characteristics, estimates are rounded to the nearest tenth and are suppressed if one of the following situations occurred:

- The number of cases is fewer than 15.
- The number of cases is 15 or greater and the relative standard error for the estimate exceeds a specified limit.

Presentation of SOII Estimates

Each year, the BLS publishes selected national estimates from the Survey of Occupational Injuries and Illnesses (SOII) in two [news releases](#)—a summary of private industry counts and incidence rates of nonfatal workplace injuries and illnesses is followed shortly thereafter by a more detailed release on the characteristics of injury and illness cases that involved days away from work. A comprehensive bulletin covering national results is published later. This bulletin has two sections. The first section includes charts and text highlighting summary and case and demographic estimates gathered from the SOII. The second section, enclosed in the bulletin on a compact disc, contains tables presenting detailed estimates by industry, case characteristics, and worker demographics, as well as appendices presenting the scope and methodology of the SOII. An additional disc containing the

Occupational Safety and Health Systems *Profiles* system is also included in the bulletin. The Profiles system includes both nonfatal injury and illness data from the SOII and fatal injury data from the Census of Fatal Occupational Injuries (CFOI) and allows users to create customized tables based on user-specified criteria.

A number of electronic resources also are available from which SOII estimates can be accessed. Among these is the [Profiles on the Web](#) system, which allows users to create customized tables based on user-specified criteria. Profiles can be created both for summary estimates and for case and demographics numbers or rates from the SOII. Employers can also use an [Incidence Rate Calculator and Comparison Tool](#) to calculate their establishment's incidence rates which are then compared directly to the incidence rates from the SOII for their respective industry.

SOII estimates also are presented periodically in articles published in two BLS journals—[Monthly Labor Review](#) and the online [Compensation and Working Conditions](#). The data are also available on CDs and on the Internet. The data are published in private safety and trade journals and in the President's *Annual Report on Occupational Safety and Health to the U.S. Congress*. In addition, State data through 1987 are available on microfiche from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. A list of States (including telephone numbers) which can provide more current State estimates is available from the BLS Office of Safety, Health, and Working Conditions at (202) 691-6170 or can be accessed on the Internet at <http://www.bls.gov/iif/oshstate.htm>.

Flat files containing all SOII estimates are available in FTP (file transfer protocol) format from the BLS [FTP webpage](#). Each data series on the BLS FTP site includes a 2-character series designator. Clicking on the series designator expands the directory to provide a list of the files included with each series. Included with each series (generally the last file in each series directory) is a text file that provides: (1) a survey definition and a listing of the FTP files listed in the survey directory; (2) time series, series file, data file, and mapping file definitions and relationships; (3) series, data, and mapping file formats and definitions; and (4) a data element directory. SOII series have experienced several breaks due to changes in coding systems. Data from these separate series may not be comparable to one another. Consequently, the following FTP series identifiers cover available SOII data reflective of these series breaks:

- Summary data series:
 - hs – 1976-1988 (1972 SIC)

- sh – 1989-2001 (1987 SIC)
- si – 2002 (New OSHA recordkeeping)
- ii – 2003 forward (2002 NAICS)
- Case and demographics data series
 - cd – 1992-2001 (1987 SIC)
 - ch – 2002 (New OSHA recordkeeping)
 - hc – 2003 forward (2002 NAICS)

Uses and Limitations of SOII Estimates

National and State policymakers use SOII estimates as an indicator of the magnitude of and trends in occupational safety and health problems. The Occupational Safety and Health Administration (OSHA) uses the statistics to help measure the effectiveness of its enforcement and outreach programs in reducing work-related injuries and illnesses. Both labor and management use SOII estimates in evaluating safety programs. Other users include insurance carriers involved in workers' compensation, industrial hygienists, manufacturers of safety equipment, researchers, and others concerned with job safety and health.

Many factors can influence counts and rates of injuries and illnesses in a given year. These include not only the year's injury and illness experience but also employers' understanding of which cases are work-related under current OSHA recordkeeping guidelines. The number of injuries and illnesses reported in a given year also can be affected by changes in the level of economic activity, working conditions and work practices, worker experience and training, and the number of hours worked.

Each year, the SOII measures the number of new work-related illness cases which are recognized, diagnosed, and reported. But some conditions, such as long-term latent illnesses caused by exposure to carcinogens, often are difficult to relate to the workplace and are not adequately recognized and reported and are believed to be understated in the SOII. In contrast, the overwhelming majority of the reported new illnesses are those which are easier to directly relate to workplace activity (e.g., contact dermatitis or carpal tunnel syndrome).

Two relatively recent changes have had an impact on and may limit comparability of data series from the SOII. The first change involved recordkeeping. New recordkeeping guidelines were introduced by OSHA, effective January 1, 2002. Definitional changes between current and previous recordkeeping guidelines may limit the comparability of SOII estimates. Therefore, SOII estimates for 2002 may not be comparable to estimates for other years. A side-by-side comparison of current and prior recordkeeping guidelines is available on the Internet at <http://www.osha.gov/recordkeeping/RKside-by-side.html>.

As discussed in *Part 1. Common Coding Systems*, industry and occupation classification systems used in the stratification of SOII estimates also changed in 2003. Due to significant differences compared to prior industry and occupation classification systems, caution should be exercised when attempting to compare estimates for 2003 forward with those from prior years. The section on *Technical References* later in this chapter references articles discussing the impact of changes in coding systems used for SOII estimates.

SOII estimates published by the BLS are in the public domain and, with appropriate credit, may be used without explicit permission from the BLS.

Survey Forms

Various forms for the Survey of Occupational Injuries and Illnesses (SOII) can be downloaded from <http://www.bls.gov/respondents/iif/forms.htm>. Included on this page are links to:

- Notification of the Requirement to Participate in the Survey of Occupational Injuries and Illnesses
- OSHA recordkeeping forms:
 - Form 300 (Log of work-related injuries and illnesses)
 - Form 300A (Summary of work-related injuries and illnesses)
 - Form 301 (Injury and illness incident report)
- Instructions for responding electronically to the SOII using the BLS Internet Data Collection Facility (IDCF) – BLS-9300-IDCF
- SOII forms:
 - A fillable electronic SOII form – BLS-9300-N06

- A nonfillable SOII form – BLS-9300-N06, i.e., like that which one would receive in the mail
- A Spanish-language SOII form – Encuesta Sobre Lesiones y Enfermedades Ocupacionales, 2007 (Form BLS-9300 N06)
- A FAX response form – BLS-9300 FAX
- An electronic options brochure, explaining the different electronic methods that respondents can use to satisfy their requirement to respond to the SOII.

Additional instructions for responding to the SOII are available on the Internet at

<http://www.bls.gov/respondents/iif/instructions.htm>.

Part III. Census of Fatal Occupational Injuries

Beginning with 1992, the Census of Fatal Occupational Injuries (CFOI) of the Bureau of Labor Statistics (BLS) has collected and published a comprehensive count of work-related fatal injuries and descriptive data on their circumstances. CFOI counts are especially accurate because the fatality census culls multiple data sources (e.g., death certificates, State workers' compensation records, news media, OSHA reports, etc.) to identify fatal injuries that are work-related. Complete and reliable counts of fatal work injuries and how they occurred enable the safety and health community to identify and track specific life-threatening hazards, such as work-related homicides in retail stores and construction workers struck and fatally injured by highway vehicles and equipment. In 1994-95, several groups of safety experts, including the National Safety Council and the National Center for Health Statistics, endorsed the CFOI as the official count of work-related fatalities, in preference to other, less comprehensive measures.

Background

Since 1992, CFOI data have supplanted the limited information on fatalities that had been available since 1972 from the Survey of Occupational Injuries and Illnesses (SOII). The CFOI covers not only private wage and salary workers covered in the SOII, but also workers on small farms, the self-employed and family workers, and public sector workers not covered by the survey. Unlike CFOI data, the SOII's fatality estimates covered only establishments with more than 10 employees and, for purposes of statistical reliability, were combined into a 2-year average before a distribution of fatalities by the associated event or exposure could be published.

The seeds for the CFOI were sown by the National Academy of Sciences and other safety and health organizations in the late 1980s, when they recommended obtaining complete and timely counts and detailed characteristics of fatal workplace injuries so that policymakers could develop and more effectively implement safety initiatives. Some of those expert recommendations mentioned using multiple data sources such as death certificates and workers' compensation reports to identify and profile fatal work injuries for *all* workers. More specifically, the Keystone Dialogue Group recommended the development of a consensus method for counting work-related fatalities,⁶ stating that the "development of an accepted count of workplace deaths should mute controversy on this

issue stemming from the variety of estimates coming from different sources.” In this regard, fatality estimates made by different organizations at that time varied greatly from 3,000 to 11,000 deaths nationally per year.⁷

The CFOI approach to compiling data on fatal work injuries was initially tested in a BLS cooperative effort with the Texas Department of Health during 1988. That study, which collected fatality data retrospectively for 1986, highlighted the need for multiple data sources and the feasibility of matching fatalities and their characteristic data across those sources.⁸ This approach was tested again in Texas and Colorado in 1990, with results confirming that the same kind of data could be obtained from multiple data sources on a current basis.⁹ The CFOI was initially implemented in 32 States and New York City in 1991 and expanded to cover all 50 States and the District of Columbia in 1992.

CFOI Definitions

For a fatality to be included in the CFOI, the decedent must have been employed (that is, working for pay, compensation, or profit) at the time of the event, engaged in a legal work activity, and present at the site of the incident as a job requirement. These criteria are generally broader than those used by Federal and State agencies administering specific laws and regulations. Fatalities that occur during a person’s normal commute to or from work are excluded from CFOI counts.

An occupational injury is defined as any wound or damage to the body resulting from acute exposure to energy, such as heat, electricity, or impact from a crash or fall, or from the absence of such essentials as heat or oxygen, caused by a specific event or incident within a single workday or shift. Included are open wounds, intracranial and internal injuries, heatstroke, hypothermia, asphyxiation, acute poisonings resulting from short-term exposures limited to the worker's shift, suicides and homicides, and work injuries listed as underlying or contributory causes of death. Because of the latency period of many occupational illnesses and the resulting difficulty associated with linking illnesses to work, it is difficult to compile a complete count of all fatal illnesses in a given year. Thus, information on illness-related deaths is excluded from the basic fatality count.

Over 25 data elements are collected, coded, and tabulated in the CFOI, including information about the worker and the circumstances surrounding the fatal incident. Some of the elements collected include:

- Case characteristics
 - Nature of injury
 - Part of body affected by injury
 - Source of injury
 - Event or exposure
 - Secondary source of injury
- Date of birth
- Date of death
- Date of incident
- Demographic characteristics of worker
 - Occupation
 - Age
 - Race or ethnic origin
 - Country of foreign birth (if applicable)
 - Sex
 - Length of service with employer
- Employee status (e.g., wage and salary, self-employed, family business)
- Establishment employment size
- Industry of employer
- Location type (e.g., farm, street, warehouse, etc.)
- Medical complication (if any)
- Narrative of how incident occurred
- Ownership (e.g., private sector or State, local, or Federal Government)
- State of injury/death
- Time of incident (month, day of week, time of day)
- Time workday began
- Usual lifetime occupation/industry
- Worker activity (e.g., driving a vehicle, tending a store, etc.)

CFOI Collection Methods

The CFOI program is a cooperative venture in which the operating costs are shared equally between the State and Federal governments. Each year, States are responsible for data collection, follow-up, and coding on a timely basis. Preliminary CFOI data are generally released approximately 8 months after the close of the reference year. Revised and final CFOI data are generally released approximately 16 months after the close of the reference year. Data elements are coded according to standard CFOI instructions.

States obtain information on fatal work injuries from a number of different sources. Among these are death certificates marked injury at work, workers' compensation reports, and other reports provided by State administrative agencies. Additional information provided to States originates from Federal agencies, such as the Department of Labor's Occupational Safety and Health Administration (OSHA), Employment Standards Administration (ESA), and Mine Safety and Health Administration (MSHA). Overall, State agencies collect more than 20,000 individual source documents each year or about an average of four documents from different sources for each fatality case. To avoid duplication of fatalities in the counts, source documents are matched using the decedent's name and other information.

To ensure an accurate count of fatal occupational injuries, the CFOI program requires that for each case, the work relationship (that is, whether a fatality is work-related) be substantiated by two or more independent source documents or a source document and a follow-up questionnaire. Follow-up questionnaires are sent either to the employer or to another contact that has knowledge of the incident. The follow-up questionnaire is also used to collect information that may be missing from the source documents. Nonresponse to the questionnaire or inconsistent data results in further follow-up by telephone. At the end of the collection period, fatalities for which the State has only one source document are reviewed by the BLS. The fatality is included in the national database only if the State and the BLS agree that there is sufficient information on the sole source document to determine that the fatality is indeed work-related.

CFOI Measures

The CFOI provides annual fatality counts for case characteristics and worker demographics highlighting the number of worker fatalities for:

- Industry by selected event or exposure
- Industry by transportation incident and homicide
- Industry by worker status
- Primary and secondary source by major private industry division
- Occupation by event or exposure
- Occupation by transportation incident and homicide
- Worker characteristics (e.g., worker status, sex, age, race or ethnic origin) by event or exposure
- Event or exposure by age
- Event or exposure by major private industry sector

In addition to fatality counts, percent distributions of workers who were fatally injured are available by selected characteristics of the deceased including:

- Event or exposure
- Industry and selected event or exposure
- Occupation and selected event or exposure
- Selected worker characteristics and selected event or exposure
- State and selected event or exposure

Fatality counts from the BLS census are combined with annual average employment from the Current Population Survey (CPS) and, where appropriate, the U.S. Department of Defense to produce a fatal work injury rate.¹⁰ Fatality rates depict the risk of incurring a deadly injury faced by all or a subgroup of workers, such as workers in a certain occupation or industry. The formula for calculating a fatality rate is:

$$(N/W) \times 100,000,$$

where: N = the number of fatally injured workers, 16 years and older

W = the number of employed workers, 16 years and older.

For example, in computing the 2005 national fatality rate:

$N = 5,734 - 23 \text{ workers under age 16} = 5,711$ (from 2005 CFOI)

$W = 142,894,000$ (from CPS, 2005 annual averages, plus resident military figures derived from the U.S. Department of Defense).

Fatality rate = $(5,711/142,894,000) \times 100,000 = 4.0$ fatalities per 100,000 workers.

Presentation of CFOI Data

Summary information including the key fatality characteristics (event/exposure, occupation, and industry) and the demographics of workers fatally injured on the job, along with overall fatality counts, are included in a national [news release](#) issued about 8 months after the end of the reference period. Supplementary tables containing fatality rates and special profiles of specific fatal events (e.g., highway incidents and homicides) also are available with the news release. Besides national data, State-specific data on workplace fatalities are available from participating State agencies. A list of State agencies along with their telephone numbers is available from the BLS at (202) 691-6170 or on the Internet at <http://www.bls.gov/iif/oshstate.htm>.

As with estimates from the SOII, the [Profiles on the Web](#) system allows users to create customized tables of the number of work-related fatal injuries based on user-specified criteria.

Articles and detailed tables containing both national and State data are published regularly in the Bureau's online publication, [Compensation and Working Conditions](#), and occasionally in the [Monthly Labor Review](#) or other publications. Much of this information also appears in yearly fatality reports compiled by the BLS, which are referenced at the end of this chapter. A research microdata file useful for safety researchers and others involved in promoting safety in the workplace can be obtained through a letter of agreement with the BLS to protect the confidentiality of data.¹¹

Flat files of estimates from the entire CFOI database or parts of the database are available in FTP (file transfer protocol) format from the BLS [FTP webpage](#). Each dataset on the BLS FTP site includes a 2-character series designator. Clicking on the series designator opens a list of the files included with each series. Included with each (generally the last file in each list) will be a text file that explains what each data set covers, the variables included in each set, naming conventions, variable field lengths in the flat file, etc. The CFOI series experienced a break in 2003 due to changes in industry (SIC to NAICS) and occupation (SOC) coding systems. Data from these separate series may not be comparable to one another. Consequently, the following FTP series identifiers cover available CFOI data reflective of these series breaks:

- CFOI data series:
 - cf – 1992-2002 (1987 SIC)
 - fi – 2003 forward (2002 NAICS)

Uses and Limitations of CFOI Data

The CFOI data help safety and health experts to monitor the number and types of deadly work injuries over time and to focus on work settings having particularly high risks, such as robbery-related homicides in retail stores, construction-related fatalities, and drownings in the commercial fishing industry.¹² Fatality profiles can be generated from the CFOI database for specific worker groups (e.g., the self-employed or female workers), for certain types of machinery (e.g., farm equipment), and for specific fatal circumstances (e.g., work activities at the time of fatal contact with electric current). Such profiles help identify existing work standards that may require revision and highlight safety problems where intervention strategies need to be developed.

Although States are using about two dozen independent data sources to identify and substantiate work-related fatalities, there are some fatal injuries at work that are missed by the CFOI. Some unidentified work-related fatalities undoubtedly occur on farms, at sea, and on highways, to cite three examples. The BLS and its participating State partners continue to seek new ways of verifying work-related fatalities to make CFOI counts as complete as possible. In that regard, States have up to 8 months to update their initial published counts with fatalities that were verified as work-related after preliminary data collection has ended for a given census. Since 1992, the updates have averaged less than one percent of each year's total that was initially published.

The CFOI facilitates the exchange of information by States on fatalities resulting from similar work hazards, such as construction falls or workers being struck by vehicles or equipment on or near roadways. Individual States, moreover, can use CFOI data to provide information to employers and their workers to promote safety in the workplace. Users need to exercise caution in State-to-State comparisons, however. For example, comparison of fatality rates for a State with a large agricultural economy with that of a State with a large industrial economy would be ill-advised, as agriculture has one of the highest fatality rates and manufacturing one of the lowest. In addition, the number of fatalities and their characteristics can vary markedly within a State from one year to the next, in part reflecting single incidents involving multiple deaths such as airplane crashes and natural disasters.

In accordance with BLS policies, individually identifiable data collected by the CFOI are used exclusively for statistical purposes and under a pledge of confidentiality are treated in a manner that ensures no data published by the CFOI identify a particular decedent, fatal incident, or company.

Part IV: Special Topic Surveys

In addition to the SOII and CFOI products normally produced in any reference year, the BLS has conducted in conjunction with other governmental agencies various “special topic” surveys regarding occupational safety and health related topics. These special topic surveys have included the:

- Survey of Respirator Use and Practices
- Survey of Workplace Violence Prevention

The Survey of Respirator Use and Practices is a special survey of United States employers regarding the use of respiratory protective devices conducted by the BLS for the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention. This voluntary survey provided estimates of the number of establishments and employees who used respirators during a 12-month period by type of respirator and type of use. The survey also collected data on the characteristics of the respirator program at the establishment; assessment of medical fitness to wear respirators; characteristics of respirator training at the establishment; usefulness of NIOSH approval labels and respirator manufacturers’ instructions; substances protected against by the use of respirators, and fit testing methods used for respirators. Results from this survey are available on the Internet at <http://www.bls.gov/iif/oshwc/osh/os/osnr0014.pdf>.

The Survey of Workplace Violence Prevention is a special survey that was also conducted by the BLS for NIOSH. This survey studied the prevalence of security features, risks facing employees, employer policies and training, and related topics associated with maintaining a safe work environment. Data from this survey are available for private industry and State and local government by industry and size of establishment, where size is measured by the number of workers employed. Results from this survey are available on the Internet at http://www.bls.gov/iif/osh_wpvs.htm.

Technical References

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Monthly Labor Review (MLR) Online, articles on safety and health topics, available on the Internet at <http://www.bls.gov/opub/mlr/indexa.htm>.

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U.S. Department of Labor, *Recordkeeping Guidelines for Occupational Injuries and Illness*. Available on the Internet at <http://www.osha.gov/recordkeeping/index.html>.

Using Survey data to evaluate your firm's injury and illness experience. Guidelines to assist employers in comparing their injury and illness experience to others with similar size workforces in the same industry. Available on the Internet at <http://www.bls.gov/iif/osheval.htm>.

William J. Wiatrowski. "Occupational safety and health statistics: new data for a new century," *Monthly Labor Review*, October 2005, pp. 3-10. Available on the Internet at <http://www.bls.gov/opub/mlr/2005/10/art1full.pdf>.

"Workplace injuries and illnesses," "Nonfatal occupational injuries and illnesses requiring days away from work," and "National census of fatal occupational injuries." News releases issued annually. Available for 1994 forward on the Internet at <http://www.bls.gov/iif>.

Footnotes

1 *The Safety Movement in the Iron and Steel Industry*, Bulletin 234 (Bureau of Labor Statistics, 1918).

2 *The White-Lead Industry in the United States*, Bulletin 95 (Bureau of Labor, 1911).

3 Between the mid-1970s and early 1990s, a limited amount of data on case characteristics and worker demographics of work-related injuries and illnesses were aggregated for selected States participating in the Supplementary Data System and Work Injury Reports. For a description of those programs, see *BLS Handbook of Methods*, Bulletin 2414 (Bureau of Labor Statistics, 1992), chapter 14.

4 See E.S. Pollack and D.F. Keimig, eds., *Counting Injuries and Illnesses in the Workplace: Proposals for a Better System* (Washington, National Research Council, National Academy Press, 1987), pp. 103-06.

5 See [section 24\(a\)](#) of the Occupational Safety and Health Act of 1970 (Public Law 91-596).

6 See the Keystone Center's final report, "Keystone National Policy Dialogue on Work-Related Illness and Injury Recordkeeping," (Keystone, CO, January 1989). For an account of various attempts to count fatalities at work, see Dino Drudi, "The evolution of occupational fatality statistics in the United States," *Compensation and Working Conditions*, July 1995, pp. 1-5.

7 See BLS Survey of Occupational Injuries and Illnesses(1972-91); the National Safety Council *Accidents Facts*; and the National Institute for Occupational Safety and Health's National Traumatic Occupational Fatality Study *A Decade of Surveillance, 1980-1989*.

8 See Janice Windau and Donna Goodrich, "[Testing a census approach to compiling data on fatal work injuries](#)," *Monthly Labor Review*, December 1990, pp. 47-49. The study also found that, for verification purposes, timeliness is important in maximizing respondents' recall and in reducing the number of those failing to respond because they have relocated.

9 See Guy Toscano and Janice Windau, "Further testing of a census approach to compiling data on fatal work injuries," *Monthly Labor Review*, October 1991, pp. 33-36.

10 Because neither hours worked nor employment are collected in the CFOI, fatality rates are calculated using annual average employment estimates from the Current Population Survey, conducted for BLS by the U.S. Census Bureau and, where appropriate, from the U.S. Department of Defense. Employment-based fatality rates measure the incidence of a fatal injury for all workers classified in the group regardless of the number of hours worked.

11 The BLS may approve access to an offsite CFOI micro data research file. The CFOI research file contains data from various sources. Much of these data are collected under a pledge of confidentiality and therefore are protected under the Confidential Information Protection and Statistical Efficiency Act of 2002 (CIPSEA). The CFOI research file is available only to researchers who agree to protect the confidentiality of the data and have the safeguards in place to do so. In addition, proposed projects must have a well-defined research question of scientific merit that is of a purely statistical nature. Ultimately, final approval for access to this file rests with the Commissioner of BLS.

Upon approval, the BLS will prepare a Letter of Agreement which must be signed by the Commissioner for Labor Statistics and an official of the recipient's organization, such as a President, Vice President, Dean, Provost, Center Director, or similar official, prior to release of the CFOI research file. By signing the Letter of Agreement, the researcher and the researcher's organization agree to adhere to the BLS confidentiality policy as applicable to the CFOI research file. In addition, all individuals who will have access to the CFOI data must sign an Agent Agreement acknowledging their understanding of the BLS confidentiality policy prior to accessing the CFOI data.

Applications are processed twice a year—during the months of April and October. The application review process takes approximately 6 to 8 weeks. The application can be downloaded online at [ftp.bls.gov/pub/special.requests/ocwc/osh/cfoi_app.zip](ftp://ftp.bls.gov/pub/special.requests/ocwc/osh/cfoi_app.zip). (For information on viewing ZIP files, see <http://www.bls.gov/bls/blszip.htm>.) Before submitting an application, please contact us at iifstaff@bls.gov or call us at 202-691-6170 to discuss your project. Procedures for obtaining access to the research file can be found here: http://www.bls.gov/iif/cfoi_offsite.htm.

12 See, for example, Guy Toscano and William Weber, "Violence in the workplace," and Scott Richardson and Rene Reyes, "Fatal work injuries in construction in Texas, 1991-93," *Compensation and Working Conditions*, April 1995, pp. 1-18; and Letitia K. Davis, et al, "Data sources for fatality surveillance in commercial fishing: Massachusetts, 1987-91," *Compensation and Working Conditions*, July 1994, pp. 7-13.