

# 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 safety and health report issued by 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.<sup>1</sup> Work-related illnesses also were the subject of BLS studies conducted in the early 1900s, such as the pioneering research on lead poisoning in the workplace done by Dr. Alice Hamilton.<sup>2</sup>

It was not until the passage of the **Occupational Safety and Health Act of 1970** that Congress delegated to BLS the responsibility for developing a comprehensive statistical system covering work-related injuries, illnesses, and fatalities in private industry. In 1972, 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 when deciding how to allocate 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 the survey identified industries with dangerous work settings, it shed little light on the circumstances of an injury or illness; for example, the survey did not ask about the manner in which an incident occurred and which occupations were involved.<sup>3</sup> The SOII also failed to produce a reliable count of workplace fatalities or profiles

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

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

<sup>3</sup>Between the mid-1970s and early 1990s, a limited amount of data on case circumstances of work-related injuries and illnesses and characteristics of the workers involved 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.

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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.<sup>4</sup> This critical review of the SOII, which highlighted

<sup>4</sup>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.

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, BLS began a multiyear 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 circumstances and worker characteristics for cases that involved days away from work, and a separate Census of Fatal Occupational Injuries (CFOI) was established to capture counts and profiles of work-related fatalities. (For more information on case circumstances and worker characteristics, see discussion of the **Occupational Injury and Illness Classification system** and the **Standard Occupational Classification system** in Part I. Common Coding Systems, which follows this section.)

The changes to the BLS Occupational Safety and Health Statistics (OSHS) program implemented in 1992 added two new outputs for the program. The three distinct outputs include the Census of Fatal Occupational Injuries (CFOI); Survey of Occupational Injuries and Illnesses—Case and Demographics (SOII—C&D); and the original Survey of Occupational Injuries and Illnesses—Annual Summary (SOII—AS). The results of the survey and census are reported in separate news releases published annually by the following titles:

- *Census of Fatal Occupational Injuries* includes detailed case circumstances and worker characteristics for work-related fatalities (CFOI)
- *Workplace Injuries and Illnesses* includes industry-level estimates of nonfatal work-related injuries and illnesses from the SOII (SOII—AS)
- *Nonfatal Occupational Injuries and Illnesses Requiring Days Away From Work* includes detailed case circumstances and worker characteristics for cases involving days away from work from the SOII (SOII—C&D)

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

## Part I. Common Coding Systems

The Survey of Occupational Injuries and Illnesses (SOII) and the Census of Fatal Occupational Injuries (CFOI) share several systems to classify industry, occupation, and case circumstances 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 adopted a new industry classification system beginning with data for reference year 2003. 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, and was revised numerous times during its life cycle (most recently in 1987) to account for changes in the composition of the U.S. economy.

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. Many industrial changes were not accounted for under the SIC system, such as recent developments in information services, new forms of health care provision, expansion of the services sector, and high-tech manufacturing.

The North American Industry Classification System (NAICS) was developed in cooperation with Canada and Mexico to replace the SIC system, and it was one of the most profound changes for statistical programs focused on measuring economic activities. NAICS uses a process-oriented conceptual framework to group establishments into industries according to 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.

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 the Manufacturing sector to recognize new high-tech industries. A new subsector 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 the Retail Trade and Wholesale Trade sectors 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 the NAICS revision in 2002.

NAICS uses a 6-digit hierarchical coding system to classify economic activities into 20 industry sectors—4 sectors are mainly goods-producing sectors and 16 are entirely service-providing sectors. This 6-digit hierarchical structure allows greater coding flexibility than the 4-digit structure of the SIC. NAICS allows for the identification of 1,170 industries compared with the 1,004 found in the SIC system.

In late 2004, BLS began publishing survey year 2003 occupational safety and health statistics using NAICS, first with the CFOI in September, followed by summary estimates from the SOII in December. In March 2005, BLS published NAICS-based detailed case circumstances and worker characteristics estimates from the 2003 SOII. 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.

The NAICS 2002 structure was revised on a planned 5-year cycle to reflect changes in the economy, resulting in the NAICS 2007 standard. SOII and CFOI industry data incorporated NAICS 2007 coding with the release of data for 2009. The differences between the NAICS 2002 and NAICS 2007 were not as broad as those between SIC and NAICS. Therefore, adoption of NAICS 2007 did not result in series breaks. For additional information regarding differences between NAICS 2002 and NAICS 2007, visit the U.S. Census Bureau NAICS webpage at <http://www.census.gov/eos/www/naics/>.

The following list identifies the individual goods-producing and service-providing sectors according to 2007 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 these NAICS sectors, SOII and CFOI statistics are tabulated for several additional **NAICS aggregations** that are unique to BLS, including the following:

- 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)

## Standard Occupational Classification (SOC)

Beginning with the 2011 reference year, the CFOI and the SOII began using the **2010 Standard Occupational Classification system** for coding occupations. Prior to 2011, the **2000 Standard Occupational Classification system** for occupations was used. Because of the differences between the current and older 2000 SOC version, CFOI and SOII results by occupation in 2011 constitute a break in series, and users are advised against making comparisons between the 2011 (and subsequent years) occupation categories and the results for previous years. The 2010 SOC system classifies workers at four levels of aggregation:

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

All occupations are clustered into one of 23 major groups, within which are 97 minor groups, 461 broad occupations, and 840 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). (The zeros are not always printed.) 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

Also note, prior to 2003, both CFOI and SOII used the U.S. Census Bureau Occupational Coding structure to code occupation. Beginning with 2003 data, CFOI and SOII-C&D both used 2000 SOC for the first time to classify occupation. Because of the substantial differences in the Census Bureau Occupational Coding structure and the 2000 SOC system, users are advised against making comparisons between the 2003–2010 occupation categories and the results for years before 2003.

## Occupational Injury and Illness Classification System (OIICS)

The Occupational Injury and Illness Classification System (OIICS) was developed by BLS to provide a consistent set of classifications of the circumstances of the characteristics associated with workplace injuries, illnesses, and fatalities. The circumstances of each case are classified based on the *BLS OIICS manual*. The Bureau of Labor Statistics Classification Structure Team developed the original OIICS with input from data users and states participating in the BLS Occupational Safety and Health Statistics (OSHS) federal/state cooperative programs. The original system was released in December 1992 and approved for use as the American National Standard for Information Management for Occupational Safety and Health in 1995 (ANSI Z16.2—1995). In September 2007, OSHS staff updated the 1992 manual to incorporate various interpretations and corrections.

The OIICS revision in September 2010 was the first major revision since the 1992 manual. The BLS OIICS Revision Team developed the new manual using input from many stakeholders. In February 2008, BLS issued a Federal Register Notice requesting suggestions for proposed changes to the manual. In addition, the OSHS program sent out numerous letters and e-mails to others who use the OIICS to classify injury and illness data. In April 2010, the OSHS program sent a draft of the revised OIICS manual to interested parties for their comments. The team considered comments received, made revisions, and completed the final manual in September 2010. OIICS 2.0 differs significantly enough from the original version to be considered a break in series, so data may not be comparable to previous years.

The SOII—C&D and CFOI use five classifications to describe each incident that led to a serious nonfatal injury or illness or a fatal injury:

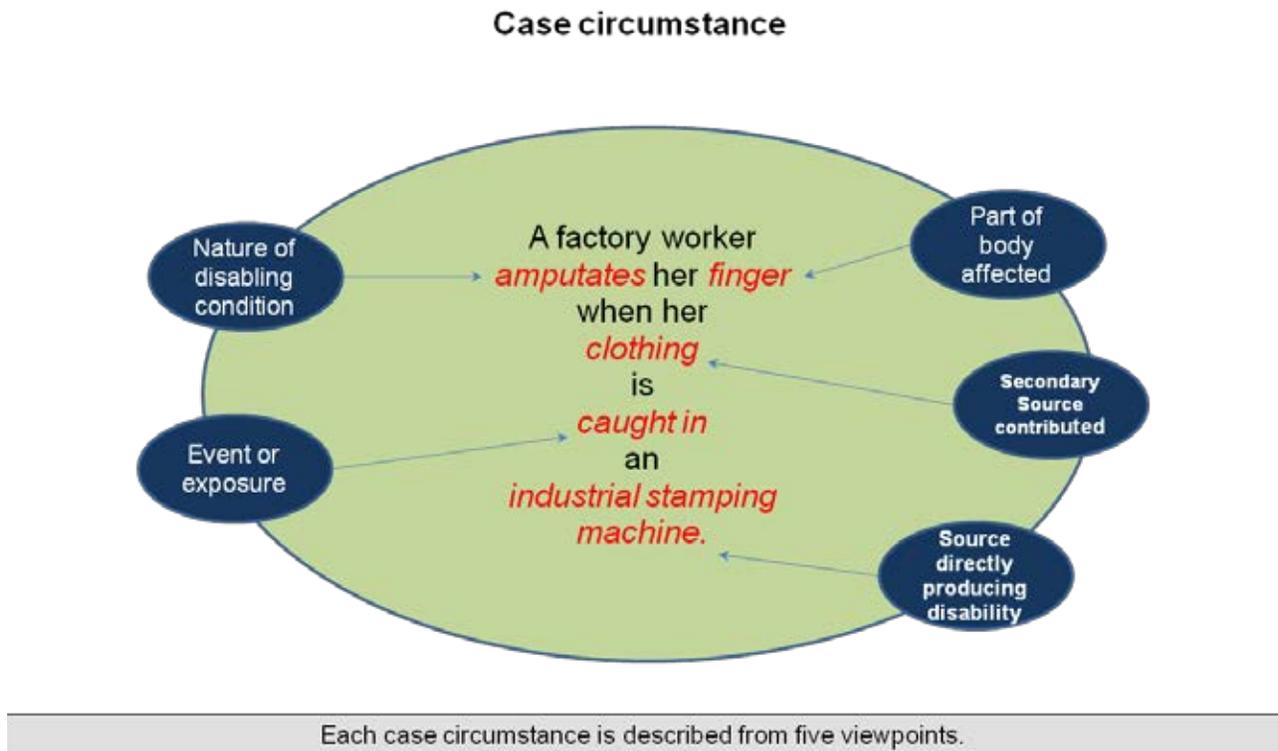
- *Nature*—the physical characteristics of the disabling injury or illness, such as cuts and lacerations, fractures, sprains and strains, or electrocution
- *Part of body affected*—the part of body directly linked to the nature of injury or illness cited, such as finger, arm, back, or body systems
- *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 was responsible for producing or inflicting the disabling condition, such as machinery, ground, patient, or electrical wiring
- *Secondary source*—the object, substance, or person, if any, that generated the source of injury or illness or that contributed to the event or exposure, such as ice or water that contributed to a fall

Figure 1 is an illustrative example of how SOII—C&D may use OIICS codes to describe an injury incident.(see page 5)

## Race and Ethnicity Standards

Both the Census of Fatal Occupational Injuries (CFOI) and the Survey of Occupational Injuries and Illnesses (SOII—C&D) were implemented in 1992, following recommendations of a National Academies of Science review highlighting the need to capture detailed case circumstances and worker characteristics for fatal and nonfatal workplace incidents, respectively. At their inception, each of these series used separate methods to categorize the race or ethnicity of injured or ill workers. The SOII—C&D categorized Hispanics separately, while the CFOI categorized Hispanics by race (e.g., Black or White) and also provided a total count

Figure 1



of Hispanics. The remaining race and ethnicity categories for both series were

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

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. In 1999, the CFOI amended race categories so that Hispanics no longer counted as a race, but solely as an ethnicity. Three additional changes were also incorporated to race and ethnicity categories:

- Asian became a separate category.
- Native Hawaiian was combined with Pacific Islander to form a new category, Native Hawaiian or Pacific Islander.
- “Multirace” was added.

In 2002, the SOII—C&D incorporated these same race categories. One result of this revision is that individuals may be categorized in more than one race or ethnic group. Race

and ethnicity is one of the few data elements that are optional in the SOII. This resulted in 37 percent of the cases involving days away from work for which race and ethnicity were not reported in the 2009 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 3 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 did not result in days away from work.

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.<sup>5</sup>

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 circumstances of the most serious of its nonfatal cases—those involving days away from work—and the characteristics 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 U.S. Department of Labor's Occupational Safety and Health Administration (OSHA). 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, for which SOII estimates 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 online at <http://www.osha.gov/recordkeeping/index.html> or from OSHA's Office of Public Affairs, available via telephone at 202-693-1999.

Because of the revised recordkeeping requirements, SOII estimates for 2002 are not comparable with those from prior years. Similarly, SOII estimates since 2003 are not comparable to those for previous years owing to changes in industry and occupation coding systems. (See Part I. 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. (The revised 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 recordkeeping guidelines of OSHA, effective January

<sup>5</sup>See section 24(a) of the Occupational Safety and Health Act of 1970 (Public Law 91-596).

1, 2002, and used by employers to keep logs and case details of such incidents throughout the survey (calendar) year. (See the Technical References section for citations of instructional materials useful in understanding the types of cases recorded under current recordkeeping guidelines.)

## Recording criteria

Nonfatal recordable workplace 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 workplace injuries or illnesses include the following:

- 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 when revisions were 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 more severe cases. (See discussion of OIICS in Part I. Common Coding Systems.)

- *Occupational injury* is any injury, such as a cut, fracture, sprain, amputation, and so forth, that results from a work-related event or from a single instantaneous exposure in the work environment.
- *Occupational illness* is any abnormal condition or disorder caused by exposure to factors associated with employment, other than those resulting from an instantaneous event or exposure. It includes acute and chronic illnesses or diseases that may be caused by inhalation, absorption, ingestion, or direct contact. Five categories of occupational illnesses and disorders are used to classify recordable illnesses, described as follows. Examples of each category are provided, but these are not a complete listing of the types of illnesses and disorders that are 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 the following:

- *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). The number of days away from work for these cases is determined according to the number of calendar days (not workdays) that an employee was unable to work, even if the employee was not scheduled to work those days. The day on which the employee was injured or became ill is not counted. These cases may also include days of job transfer or restricted work activity in addition to days away from work. Take the case of an employee who suffers a work-related injury resulting in 5 days away from work. Upon returning to work, the employee was unable to perform normal duties associated with the job for an additional 3 days (i.e., the employee was on restricted work activity). This case would be recorded as a days-away-from-work case with 5 days away from work and 3 days of restricted work activity. The number of

days away for which employers are required to report is “capped” at 180 calendar days.

- *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 keeps or health care professional 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 the following instances:
  - An employee is assigned to another job on a temporary basis
  - An employee works at a permanent job less than full time
  - An employee works at a permanently assigned job but is unable to perform all duties normally connected with it.

The day on which the injury or illness occurred is not counted as a day of job transfer or restriction. Workers who continue working after incurring an injury or illness in their regularly scheduled shift but produce fewer goods or services are not considered to be in restricted activity status. They must be restricted from performing their routine work functions to be counted in this category.

- *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 a 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 circumstances

Information about the circumstances of nonfatal occupational injuries and illnesses cases involving days away from work are collected from employers OSHA case forms and classified using definitions and rules of selection stipulated in the *BLS Occupational Injury and Illness Classification System (OIICS) manual*, cited among technical references at the end of this chapter. The following case circumstances are used in the SOII to describe these injuries and illnesses from different perspectives.

- Nature of injury or illness,
- Part of body affected,

- Source and secondary source of injury or illness,
- Event or exposure.

Other circumstances include

- Day of the week the incident occurred,
- Time of day the incident occurred,
- Hours of work before the incident occurred.

See Part I. Common Coding Systems for additional details on OIICS.

### Worker characteristics

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

- Occupation (See Part I. Common Coding Systems for discussion of SOC.)
- Industry (See Part I. Common Coding Systems for discussion of NAICS.)
- Age and age groups
- Race or ethnic origin (See Part I. Common Coding Systems for discussion race and ethnicity.)
- Gender
- Length of service

### 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:

- 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

See the SOII Definitions section for additional details.

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 the case circumstances and worker characteristics by the following:

- Case counts
- Incidence rates
- Percent distributions

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

- Median number of days away from work
- Number of days away from work by case count and percent distribution

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

For cases involving days away from work, 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. 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 circumstances and worker characteristics for cases involving the following:

- 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

*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 cases

involving days away from work, job transfer, or restriction, or other recordable cases. 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 are also available for specific case circumstances. For example, the incidence rates associated with carpal tunnel syndrome, back injury 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 characteristics, 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 below on State Participation in the SOII for description of availability of state estimates.) These demographic rates for both national and state estimates are available cross-tabulated by the aforementioned circumstances—nature, part, source, and event. Beginning with survey year 2009, incidence rates by occupation in state government and local government are also available.

## Scope of the SOII

The sample of workplaces selected by BLS for participation in the SOII 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. Starting with survey year 2008, SOII also collects data from state and local government establishments to provide estimates of occupational injuries and illnesses among government workers for the nation and each participating state. Prior to 2008, state and local government injury and illness estimates were available for only a selection of states and at varying levels of detail. The SOII uses data from 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.

Self-employed persons are not considered to be employees under the 1970 act. Private households (NAICS 814), the United States Postal Service (NAICS 491), and federal government workers are out of scope for the SOII.

## State Participation in the SOII

The SOII shares costs evenly with participating states to develop estimates of occupational injuries and illnesses for each participating state and the nation. BLS collects data in nonparticipating states to support the national estimates only. The participating state agencies collect and process the data from which state and national estimates are tabulated using standardized procedures and systems established by BLS to

insure uniformity and consistency among the states. BLS designs and selects the survey sample for each state, though states make decisions about the overall size of the sample. To further ensure comparability and reliability of SOII estimates, BLS provides training and continuing technical assistance, reviews the establishment data, and validates the survey results.

State participation in the SOII varies by year, depending on funding decisions in each state. In 2009, nonfatal workplace injuries and illnesses estimates for private industry were tabulated separately for 44 participating states, cities, and territories. Beginning with 2008, BLS published estimates of injuries and illnesses to state and local government workers for the nation as a whole and for each participating state. Prior to 2008, about half of the participating states collected and published estimates of injuries and illnesses to state and local government workers. The level of industry detail for which state estimates are tabulated varies and is based on the needs determined by each state. Estimates for three U.S. territories—Guam, Puerto Rico, and the Virgin Islands—are not included in the tabulation of national estimates. Estimates for the participating states, cities, and territories 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 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 involving days away from work are instructed to provide a subsample of their cases by reporting only those cases that occurred in specified months.

Because the SOII is a federal-state cooperative program and the data are designed to meet the needs of the states, an independent sample is selected for each participating state, city, or territory. The sample is selected to represent all in-scope private industries, state government, and local government. The sample size for the SOII is dependent upon the

- Number and kind of cases for which estimates are needed,
- Industries for which estimates are desired,
- Characteristics of the population being sampled,
- Target reliability of the estimates,
- Survey design employed.

One criterion of the SOII design is identifying target estimation industries (TEIs). TEIs, which are selected by each state, are North American Industry Classification System (NAICS) industries or groups of industries for which

a state wishes to produce an estimate. For example, a state may select to target estimates for Hospitals (NAICS 622). This TEI would include establishments in General medical and surgical hospitals (NAICS 622110), Psychiatric and substance abuse hospitals (NAICS 622210), and Specialty hospitals, except psychiatric and substance abuse (NAICS 622310). 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. 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 is selected.

For some sampling cells, 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:

$$\text{Sample Weight} = \frac{N_u}{n_s}$$

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 5 units are selected for the sample, then the weight assigned to each of the sample units would be 100 divided by 5, or 20.

## SOII Data Collection

Although most of the SOII data are now collected electronically, the SOII began as a 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 record their injury and illness experience on the OSHA recordkeeping forms. For establishments in those states not participating in the program (see section on State Participation in the SOII), survey forms were mailed by BLS. Each employer completed and mailed back its survey form, which was then manually keyed into a survey collection system. Data from the surveys 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, ensured 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 reduced data collection and processing times. The 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 the following:

- Internet
- Automated fillable form
- Fax form
- Telephone
- Mail

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

The Internet Data Collection Facility (IDCF) is the centralized data collection facility for BLS, 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. BLS first used the IDCF for the 2002 survey year. The IDCF survey instrument is a Web-based tool that provides sampled employers the ability to respond to the SOII using online 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 traditionally received and responded to by mail. By the 2009 survey year, around 70 percent of total responses were submitted by IDCF.

In addition to the IDCF, employers have the option to request, receive, and respond electronically to the SOII using an automated fillable 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 at least one day away from work, which can be copied from the employer's OSHA case forms. State agency and BLS personnel edit the summary data (Section 2) and code the details (see discussion of OIICS in Part I. Common Coding Systems) of serious cases (Section 3), verifying and correcting apparent inconsistencies by contacting the employer again. *Section 4: Contact Information* asks the employer to provide contact information for the individual who completed the survey form in case 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, while Internet responses remove this manual processing since data are entered directly by the employer in the 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 hard copy format (by mail). Similarly for the automated fillable form, data that employers have entered into the form are loaded directly into the SOII data collection system. All reports that are received, regardless of which reporting option was used, are electronically edited. Reports that do not meet the computer screening criteria or senior staff review are verified with the employer.

By midsummer, 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. Annual summary estimates on injury and illness incidence rates and counts by detailed industry and type of case are now published in mid-October, compared with mid-December in past years. A subsequent release covering more detailed estimates of the case circumstances and worker characteristics for injuries and illnesses that involved days away from work now follows in early November, compared with 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—annual summary (industry-level) estimates and more detailed case circumstance and worker characteristic estimates for cases that involved days away from work. Part of the estimation process involves weighting sample units and cases to represent all injuries and illnesses from 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 state, industry, employment size class, and ownership (private sector, state government, or local government), also referred to as a sampling cell. 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 sampling cell 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 summary weight for a sample unit is adjusted by numerical factors to account for 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 these factors to the original weight:

- *Unit nonresponse*—Because a small proportion of SOII forms are not returned, weights of responding employers in a sampling cell are adjusted to account for nonrespondents by applying a nonresponse adjustment factor (NRAF).
- *Outlier*—An outlier adjustment factor (OAF) is applied when an establishment experiences a rare circumstance that makes its case count or hours worked unrepresentative of its sampling cell. Including such data with the original sampling weight would have an undue influence on the estimates. For example, an establishment may report an unusually high number of illness cases that occurred as a result of a severe and uncommon scabies outbreak. The outlier adjustment factor adjusts the unit's weight to one to avoid an overrepresentation of this uncommon occurrence. An adjustment factor to distribute the remaining weighted employment of the outlier unit is also applied to each of the remaining useable units in the sampling 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 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 benchmark factors (BMF) at the state, industry, and ownership level, and at the national, industry, and ownership level as well. 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 when 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, requiring 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

Final summary weight = Original summary weight × NRAF × OAF × BMF × 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 the SOII Sample Design for discussion of subsampling) and case nonresponse for those establishments that 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)*—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 is designed 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

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

- **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 for a sampling cell. The CNRAF is designed 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

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

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, such as 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 multiplied by 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

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

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, various case circumstances, and select worker characteristics. Incidence rates for illnesses and for case and worker characteristic categories are published per 10,000 full-time 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 SOII 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 that are within 1.96 times the estimate's standard error. If several different samples were selected and used to estimate a population value (such as injury and illness incidence rates), the 95-percent confidence interval would include the true population value approximately 95 percent of the time.

For example, in 2006 the total injury and illness case incidence rate for Nursing care facilities (NAICS 6231) was 9.8 cases per 100 full-time workers, or 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 circumstances and worker characteristics) 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. Some examples are the inability to obtain information about all cases in the sample, mistakes in recording or coding the data, or definitional difficulties. Although not measured, nonsampling errors will always occur when statistics are gathered. To minimize the nonsampling errors in the estimates, standard procedures are applied to each respondent's information, 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 2010—including select industries within state and local government, which were published for the first time for the 2008 survey year. Data for the 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 circumstances and worker characteristics, estimates are rounded to the nearest ten 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, BLS publishes national estimates for private industry, state government, and local government from the SOII in two news releases—a summary of counts and incidence rates of nonfatal workplace injuries and illnesses, followed shortly thereafter by a more detailed release describing the injury and illness cases that involved days away from work. Tables containing nearly all available estimates are published on the Internet in conjunction with these news releases. For some years, a comprehensive report produced jointly by the SOII and the Census of Fatal Occupational Injuries (CFOI) is produced later in the year. This report features charts and text highlighting fatal occupational injury data, nonfatal industry summary data, and nonfatal case circumstances and worker characteristics data. SOII estimates can also be accessed through a number of electronic resources. 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 annual summary estimates and for case circumstance and worker characteristic 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 at <http://www.bls.gov/iif/oshcont1.htm>. The data are also published in private safety and trade journals. 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) that can provide more current state estimates is available from the BLS Office of Safety, Health, and Working Conditions at (202) 691-6170, or the list can be accessed online at <http://www.bls.gov/iif/oshstate.htm>.

Flat files containing all SOII estimates are available through FTP (file transfer protocol) from the BLS FTP webpage. Each data series on the BLS FTP site includes a two-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. The 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:

- SOII - Summary data series:
  - hs —1976–1988 (1972 SIC)
  - sh —1989–2001 (1987 SIC)
  - si —2002 (New OSHA recordkeeping)
  - ii —2003 forward (2007 NAICS)
- SOII - Case and demographics data series:
  - cd —1992–2001 (1987 SIC)
  - hc —2002 (New OSHA recordkeeping)
  - ch —2003 forward (2007 NAICS)
  - cs – 2011 forward (OIICS 2.0)

### 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 experiences 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 and reported. But some conditions, such as long-term latent illnesses caused by exposure to carcinogens, often are difficult to associate with the workplace and are not adequately recognized and reported, and therefore 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 link to workplace activity (such as contact dermatitis or carpal tunnel syndrome).

Two relatively recent changes have had an impact on the SOII, and these changes may limit comparability of data series. The first change involves 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.

As discussed in Part I. Common Coding Systems, industry and occupation classification systems used in the stratification of SOII estimates also changed in 2003. Owing to the significant differences when compared with prior industry and occupation classification systems, caution should be exercised when attempting to compare estimates from 2003 forward with estimates from prior years. Similarly the 2011 change in OIICS, leads to caution when comparing estimates from 2011 forward with estimates from prior years. The section on Technical References later in this chapter references articles that discuss the influence of changes in coding systems used for SOII estimates. SOII estimates published by BLS are in the public domain and, with appropriate credit, may be used without explicit permission from BLS.

### Survey Forms

Various forms for the SOII can be downloaded from <http://www.bls.gov/respondents/iif/forms.htm>. Included on this page are links to the following:

- Notification of the Requirement to Participate in the SOII
- 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 BLS Internet Data Collection Facility (IDCF) —BLS-9300-IDCF
- SOII forms:
  - An automated fillable SOII form—BLS-9300-N06
  - A nonfillable SOII form—BLS-9300-N06 (similar to mail-in form)
  - A Spanish-language SOII form—Encuesta Sobre Lesiones y Enfermedades Ocupacionales (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 SOII.

Additional instructions for responding to the SOII are available online at <http://www.bls.gov/respondents/iif/instructions.htm>.

## Part III. Census of Fatal Occupational Injuries

Since 1992, the Census of Fatal Occupational Injuries (CFOI) 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 census uses multiple data sources (such as death certificates, state workers' compensation records, news media, OSHA reports) to identify work-related fatal injuries. 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 and 1995, 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 SOII. The CFOI covers not only private, state government, and local government wage and salary workers covered in the SOII, but also workers on small farms, the self-employed, family workers, and federal government workers not covered by the survey. Unlike CFOI data, the SOII's fatality estimates cover 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 circumstances 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,<sup>6</sup> 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

<sup>6</sup>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.

<sup>7</sup>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.

<sup>8</sup>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.

different organizations at that time varied greatly from 3,000 to 11,000 deaths nationally per year.<sup>7</sup>

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 circumstances across those sources.<sup>8</sup> 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.<sup>9</sup> The CFOI program 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. As of 2011, the U.S. territories Puerto Rico, Virgin Islands, Guam, and America Samoa are also included.

## CFOI Definitions

For a fatality to be included in CFOI, the decedent must have been self-employed, working for pay, or volunteering at the time of the event, engaged in a legal work activity, and present at the site of the incident as a job requirement.<sup>10</sup> 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 CFOI count.

Over 30 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 the following:

- Case circumstances
  - Nature of injury
  - Part of body affected by injury
  - Source of injury
  - Event or exposure
  - Secondary source of injury

<sup>9</sup>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

<sup>10</sup>See <http://www.bls.gov/iif/oshcdef.htm> for more information on work relationship criteria.

- Date of birth
- Date of death
- Date of incident
- Worker characteristics
  - Occupation
  - Age
  - Race or ethnic origin
  - Country of foreign birth (if applicable)
  - Gender
  - Length of service with employer
- Employee status (wage and salary, self-employed, family business)
- Establishment employment size
- Industry of employer
- Location type (farm, street, warehouse, etc.)
- Medical complication (if any)
- Narrative of how incident occurred
- Ownership (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
- Worker activity (driving a vehicle, tending a store, etc.)

### **CFOI Collection Methods**

The Census of Fatal Occupational Injuries (CFOI) 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 U.S. Department of Labor's Occupational Safety and Health Administration (OSHA), Office of Workers' Compensation Programs (OCWP), 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 fatal injury. To avoid duplication 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 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. In the case of nonresponse to the questionnaire or inconsistent data results, further follow-up by telephone is required. At the end of the collection period, fatal injuries for which the state has only one source document are reviewed by BLS. The case is included in the national database only if the state and BLS agree that there is sufficient information on the sole source document to determine that it is indeed work-related.

### **CFOI Measures**

The CFOI provides annual fatal injury counts by case circumstances and worker characteristics highlighting the number of worker fatalities for the following:

- 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 (worker status, gender, 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 counts, percent distributions of workers who were fatally injured are available by selected case circumstance and characteristics of the deceased, including the following:

- 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

### **Fatal Injury Rates**

Fatal injury rates depict the risk of incurring a fatal occupational injury faced by all workers or a subgroup of workers and are used to compare risk over time or with other worker groups. Workers can be grouped for comparison by a number of variables, including industry, worker age,

or gender. Since employment data are not collected by the CFOI, fatal injury rates are calculated using estimates of hours worked from the Current Population Survey (CPS).

In 2008 the CFOI adopted hours-based employment as the denominator of fatal injury rates to measure fatal injury risk. This methodology is generally considered to be more accurate than employment-based rates per the standardized length of exposure to risk of occupational injury. It is defined as the average number of workers at work over the year multiplied by the average hours each employee works over the year. More information on the change from employment to hours-based fatal injury rates is available online at <http://www.bls.gov/iif/oshnotice10.htm>.

### National Rates

To accurately describe fatal injury risk for a worker group, the numerator (fatal injuries) and denominator (total hours worked) of the rate must refer to the same group of workers. The hours-worked data from the CPS used in the rate calculations do not include workers under the age of 16, volunteers, and members of the resident military. Therefore, fatal injuries occurring to these workers are also excluded from the numerator.

*National fatal injury rates* use data from the CPS. As opposed to the employment number, data on persons “at work” exclude persons who were temporarily absent from a job (classified in the zero-hours-worked category, “with a job but not at work”). Those not at work were absent from their jobs for the entire week for such reasons as bad weather, vacation, illness, or involvement in a labor dispute. Two estimates, “at work” and “average hours,” are combined to create the denominator, annual total hours worked,

$$EH = AW \times H$$

where:

- EH = total hours worked by all employees in a group during the calendar year
- AW = at work (number of employees working in a group)
- H = average hours (average annual hours worked by an employee in that group).

The hours-based rate (expressed per 100,000 workers) is

$$(N/EH) \times 200,000,000$$

where:

- N = number of fatal injuries in a group
- EH = total hours worked by all employees in a group during the calendar year
- 200,000,000 = base for 100,000 equivalent full-time workers (working 40 hours per week, 50 weeks per year).

### State Rates

Unlike at the national level, “at work” and “average hours” data are not available at the state level. State rates by industry can be imputed by using national-level “average hours” and “at work” information to calculate the total annual number of hours for each worker group.

The rate represents the number of fatal occupational injuries per 100,000 full-time equivalent workers and was calculated as

$$(N_s/EH_s) \times 200,000,000$$

where:

- $N_s$  = the number of fatal work injuries in the state
- $EH_s$  = total imputed hours worked by all employees in the state
- 200,000,000 = base for 100,000 equivalent full-time workers (working 40 hours per week, 50 weeks per year).

The imputation to calculate  $EH_s$  (total hours worked by all employees during the calendar year) for the state was calculated as

$$EH_s = HW_N \times E_s$$

where:

- $E_s$  = employment in the state
- $HW_N$  = average annual number of hours for each employee in a group nationally.
- The N subscript denotes a national number; an S subscript denotes a state number.

### Examples

For the national rates, compute  $N/EH \times 200,000,000$ . To get EH, the total hours, multiply “at work” and “average hours.” This first step involves the shaded area in table 1 on page 19 (columns B, C, and D in table). So to get the national denominator:

$$AW_N \times H_N = (139,824,000 \times 1,945) = 271,957,680,000 = EH_N$$

(total hours for the year).

Then take the total number of fatal injuries in 2008, 5,084 (5,214 minus the number of workers under the age of 16, volunteers, and members of the resident military), and divide by  $EH_N$  and multiply by 200,000,000:

$$(5,084/271,957,680,000) \times 200,000,000 = 3.7.$$

For the state rates, the shaded information is not available, so to impute the state average hours, divide the national total hours (column D) by the national employment (column A) to get the average annual number of hours per employee ( $HW_N$ , column E, is the imputed number).

Then multiply this by the state employment to get the denominator. So the state rate calculation is as follows:

State	Employment (in thousands) $E_s$	Fatalities $N_s$
California Total	17,045	448
California Construction	1,294	67

Then multiply this by the state employment to get the denominator. So the state rate calculation is as follows:

$$N_s / (E_s \times HW_N) \times 200,000,000$$

$$448 / (17,045,000 \times 1,871) \times 200,000,000 = 2.8$$

### CFOI Rates Prior To 2008

All the CFOI fatal injury rates published by BLS for the years 1992 through 2007 were employment-based rates and measured the risk of fatal injury for those employed during a given period of time, regardless of hours worked. The following is the formula for calculating a fatality rate from 1992 through 2007:

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

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:

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

$W = 142,894,000$  (from CPS, 2005 annual aver-

ages, 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.

### Comparison of National and State Rates Caveat

State industry rates are not directly comparable to national industry rates. Because state rates include government workers in their respective industry sector and are not broken out separately, both the numerator and denominator include a different group of workers than that of the national rates.

If a user decides to add up all the states in one industry and average out their rates to compare it to the national average, they will not get the national average due to this data difference, with the all-ownership/state rates most likely being slightly higher because of the added fatal injuries and different employment data.

### CPS Data Limitations

There are a number of limitations to these fatal injury rates:

- The CPS data used to calculate rates are estimates based on a sample rather than a complete count. Therefore, the CPS estimates and fatality rates have sampling errors. The rates calculated using the CPS may differ from those that would have been obtained from a census of employed persons. See *Explanatory Notes and Estimates of Error* in the February 2004 Employment and Earnings for an explanation of CPS sampling and estimation methodology, and standard error computations. The relative standard errors of the CPS estimates can be used to approximate confidence ranges for the fatality rates.
- The CPS categorizes workers according to their primary job, which may differ from the job the deceased was working in when fatally injured, as reported in the CFOI.
- The annual average of hours worked represent total hours at work for CPS respondents, including those

	A	B	C	D	E
Industry	Employment (in thousands) $E_N$	At work (Employment in thousands) $AW_N$	Avg. Annual Hours (Weekly Hours x 50) $H_N$	Total Hours (Annual, in thousands) $EH_N = AW_N * H_N$	Adjustment (Annual Total Hours, per employee) $HW_N = EH_N / E_N$
Total	145,362	139,824	1,945	271,957,680	1,871
Construction	10,974	10,558	1,980	20,904,840	1,904

Source Data 2008: National, all ownerships

that work more than one job. Total hours worked for respondents with multiple jobs will be recorded in the occupation and industry of the primary job.

- Rates are calculated at the level of detail available from the CPS data. Additionally, rates are only calculated for those occupations and industries which met minimum thresholds of having at least 15 fatal injuries and 20,000 employed.

## Presentation of CFOI Data

Summary information including the key fatal injury circumstances (event/exposure, occupation, and industry) and the demographics of workers fatally injured on the job, along with overall counts, are included in a national news release issued about 8 months after the end of the reference period. Supplementary tables containing fatal injury rates and special profiles of specific fatal events (such as 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 BLS at (202) 691-6170 or online 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. The CFOI also produces a joint report with SOII featuring charts and text highlighting fatal injury data, nonfatal industry summary data, and nonfatal case circumstances and worker characteristic data.

Articles and detailed tables containing both national and state data are published regularly in the BLS online

<sup>11</sup>BLS may approve access to an offsite CFOI microdata research file. The CFOI research file contains data from various sources. Some 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, BLS will prepare a Letter of Agreement which must be signed by the Commissioner of the Bureau of Labor Statistics and an official of the recipient's organization, such as a President, Vice President, Provost, Director of Sponsored Research, Director of Contract and Grant Administration, 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 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 BLS confidentiality policy prior to accessing the CFOI data. Applications can be submitted at any time but are processed twice a year. Deadlines for processing are March 15 and September 15. Applications received after these dates will not be processed until the next application deadline. The application review process takes approximately 8 to 10 weeks. The application can be downloaded online at [ftp://www.bls.gov/pub/special.requests/ocwc/osh/cfoi\\_app.zip](ftp://www.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 [CFOIresfile@bls.gov](mailto:CFOIresfile@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](http://www.bls.gov/iif/cfoi_offsite.htm).

publication, *Compensation and Working Conditions*, and occasionally in the *Monthly Labor Review* or other publications. A research microdata file that is useful for safety researchers and others involved in promoting safety in the workplace can be obtained through a letter of agreement with BLS to protect the confidentiality of data.<sup>11</sup>

Flat files of estimates from the entire CFOI database or parts of the database are available through FTP (file transfer protocol) from the BLS FTP Webpage. Each dataset on the BLS FTP site includes a two-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. The CFOI series experienced another break in 2011 due to changes in the Occupational Injury and Illness classification system (OIICS) to OIICS 2.0. Data from these different 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—2003–2010 (2002 NAICS)
  - fw—2011 forward (OIICS 2.0)

## Uses and Limitations of CFOI Data

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 that have particularly high risks, such as robbery-related homicides in retail stores, construction-related fatalities, and drownings in the commercial fishing industry.<sup>12</sup> Fatal injury profiles can be generated from the CFOI database for specific worker groups (such as the self-employed or female workers), for certain types of machinery (such as farm equipment), and for specific fatal circumstances (such as 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 fatal injuries undoubtedly occur on farms, at sea, and on highways, to cite three examples. BLS and its participating state partners continue to seek new ways of verifying work-related fatal

<sup>12</sup>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

injuries to make CFOI counts as complete as possible. In that regard, states have up to 8 months to update their initial published counts with cases that were verified as work-related after preliminary data collection has ended for a given census. From 1992 to 2002, the updates have averaged less than 1 percent of each year's total that was initially published. However, updates have been growing, and since 2003 average 2 percent of each year's total that was initially published. CFOI facilitates the exchange of information by states on the fatal injuries that result 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, comparing rates for a state with a large agricultural economy with that of a state with a large industrial economy would be ill-advised because agriculture has one of the highest fatal injury rates while manufacturing has one of the lowest. In addition, the number of fatalities and their circumstances 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 CFOI are used exclusively for statistical purposes and, under a pledge of confidentiality, are treated in a manner that ensures no data published by 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, BLS has conducted, in conjunction

with other governmental agencies, various "special topic" surveys regarding occupational safety and health-related topics. These special surveys have included the following topics:

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

The Survey of Respirator Use and Practices was a special survey of U.S. employers regarding the use of respiratory protective devices conducted by 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 online at <http://www.bls.gov/iif/oshwc/osh/os/osnr0014.pdf>.

The Survey of Workplace Violence Prevention was another special survey conducted by BLS for NIOSH. This survey studied the maintenance of a safe work environment, including the prevalence of security features, risks facing employees, employer policies and training, and related topics. 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 online at [http://www.bls.gov/iif/osh\\_wpvs.htm](http://www.bls.gov/iif/osh_wpvs.htm).

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