Improvements in the BLS safety and health statistical system

New and improved measures of risk, severity, and circumstances involved in work-related injuries, illnesses, and fatalities provide valuable information in preventing deadly and disabling incidents in the workplace

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No one is immune from becoming disabled or dying of work-related injuries, but the risk can vary by the personal traits of the worker and the work being done. Until recently, there was no complete and credible information on the workers most at risk or on the risks themselves. Three years ago, however, the Bureau of Labor Statistics redesigned its long-standing safety and health survey to help identify industries, occupations, and worker groups in the private sector that have relatively high risks of serious, nonfatal injury or illness resulting in lost worktime and to zero in on how those incidents occurred and their severity.[1] In addition, a separate census that systematically counts all fatal work injuries using multiple data sources to identify, verify, and profile such tragic incidents replaces the previous fatality estimates.

This article describes improvements in the Bureau's statistical system and illustrates how the new data, and measures based upon them, can help those striving for safer, healthier workplaces.

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Background

The year 1995 marked the 25th anniversary of the Occupational Safety and Health Act, a landmark piece of Federal legislation that mandated several safety and health initiatives in the workplace, including a nationwide data base for occupational fatalities, work-related illnesses, and nonfatal occupational injuries that require more than first aid treatment.[2] With the passage of the 1970 act, the Bureau was delegated responsibilities for collecting, compiling, analyzing, and publishing such safety and health statistics. To meet its mandate, the Bureau developed a survey that measured the frequency of reported injuries and illnesses in various work settings, enabling analysts to identify industries with comparatively high rates of such work-related incidents. This survey information has been available from 1972 forward, and continues to be of value in allocating prevention resources among several hundred industries, across which workers' risks of injury and illness vary widely.

As originally designed, however, the survey had its shortcomings. Although it pinpointed dangerous work settings, the survey shed little light on the characteristics of injury or illness incidents, for example, the nature of the injury or illness, how it happened, and what job was involved. The survey also failed to produce a comprehensive count of workers dying on the job and the circumstances surrounding their deaths. These shortcomings did not go unnoticed in the safety and health community. Data from State workers' compensation systems, in fact, helped fill a portion of these information gaps; but the State systems have some important statistical limits, for instance, their varying definitions of industries, workers, and cases covered, which make cross-State comparisons difficult and a national aggregation of State data even more problematic.[3]

Until recently, the Bureau lacked the necessary support and resources to redesign and expand its survey into a comprehensive safety and health sta-

tistical system. In 1987, however, the Bureau received a gentle wakeup call from the National Academy of Sciences that questioned whether the BLS survey should continue in its present form; the Academy's report implied that the survey data were not adequate as a basis for designing safety and health programs to prevent serious injuries on the job.[4] Around that time, other safety and health experts also encouraged BLS to reengineer some elements of its survey.[5] These critical reviews, which spotlighted the survey's long-standing deficiencies, have provided the impetus for its redesign.

With congressional funding, technical support from the safety and health community, and assistance from some 40 participating States, the Bureau began a multi-year effort to redesign and test an improved safety and health statistical system, which was implemented in the early 1990's. Beginning with 1992, survey information on serious, nonfatal incidents involving days away from work has been expanded to profile (1) the occupation and other demographics (age and gender, for example) of workers sustaining such injuries and illnesses, (2) the nature of these disabling conditions and how they occurred, and (3) the resulting time away from work. In 1993, the latest survey year available, there were about 2-1/4 million disabling incidents involving lost worktime; these profiled cases accounted for more than a third of all work-related injuries and illnesses.[6] In addition, work-related fatalities now are counted and profiled more accurately in a separate national BLS Census of Fatal Occupational Injuries. For 1994, that census reported on more than 6,500 fatal work injuries.[7] The specific data elements of the BLS survey and census are listed in the appendix to this article.

New measures and analysis

Which occupations are among the most hazardous? Which disabling conditions result in the longest absences from work? How are workers disabled in various jobs? These are but a few of the queries posed by safety and health practitioners that the redesigned BLS safety and health statistical system can answer. Such important safety and health questions, in fact, primarily fall into three broad topics addressed by the redesigned system: (1) determining the *risk* of injury (nonfatal and fatal) and serious, nonfatal illness for various worker groups; (2) measuring the *severity* of disabling incidents resulting in lost worktime; and (3) profiling the *circumstances* surrounding work-related incidents.

Measuring risk is important to the safety and health community because it needs to allocate limited prevention resources optimally among a large array of safety and health problems that compete for a share of a static or even dwindling pie. Since the early 1970's, the survey has helped with this process by identifying high hazard industries such as logging and roofing, which led the top 10 list in 1993. (See table 1.) Additionally, the redesigned survey permits rates to be computed by industry and *specific* injury and illness characteristics. (See, for example, the bottom half of table 1 for a ranking of industries according to the incidence of injuries and illnesses due to overexertion, the leading way in which disabling incidents occur.) These new measures of industry risk enable policymakers to zero in on a particular work hazard and the work settings where its risk is relatively high. Nursing homes, for instance, led all other industries in the rate of injuries due to overexertion (primarily from nursing staff lifting or otherwise maneuvering patients). Logging and roofing rates, in contrast, were not among that list's top 10, although they ranked first on other 1993 risk lists. More spe-

Table 1. Top 10 private industries with the highest rates of injuries and illnesses resulting in days away from work, by all events and exposures and overexertion only, 1993

SIC code[1]	Top 10 industries	Cases per 100 workers[2]
	Injury or illness resulting from any event or exposure	
...	All private industry	2.9
241	Logging	8.1
176	Roofing and siding	8.0
451	Air transportation	7.6
245	Wood buildings	7.5
027	Animal specialties	7.4
122	Bituminous coal mining	7.3
244	Wood containers	7.3
805	Nursing homes	7.0
334	Secondary nonferrous metals	7.0
373	Ship and boat building	6.9
	Injury or illness resulting from overexertion only	
...	All private industry	.8
805	Nursing homes	3.6
451	Air transportation	2.9
122	Bituminous coal mining	2.6
518	Beer wholesaling	2.4
208	Beverage manufacturing	2.3
411	Local transportation	2.2
373	Ship and boat building	2.1
421	Trucking services	2.1
101	Iron ore mining	2.0
514	Groceries wholesaling	2.0

[1] *Standard Industrial Classification Manual*, 1987 (Washington, DC, Office of Management and Budget). Rates are shown at a three-digit level, for industries with at least 100 cases in a ranking. Full industry titles are shown in the manual by SIC code.

[2] These "incidence rates" represent the number of days away from work cases resulting from either all events or exposures or from overexertion only per 100 equivalent full-time workers and were calculated as:

(N/EH) X 200,000, where

N = number of days away from work cases for all events or a given event category, such as overexertion

EH = total hours worked by all employees during the calendar year

200,000 = base for 100 equivalent full-time workers (working 40 hours per week, 50 weeks per year).

NOTE: The top 10 industries and their rankings may vary from one year to the next, depending on changing safety and health conditions and initiatives.

cifically, logging sites were where workers were most likely to be struck by objects (chiefly trees), and roofing work entailed the greatest risk of falls to a lower level (commonly from a ladder or roof).

Identifying high risk occupations helps safety and health practitioners to allocate some of their resources to certain kinds of hazardous work duties found across several industries, such as those performed by laborers. The survey provides one of two critical elements for measuring occupational risk—a count of injuries and illnesses with days away from work by occupation. The other element—employment or hours worked by occupation—is not collected in the annual survey, as that would be too burdensome. Employment and hours information can be obtained from the Current Population Survey (CPS), conducted for the Bureau of Labor Statistics by the Bureau of the Census. BLS recently combined occupational survey counts with hours from the 1992 CPS, developing indexes of relative risk for high risk occupations.[8] The indexes were prepared separately for men and women. Near the top of both occupational risk lists were nonfarm, nonconstruction laborers, various food preparation jobs, and nursing aides and orderlies—jobs with an injury and illness risk 3 to 5 times that of the average job. In general, this research showed that lesser skilled jobs tend to bear relatively high risks of disabling injury and illness, in part reflecting more manual labor (heavy lifting, for example) and higher turnover rates (diluting the salutary effect of safety training) for workers in these jobs.[9]

The Bureau also used indexes of relative risk to answer another occupationally oriented question: Are women or men safer in the same job?[10] This analysis of gender differences revealed a somewhat puzzling pattern, namely, that women face higher injury risks working in male-dominated jobs (such as driving a truck or a bus), while men's risks exceed women's in female-dominated jobs (such as providing nursing assistance). It remains for further research, however, to explain why this pattern is observed. The finding might have implications for employers considering special training or safety gear for women working in construction or for men doing relatively more of the risky manual tasks associated with general office work (to cite just two examples of activities staffed primarily by members of one sex or the other).

The BLS fatality census, like the annual survey, identifies high hazard jobs. Chart 1 displays 10 occupations with unusually high risks of fatal injury, ranging from about 4 to about 25 times the national rate of 5 fatalities per 100,000 workers in 1994.[11] These 10 jobs share a common element, namely, they are primarily performed outdoors, typically in agricultural, construction, and transportation industries, rather than on factory floors. Manufacturing settings, in fact, have fatality rates at or slightly below the corresponding national average, in contrast to having some of the highest rates of injuries and illnesses resulting in lost worktime. The list of deadliest jobs and the list of most disabling jobs, moreover, evidence little occupational overlap. Thus, a two-pronged approach to addressing both types of high hazard occupations might be in order, whereby some safety programs zero in on major life-threatening hazards, such as highway and other transportation-related incidents, while others focus instead on preventing common types of lost worktime incidents, such as overexertion while lifting.[12]

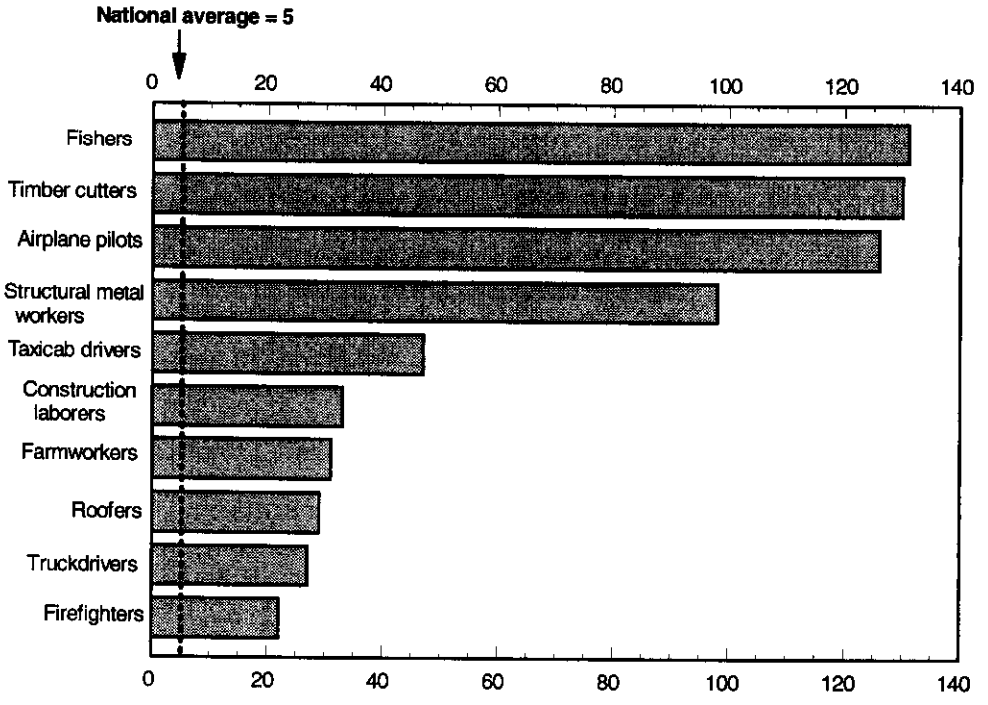
The Bureau's survey also includes a new measure of the severity of nonfatal injuries and illnesses involving lost worktime. This should be of value to policymakers who wish to identify and accord high priority to safety programs designed to prevent those types of disabling incidents resulting in the lengthiest absences from work. Median days away from work—the Bureau's new measure of injury and illness duration—designates the point at which half the cases involved more days and half involved fewer days.[13] The surveywide median for calendar 1993, for example, was 6 workdays lost for the 2-1/4 million cases involving at least 1 day away from work. Such medians also were calculated by industry, occupation, and the following worker and case characteristics covered by the redesigned survey: Gender, age, length of service with employer, race and Hispanic origin, disabling condition, part of the body affected by that condition, source directly producing the injury or illness, and the manner in which the incident occurred, that is, the event or exposure.[14]

Industries and occupations identified as having relatively high *median days away from work* might be considered hazardous, even when a relatively low injury rate would suggest otherwise. In the 1993 survey, for example, petroleum refining had a relatively low injury and illness rate, yet it reported a comparatively lengthy recuperation period (17-day median) for these incidents. Likewise, bank tellers face a relatively low risk of incurring a lost worktime injury or illness, but when tellers sustained such disabling conditions in 1993, they lost a median of 13 days.

The median number of lost workdays was chosen as a summary measure of injury or illness severity because it is less sensitive to cases of unusually long duration than the mean would be. Neither measure, however, can provide a complete picture of the distribution of case durations. This is why companion data on injury and illness severity were developed—percent distributions of all days-away-from-work cases across seven groupings of workdays lost, available by occupation and other characteristics.[15]

The new severity measures also offer safety researchers and practitioners a look at disabling conditions resulting in the longest absences from work as well as events and exposures associated with relatively lengthy days-away-from-

Chart 1. The rate of fatal injuries per 100,000 workers in "high-risk" occupations, 1994



NOTE: Rate = (fatal work injuries / employment) x 100,000 workers. The employment data that were used are annual averages from the 1994 Current Population Survey.

work cases. Seven specific disabling conditions, each cited for at least 5,000 cases in the 1993 survey, are listed here along with their median days away from work (in parenthesis): Carpal tunnel syndrome (30 days), dislocations (29 days), inguinal hernias (27 days), neurotic reaction to stress (25 days), amputations (22 days), fractures (20 days), and a combination of fractures and other nonburn injuries (20 days). Most disabling conditions can occur in more than one way; a fracture, for example, can be sustained in falling from a ladder or being struck by a vehicle, to name just two ways. That is why safety practitioners also need to know about the severity of disabling events and exposures. The following specific ways in which disabling incidents happen, each mentioned in at least 2,500 cases in the 1993 survey, had relatively high median days away from work (in parenthesis): Falls from a roof (30 days); falls from a scaffold (20 days); repetitive use of tools (19 days); repetitive placing, grasping, or moving objects (19 days); typing or keyentry (16 days); and certain highway incidents, such as collision between vehicles moving in an intersection (10 days) and vehicles which had jackknifed or overturned without colliding (10 days).

Data on the ages of workers offer researchers another opportunity to study relatively lengthy absences from work. The 1993 survey, for example, showed that injury and illness duration increases with age, doubling from a median of 4 or 5 workdays lost for workers 16 to 35 years to 10 days for those 55 years and older. This pattern holds for both men and women. It appears that at least two factors contribute to longer recuperation periods for older workers. First, they take longer to return to work than do younger workers experiencing the same kind of disabling condition. And second, they sustain conditions requiring relatively lengthy recuperation, such as fractures, more often than do younger workers. Fractures, for example, made up about 16 percent of all disabling conditions reported for workers 65 years and older, 10 percent of cases for 55- to 64-year-olds, and 6 percent for workers younger than 55 years. Additional research is needed to explain more fully why the injuries and illnesses of older workers tend to be so severe. [16]

Besides measures of risk and severity, another important piece of information to be gathered about work-related incidents is how they most commonly happen. On that score, the

BLS fatality census and expanded survey offer two general findings. First, the leading ways in which workers were fatally injured (highway incidents and homicides) differed from the main manners in which lost worktime injuries and illnesses occurred (overexertion and being struck by objects). Such differences were evident for most individual occupations as well. Second, the leading ways in which a worker was fatally injured or disabled often varied by occupation. In sustaining fatal work injuries, for example, truckdrivers typically were involved in highway crashes or related transportation incidents; structural metal workers usually fell from girders or other elevated worksites; and taxicab drivers commonly were the victims of robbery-related homicides. Such profiles help zero in on the major hazards—life-threatening or otherwise—of a given occupational grouping.

The redesigned safety and health statistical system also enables researchers to analyze, in great detail, some of the circumstances behind specific hazardous situations. As an example, "falls in construction" is one of the leading ways in which workers are fatally injured or seriously disabled in that hazardous industry.[17] (See table 2.) Falls from a roof lead all other types of fatal falls, with falls from scaffolds and staging ranking second. Together, roofing and scaffold falls made up slightly more than half of the 330 fatal falls in the construction industry, as reported by the 1994 BLS fatality census. In contrast, most disabling falls in the industry happened in other ways. According to the 1993 BLS survey, falls on the same level accounted for slightly more than a third of the 41,800 fall injuries that resulted in days away from work. Next in frequency were falls from ladders—a fifth of that year's total for disabling falls. Relatively lengthy periods of recuperation reflect the hazardous nature of construction falls. Construction workers faced a median of 14 days away from work to recover from the typical fall, double the 7-day median for all the industry's disabling events and exposures. Falls from a roof, scaffold, or building girder required especially lengthy periods of recuperation.

Table 2. Fatal and disabling falls in the construction industry, 1993–94

Type of fall	Percent distribution		Median workdays lost from disabling falls[2]
	Fatal falls[1] (n=330)	Disabling falls[2] (n=41,800)	
All falls	100	100	14
Fall to lower level	96	57	17
Down stairs or steps	1	4	12
From floor, dock, or ground level	3	3	11
From ladder	14	20	15
From roof	32	7	33
From scaffold, staging	21	8	21
From building girder or other structural steel member	8	1	28
From nonmoving vehicle	3	6	11
Fall on same level	3	37	10
Other or unspecified	1	6	—

[1] Based on data from the 1994 BLS Census of Fatal Occupational Injuries, which covered all construction workers—wage and salaried, self-employed, and family members—in the private and public sectors.

[2] Based on data from the 1993 BLS Survey of Occupational Injuries and Illnesses, which covered just wage and salaried workers in private construction industries. Disabling falls are those that result in lost worktime. Median days away from work is the point at which half those cases involved more days and half involved fewer days.

NOTE: Dash indicates that a median was not computed.

User feedback

To date, BLS has published 2 years of expanded survey data (1992–93) and 3 years of national fatality data (1992–94). Both the BLS census and the expanded survey have received many positive comments from private and public users of the data. In addition, survey participants have told us they are impressed by efforts to minimize duplicate reporting, such as permitting employers to attach completed forms they already have on hand that answer questions about the individual injury or illness, rather than completing the BLS questionnaire.

Employers are beginning to expand their use of the detailed survey data as a benchmark against which to assess their own establishment's injury and illness experience. For many years, individual employers have compared their establishment's injury and illness *rates* to the average rates for employers of similar size, producing like products or delivering comparable services. They did so by using a series of employer guides prepared by BLS for individual industries within major industry divisions, such as manufacturing.[18] Using the new data, to take one example, a risk engineer in the insurance industry informed the Bureau that he compares detailed manufacturing industry data from the expanded BLS survey with profiles of the way his clients' workers were seriously injured and the typical loss of worktime associated with their disabling incidents. Establishment-to-survey comparisons can be especially useful after employers have introduced new machinery, tools, or work processes that might affect their injury and illness rates or profiles.

Employees also can play a pivotal role in making workplaces safer by becoming aware of potential hazards on their worksites and avoiding unsafe work practices, such as attempting single-handedly to lift health care patients or working too close to a roof's edge. We understand that some employers are posting BLS safety and health reports on their office bulletin boards and that many of their employees read and heed our information on work hazards.[19]

For many years, Federal safety and health agencies have searched unsuccessfully for reliable national statistics on the "who and how" of injuries and illnesses in dangerous work settings. Now that the characteristics of workers and their in-

juries are available on a nationwide basis, the Federal Occupational Safety and Health Administration (OSHA) has asked the Bureau to prepare a large number of survey profiles of individual high hazard industries, such as logging. Those profiles are of value in alerting safety and health personnel to the major kinds of work hazards found in such workplaces, information that also can be shared with interested employers and employees. Looking for even more detailed information on work-related fatalities, the National Institute for Occupational Safety and Health, another Federal safety agency, recently requested and received a research data base of nonconfidential information from the BLS fatality census, including narratives describing the circumstances surrounding each fatal work injury. Such narratives are particularly helpful in describing a succession of events leading up to a fatal incident, for example, a forklift operator who accidentally dislodges a ladder from which a warehouse worker falls 8 feet to his death.

State safety agencies also are finding the redesigned BLS statistical systems of value in identifying life-threatening work hazards that merit special attention and resources. Various New Jersey government agencies, for instance, are taking special measures to prevent highway workers from being struck by vehicles, such as checking for appropriate posting of construction signs. The BLS fatality census was instrumental in pointing out the magnitude of this particular hazard; more than 150 workers on or near the Nation's roadways were struck and fatally injured by vehicles and mobile equipment in 1994. California's recent safety initiative, Model Injury and Illness Program for Workplace Security, also is well grounded in BLS data that document the frequency of violent workplace incidents it intends to prevent. The 1994 fatality census reports that robbery was the primary motive for work-related homicide; and the 1993 BLS survey found that health care patients were responsible for about half the nonfatal assaults resulting in lost worktime. The California initiative focuses on robberies that involve assaults; violence-related injuries to health care workers, law enforcement personnel, and social workers; and assaults of a personal nature, such as by a co-worker or worker's spouse. It includes a hazard assessment checklist for employers to evaluate their workplace security risks, as well as suggestions for minimizing security hazards and related training materials to do so.[20]

This type of feedback suggests that data from the Bureau's redesigned safety and health statistical system are being transformed into information of value in preventing deadly and disabling injuries in the workplace. In fact, several groups of safety experts, including the National Safety Council and the National Center for Health Statistics, have endorsed the BLS Census of Fatal Occupational Injuries as the official count of work-related fatalities, in preference to other, less comprehensive measures. While such accolades support that program's future, it's equally important that BLS survey participants also recognize the value of providing their data. In this regard, one BLS survey respondent felt strongly enough about preventing costly workplace incidents to write a poem in the comments section of his completed questionnaire that ends with a positive thought about tying survey participation to improving workplace safety and health:

"We thank you for the chance to share
'Cause just like you, we really care."

Footnotes

[1] For a detailed account of how the survey was expanded and descriptions and definitions of the new survey elements, see *Occupational Injuries and Illnesses: Counts, Rates, and Characteristics, 1992,* Bulletin 2455 (Bureau of Labor Statistics, 1995), Appendixes A through F.

[2] Prior to the 1970 Occupational Safety and Health Act, the Bureau of Labor Statistics had conducted annual surveys for which employers volunteered to provide data on injuries involving lost worktime. The 1970 Act substantially broadened the coverage of work-related incidents and set up a mandatory requirement for employers covered by the Act to keep detailed records of such incidents and to participate, when selected, in the Bureau's Survey of Occupational Injuries and Illnesses. Section 8(c)(2) of the 1970 Occupational Safety and Health Act (Public Law 91-596) requires employers to make periodic reports of deaths, injuries, and illnesses which have been recorded in appropriate recordkeeping logs.

[3] In 1976, BLS implemented a Federal-State cooperative program—the Supplementary Data System—to capture a number of data elements, such as worker and case characteristics, from about three dozen participating States. For a description of that System, see the *BLS Handbook of Methods,* Bulletin 2414 (Bureau of Labor Statistics, 1992), chapter 14.

[4] See E.S. Pollack and D.F. Keimig, eds., *Counting Injuries and Illnesses in the Workplace: Proposals for a Better System* (Washington, National Research Council, National Academy Press, 1987). The fundamental issue of whether the annual survey should be conducted at all is discussed on page 24 of the report; the Academy's recommendations for revising the annual survey appear on pages 103–06.

[5] See, for example, "Keystone National Policy Dialogue on Work-Related Illness and Injury Recordkeeping" final paper of Keystone Center (Keystone, CO, January 1989).

[6] An initial account of the 1993 survey results on worker and case characteristics appears in the news release, *Work Injuries and Illnesses by Selected Characteristics, 1993,* USDL 95–142 (U.S. Department of Labor), Apr. 26, 1995. Comprehensive results of the 1992 survey, the first under the redesigned system, are published in *Occupational Injuries and Illnesses,* Bulletin 2455.

[7] Initial results from the 1994 fatality census were released in *National Census of Fatal Occupational Injuries, 1994,* USDL 95-288 (U.S. Department of Labor), Aug. 3, 1995.

[8] See U.S. Department of Labor, *Report on the American Workplace* (Washington, Government Printing Office, 1994), p. 116. The third chapter of this report, prepared by John W. Ruser, a BLS researcher, contains a detailed discussion of safety and health in the workplace and the factors that affect them.

[9] *Ibid,* pp. 114–15.

[10] *Ibid*, pp. 120–22.

[11] For each occupation, fatality rates relate the total number of workplace deaths in 1994 to the average number of workers facing that risk. These measurements do not reflect the movement of persons into and out of the labor force, the length of their workweek or workyear, or the effect of multiple jobholders. For more on the measurement and limits of fatality rates, see Guy Toscano and Janice Windau, "The changing character of fatal work injuries," *Monthly Labor Review*, October 1994, pp. 17–28.

[12] Both the BLS fatality census and BLS survey contain detailed information on how injuries occurred by occupation, available upon request to the Office of Safety, Health and Working Conditions, Bureau of Labor Statistics, 2 Massachusetts Ave., NE., Room 3180, Washington, DC 20212.

[13] This measure replaces other measures of severity for lost workday injuries and illnesses previously reported in the annual survey. These included the total number of lost workdays and lost workday incidence rate per 100 full-time workers. Recent research suggests that these measures systematically underestimated the duration of cases lasting so far beyond the end of a survey year that employers needed to predict future lost worktime. See Arthur Oleinick, et al, "Current Methods of Estimating Severity for Occupational Injuries and Illnesses: Data from the 1986 Michigan Comprehensive Compensable Injury and Illness Database," *American Journal of Industrial Medicine* (23) (February 1992).

[14] See *Work Injuries and Illnesses by Selected Characteristics, 1993*, tables 7–10.

[15] The seven intervals of days lost are 1 day, 2 days, 3 to 5 days, 6 to 10 days, 11 to 20 days, 21 to 30 days, and 31 days or more. Information of this type by detailed industry or occupation is available from the 1993 survey data base, upon written request to the Office of Safety, Health and Working Conditions. (See footnote 12.)

[16] Older workers also had a relatively high rate of fatal work injury, peaking at 14 fatalities per 100,000 workers, 65 years and older in 1994. For a discussion of the relatively high risks of fatal and disabling incidents that older workers face, see Martin E. Personick and Janice A. Windau, "Characteristics of Older Workers' Injuries," in *Fatal Workplace Injuries in 1993: A Collection of Data and Analysis*, Report 891 (Bureau of Labor Statistics, 1995).

[17] A special analysis of disabling falls in construction is contained in *Work Injuries and Illnesses by Selected Characteristics, 1993*, pp. 5–7.

[18] See *Evaluating Your Firm's Injury and Illness Record, Manufacturing Industries*, Report 808 (Bureau of Labor Statistics, 1991). Other guides issued contemporaneously with the manufacturing report cover transportation and public utilities (Report 811), construction (Report 812), trade (Report 813), and services (Report 814).

[19] To encourage this kind of communication between employer and employee, BLS will continue to prepare concise and topical pieces, such as the summaries, dubbed *Issues in Labor Statistics*. Two of the more popular safety topics in this series relate to violence in the workplace and to deadly jobs. See "Violence in the Workplace Comes Under Closer Scrutiny," BLS Summary 94–10 (Bureau of Labor Statistics, August 1994) and "Outdoor Occupations Exhibit High Rates of Fatal Injuries," BLS Summary 95–6 (Bureau of Labor Statistics, March 1995).

[20] In recent years, the Bureau has sponsored research conducted by several States that used data from the BLS fatality census to explore specific life-threatening work hazards, such as commercial fishing and construction incidents. See, for example, Letitia K. Davis, et al, "Data Sources for Fatality Surveillance in Commercial Fishing: Massachusetts, 1987–91," in *Fatal Workplace Injuries in 1992: A Collection of Data and Analysis*, Report 870 (Bureau of Labor Statistics, 1994).

APPENDIX: The BLS safety and health statistical system

Two decades after its inception in 1972, the BLS safety and health survey has undergone two major changes. Beginning with 1992, the survey measures *nonfatal* work-related injuries and illnesses only. Work-related fatalities now are counted and profiled in a separate program established in 1992—the national Census of Fatal Occupational Injuries. And in that year, the annual survey was expanded to include information on the characteristics and duration of serious, nonfatal injuries and illnesses resulting in lost workdays. Thus, the current BLS safety and health statistical system comprises the fatality census and the expanded survey. This appendix summarizes the methods, worker coverage, data elements, and work injury definitions of the survey and census.

Survey of occupational injuries and illnesses

The survey collects summary information on injuries, illnesses, and total hours worked from a random sample of 250,000 establishments representing most of private industry. The injury and illness data are obtained from logs and supplementary records that establishments maintain throughout the reference year. The survey excludes the self-employed, mines, railroads, farms with fewer than 11 employees, private households, and Federal, State, and local government agencies. Data for mines and railroads are provided to the BLS by other Federal Government agencies and are reported with the annual survey results. Injuries and illnesses logged by employers conform with definitions and recordkeeping guidelines set by the Occupational Safety and Health Administration, U.S. Department of Labor. Supplemental information pertaining to these definitions is in the booklet, *Recordkeeping Guidelines for Occupational Injuries and Illnesses* (Bureau of Labor Statistics, 1986).

Occupational injuries, such as sprains, cuts, and fractures, account for the vast majority of all cases that employers log and report to BLS. Occupational illnesses are new cases recognized, diagnosed, and reported during the year. Overwhelmingly, those reported (such as, contact dermatitis or carpal tunnel syndrome) are easier to directly relate to workplace activity than are long-term latent illnesses, such as cancers. The latter illnesses are believed to be underrecorded and, thus, understated in the BLS survey.

Besides injury and illness counts, survey respondents also provided additional information on the characteristics and severity of the most serious cases logged, namely, each case that involved at least 1 day away from work, beyond the day of injury or onset of illness. Much of this information came from supplementary recordkeeping forms and State workers' compensation claims. Some employers simply attached those forms when their narratives answered the survey questions, an option the Bureau offers to help reduce respondent burden resulting from the survey's expansion. The survey design also limits respondent burden in two other ways: small employers generally are not selected to participate in consecutive surveys and employers projected to have more than 20 cases involving days away from work received instructions on how to sample those cases.

Worker characteristics. The survey collects information on four personal traits of workers sustaining injuries or illnesses with days away from work: *gender, age, race or ethnic origin,* and *length of service with employer at the time of the incident.* The latter two elements are optional because they are not required in Federal

recordkeeping and may not be available on State workers' compensation forms. Cases for which these data elements are not reported are tabulated separately.

The following tabulation distributes the total 2-1/4 million days-away-from-work cases that BLS estimates occurred during 1993 by personal traits:

Trait	*Percent of case total*
Sex:	
Men	66
Women	33
Age:	
Under 25 years	19
25 to 54 years	72
55 years and over	8
Race or ethnic origin:	
White, non-Hispanic	55
Black, non-Hispanic	9
Hispanic	9
Other races	2
Not reported	25
Length of service with employer:	
Less than 1 year	31
1 to 5 years	34
More than 5 years	27
Not reported	9

Occupation. As another required survey element, occupation was coded from job titles supplied by the employer, supplemented at times by employers' descriptions of how the incident occurred. The 1990 Occupational Classification System, developed by the Bureau of the Census, was used to slot injured workers into one of several hundred individual occupations, such as registered nurse, licensed practical nurse, or nursing aide/orderly. Each occupation is tied to 1 of 6 major occupational groups, for example, registered nurse belongs to the major group "managerial and professional specialty"; licensed practical nurse, to the group "technical, sales, and administrative support"; and nursing aides, to the group "service occupations." The other three major groups were "farming, forestry, and fishing"; "precision production, craft, and repair," which includes construction trades; and "operators, fabricators, and laborers," such as textile sewing-machine operator, truckdriver, and stock handler/bagger.

The following tabulation shows how the 1993 case total is distributed among the six major occupational groupings and also lists case shares separately for the five individual occupations with at least 50,000 cases apiece in 1993:

Occupation	*Percent of case total*
Managerial, professional specialty	5
Technical, sales, administrative support	15
Service occupations	18
Nursing aides, orderlies	5
Janitors, cleaners	3
Farming, forestry, fishing	3
Precision production, craft, repair	16
Operators, fabricators, laborers	41
Truckdrivers	7
Nonconstruction laborers	6
Construction laborers	2

Case characteristics. The Bureau developed a new Occupational Injury and Illnesses Classification System to permit standardized coding of the injury and illness involving days away from work and the way it occurred. The major code structures of that system look at each case from four aspects: (1) the *nature* of the injury or illness condition as described by the employer, such as sprain or carpal tunnel syndrome; (2) the *part of the body affected* by the specified condition, such as back or wrist; (3) the *source* of injury or illness that directly produced the disabling condition, such as a crate, the floor, or bodily motion itself; and (4) the *event* or *exposure* that describes the manner in which the injury or illness was inflicted or produced, such as overexertion while lifting, being struck by an object, or repetitive motion.

To illustrate how this classification system is applied, a truckdriver who sprains his back lifting a crate and a nursing aide who sprains her back lifting a patient would share the same case codes for nature (sprain, strain), part of the body affected (back), and event (overexertion while lifting). But their source codes would differ—"crate" for the truckdriver and "health care patient" for the nursing aide.

The following tabulation profiles the major categories of the four case characteristics, as cited for the 2–1/4 million cases in 1993 with days away from work:

Characteristic	*Percent of case total*
Nature of injury, illness:	
Sprain, strain	43
Bruise, contusion	9
Cut, laceration	8
Fracture	6
All other	34
Part of body affected:	
Back	27
Finger	9
Head	7
Knee	6
All other	51
Source of injury, illness:	
Floors, walkways, ground surfaces	15
Worker motion or position	15
Containers	15
Parts and materials	11
All other	44
Event or exposure:	
Overexertion	28
Struck by object	13
Fall to same level	11
Struck against object	7
All other	41

Case duration. The Bureau estimates injury and illness severity by using information provided by employers on the number of days away from work for each disabling condition, not counting the day of injury or onset of illness. The vast majority of cases begin and end in the same survey year, thereby permitting the actual duration of a case to be computed. If, however, the employee did not return to work by the end of January, when data collection begins for the preceding year, then the survey respondent provides an anticipated date of return from which an "approximation" of workdays lost is computed for each case of that type.

Each case's duration, worker demographics, and other charac-

teristics were used to tabulate the *median days away from work* for groups of workers or case categories as well as the *distribution of cases involving various lengths of absences from work.* For 1993, for example, the median was 6 lost workdays surveywide. Of the 2-1/4 million cases that year, three-tenths lasted a day or two, excluding the day of the incident; a third were of 3 to 10 days duration; about a sixth lasted 11 to 30 days; and a fifth, 31 days or more. Medians and an open-ended distribution, the severity measures of the redesigned survey, are affected less by long-duration cases than the average number of lost workdays per case and lost workday incidence rates, measures of severity previously reported in the annual survey.

The following tabulation illustrates that the severity of a disabling injury and illness can vary greatly by the nature of the disabling condition:

Disabling condition	*Median days away from work*
Carpal tunnel syndrome	30
Amputations	22
Fractures	20
Sprains, strains	6
Cuts, lacerations	3
Chemical burns	2

The following distribution of cases involving days away from work, moreover, depicts wide variations around those medians. It also shows that a small, but not insignificant, percent of cases involving disabling conditions that are typically not of long duration (such as cuts and lacerations) can require lengthy absences of more than 20 workdays.

Disabling condition	*Percent of cases involving:*		
	Under 6 days	*6 to 20 days*	*21 days or more*
Carpal tunnel syndrome	12	22	66
Amputations	22	26	52
Fractures	26	25	49
Sprains, strains	49	27	24
Cuts, lacerations	63	24	13
Chemical burns	76	15	8

Census of fatal occupational injuries

As the name implies, the BLS fatality census aims to count all fatal occupational injuries that occur at work during a reference year. To accomplish this, the BLS census uses multiple data sources, such as death certificates, workers' compensation records, and reports to Federal and State agencies, to identify and verify all work-related fatal injuries. Collection, followup, and coding of the fatality data are the responsibility of the 50 States and the District of Columbia, equal partners in this Federal/State venture. To ensure that a fatality that reportedly had occurred at work was work related, information is verified from two or more independent source documents, or from a source document and a follow-up questionnaire.

For a fatality to be included in the census, the decedent must have been employed (that is working for pay, compensation, or profit) at the time of the event, engaged in a legal work activity, or present at the site of the incident as a requirement of his or her job. Fatalities that occur during a person's commute to and from work, however, are excluded from the census counts. Thus, worker coverage in the BLS fatality census is much broader than in the BLS survey, including not only all private wage and salary workers, but also the self-employed, family members, and State, local, and Federal Government workers (both civilian and military).

Fatality counts include deaths occurring from traumatic occupational injuries. These include open wounds, intracranial and internal injuries, heatstroke, hypothermia, asphyxiations, acute poisonings resulting from a short-term exposure, suicides and homicides, and work injuries listed as underlying or contributory causes of death. Excluded from the census counts are work-related illnesses, many of which cannot be linked to work because their latency periods commonly span several years. Partial information on fatal occupational illnesses, compiled separately, is available upon request to the Bureau of Labor Statistics, Office of Safety, Health and Working Conditions, 2 Massachusetts Ave, NE., Room 3180, Washington, DC 20212.

About 30 data elements are collected, coded, and tabulated in the BLS fatality census, including information about the worker, the fatal incident, and the machinery or equipment involved. Summary national information for the major traits of workers fatally injured (employee status, gender, age, and race/ethnic origin) and for key fatality characteristics (occupation, industry, and fatal event), along with fatality counts, are included in a national news release issued about 8 months after the end of the census reference period.

Following are some major findings on the traits of the 6,588 workers fatally injured in 1994, as reported in the August 1995 news release (cited in footnote 7 of this article):

Trait	*Percent of fatality total*
Employee status:	
Wage/salary worker	81
Self-employed or family workers	19
Sex:	
Men	92
Women	8
Age:	
Under 25 years	11
25 to 54 years	68
55 years and over	21
Race:	
White	82
Black	11
Other or unspecified	7
Hispanic (any race)	9

The following tabulation shows how the 1994 fatality count is distributed among major groups of occupations and industries. These data include the public sector categories ("military" and "government") appropriate for each. Keep in mind that industries employ workers from more than one occupational grouping, for example, the construction industry employs construction trades and construction laborers, to name just two occupational groups. Likewise, most individual occupations are found in more than one industry, for instance, truckdrivers are employed in every major industry division. For a relatively small fraction (1 percent to 2 percent) of the fatality count, there was insufficient information to determine an occupational or industry classification, or both.

Characteristic	*Percent of fatality*
Occupation:	
Managerial, professional specialty	12
Technical, sales, administrative support	14
Sales occupations	9
Service occupations	9
Protective service	5
Farming, forestry, fishing	14
Precision production, craft, repair	17
Construction trades	9
Operators, fabricators, laborers	31
Truckdrivers	12
Construction laborers	4
Military	2
Industry:	
Agriculture, forestry, fishing	13
Mining	3
Construction	16
Manufacturing	12
Transportation, public utilities	14
Wholesale, retail trade	16
Finance, insurance, real estate	2
Services	13
Government (regardless of industry)	10

Fatal event or exposure, listed in the aforementioned BLS classification system, probably is the case characteristic most useful to the safety and health community. Following is a percent distribution of the 1994 fatality total from the BLS census by the major categories of that characteristic:

Event or exposure	*Percent of fatality total*
Transportation incidents	42
Highway incidents	20
Assaults and violent acts	20
Homicides	16
Contact with objects, equipment	15
Struck by object	9
Falls	10
Falls to lower level	9
Exposure to harmful substances or environments	10
Contact with electric current	5
Fire, explosions	3

Other commonly requested data elements from the BLS fatality census include worker activity at the time of the incident, primary and secondary source of injury, location of incident (for example, farm, street, mine), and when the fatal incident occurred (month, day of week, and hour). Once the BLS news release is issued, data for these and other elements covered by the fatality census are available upon request to the Office of Safety, Health and Working Conditions.