Worker Health Chartbook, 2004

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Foreword

The National Institute for Occupational Safety and Health (NIOSH) is the Federal agency responsible for occupational safety and health research. As such, NIOSH is committed to the periodic dissemination of data describing the magnitude of the Nation's occupational injuries, illnesses, and fatalities. NIOSH has prepared the *Worker Health Chartbook, 2004* as a resource for agencies, organizations, employers, researchers, workers, and others who need to know about occupational injuries and illnesses. This concise, chart-based document consolidates information from the network of tracking systems that forms the cornerstone of injury and illness surveillance in the United States. The *Chartbook* is intended to fulfill the NIOSH strategic goals for preventing occupational injury and illness and to guide research and prevention efforts.

This 2004 edition of the *Worker Health Chartbook* builds on the foundation established in the first edition of this document, which was published in 2000. We have made the *Chartbook* accessible to technical and nontechnical audiences through traditional printed publications as well as a variety of electronic media.

The *Chartbook* was developed with support and contributions from Federal and State agencies. Such continuing cooperation and partnerships strengthen the NIOSH framework for coordinating our surveillance programs with others in the Centers for Disease Control and Prevention (CDC), the Bureau of Labor Statistics (BLS), and the States. We look forward to continuing our work with public-sector partners who have similar interests in preventing work-related injuries and illnesses.

J Howard

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Preface

During the past 32 years, major advances have been made in recognizing, evaluating, and preventing occupational injuries, illnesses, and deaths. All have declined significantly. Despite these changes, unnecessary morbidity and mortality from occupational health hazards remain a significant burden to our workers, their families, and employers. The costs to our national health care system and the economy are substantial.

More than 146.5 million people make up the civilian labor force, and more than 137.7 million of them were employed in 2003 according to the U.S. Department of Labor. About 7.3 million of these workers held more than one job. The U.S. labor force is becoming older and more diverse, and the supply of labor and jobs is shifting from goods-producing industries to services. Use of temporary, contract, and contingent laborers has increased along with alternative work arrangements such as job sharing and part-time work. These changes in the labor force and the nature of work present new challenges to assuring the safety and health of Americans in the workplace.

This 2004 edition of the *Worker Health Chartbook* builds on the foundation established in the first edition, published in 2000. The *Chartbook* is intended as a resource for technical and nontechnical audiences, including agencies, organizations, employers, researchers, workers, and others with a need to know about occupational injury, illness, and death.

The *Chartbook* includes more than 400 figures and tables focusing on worker health and the injury and illness statistics that measure the health of workers. Contributors include Federal and State agencies as well as nonprofit organizations; they have provided data from national and State surveys and program data sources. Contributing data sources and organizations include the following:

U.S. Department of Agriculture, National Agricultural Statistics Service

U.S. Department of Labor: Office of the Assistant Secretary for Policy (OASP), Bureau of Labor Statistics (BLS), and the Mine Safety and Health Administration (MSHA)

State health and labor departments under the NIOSH Sentinel Event Notification System for Occupational Risk (SENSOR) Program

Surveillance and prevention centers from the Centers for Disease Control and Prevention (CDC), including the National Center for Health Statistics (NCHS), the National Center for Infectious Diseases (NCID), and the National Center for HIV, STD, and TB Prevention (NCHSTB)

U.S. Bureau of the Census

Consumer Product Safety Commission (CPSC)

The Center to Protect Workers' Rights (CPWR)

The *Chartbook* is organized around five chapters, three appendices, a glossary, and an index. Chapter 1 includes an introduction and provides information about the demographic characteristics of U.S. workers, worker health status, and characteristics of injured and ill workers. Data from BLS are used in this chapter and extensively throughout the *Chartbook* for tables and figures. Chapter 2 focuses on more than 30 health outcomes (fatal and nonfatal injuries as well as selected illnesses and conditions) and provides data describing the magnitude, distribution, and major demographic characteristics of cases. Chapter 3 focuses on agriculture and presents data on this sector's fatal and nonfatal injuries among adults and children as well as selected data on farm workers. Chapter 4 focuses on high-risk industries and occupations; it reflects NIOSH research priorities in the areas of mining and construction. Chapter 5 addresses special populations by exploring occupational injury and illness data on young workers, older workers, and Hispanic workers. All figures and tables were prepared from public statistical or surveillance program data sources and refer the reader to the appropriate data and sources of analysis.

Appendix A provides information about the 21 survey and surveillance programs used by the contributors. In addition to brief descriptions of these programs, this appendix provides program contacts and reference citations to enable user follow-up. Appendix B provides information about data and analysis methods. This appendix discusses data limitations and reinforces the cautionary guides that accompany the dissemination of selected source data. These limits are often overlooked by casual users, especially in the context of reviewing extensive summary tables or reports. Appendix C is a bibliography containing a variety of reference materials from the public domain, including data tables, report forms and documentation, government news releases, and research articles. The glossary briefly discusses basic definitions for many terms used throughout the *Chartbook*.

The reference character of the *Chartbook* is enhanced by a comprehensive index, which includes key words and phrases that permit users to locate data readily in the many figures and tables.

The *Chartbook* is available in HTML and PDF formats on the Web at www.cdc.gov/niosh/docs/chartbook/. *Chartbook* figures and tables are available as EPS (Encapsulated Postscript) graphic files and Excel spreadsheet files. Full-text bibliographic references are provided. A searchable index facilitates cross-referencing of data.

The *Chartbook* also is available on CD–ROM [DHHS (NIOSH) Publication No. 2004–146C] in a stand-alone HTML version and a PDF version. The CD–ROM also includes the EPS and Excel files and the bibliographic references. To obtain individual copies of the CD–ROM, contact NIOSH at

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Abstract

The *Worker Health Chartbook, 2004* is a descriptive epidemiologic reference on occupational morbidity and mortality in the United States. The *Chartbook* includes more than 400 figures and tables describing the magnitude, distribution, and trends of the Nation's occupational injuries, illnesses, and fatalities. This 2004 edition of the *Worker Health Chartbook* builds on the foundation established in the first edition, published in 2000. The *Chartbook* is intended as a resource for technical and nontechnical audiences, including agencies, organizations, employers, researchers, workers, and others who need to know about occupational injury and illness. This concise, chart-based document consolidates information from the network of monitoring systems that forms the cornerstone of injury and illness surveillance in the United States. The document is intended to fulfill the NIOSH strategic goals for preventing occupational injury and illness and to guide research and prevention efforts.

The *Worker Health Chartbook, 2004* contains five chapters and three appendices. Chapter 1 describes the U.S. labor force and the health status of workers. Chapter 2 focuses on the demographic characteristics of workers (age, sex, occupation, industry, and case severity) and 33 types of occupational injuries and illnesses that affect them: amputations; anxiety, stress, and neurotic disorders; asbestosis; asthma; back, including spine and spinal cord; bloodborne infections and percutaneous exposures; bruises and contusions; byssinosis; carpal tunnel syndrome (CTS); coal workers' pneumoconiosis (CWP); cuts and lacerations; dermatitis; disorders due to physical agents; disorders associated with repeated trauma; dust diseases of the lungs; fatal injuries; fractures; hearing loss; heat burns and scalds; hypersensitivity pneumonitis; lead toxicity; mesothelioma; musculoskeletal disorders; nonfatal injury; pneumoconioses; poisoning; respiratory diseases; respiratory conditions due to toxic agents; silicosis; skin diseases and disorders; sprains, strains, and tears; tendonitis; and tuberculosis. Chapter 2 also examines the magnitude, trends, and geographic distribution of these conditions. Chapter 3 focuses exclusively on agriculture, presenting data on fatal and nonfatal injuries among adults and children in agriculture and examining selected health conditions of farm workers. Chapter 4 concentrates on high-risk industries and occupations and reflects NIOSH research priorities in mining and construction. Chapter 5 addresses special populations, exploring available occupational injury and illness data on young workers, older workers, and Hispanic workers.

The three appendices complement the chapters with details about source data and programs. Appendix A describes the 21 survey and surveillance programs used by the contributors; it includes program contacts and reference citations for follow-up by users. Appendix B examines various aspects of data collection, analysis methods, and dissemination practices that limit the uses and inferences of data. Appendix C provides a bibliography of reference materials from the public domain, including data tables, report forms and documentation, government news releases, and research articles.

Contents

Abbreviations

ABLES..........Adult Blood Lead Epidemiology and Surveillance Program
AIDS.............acquired immune deficiency syndrome
BLL ....blood lead level
BLS...............Bureau of Labor Statistics
CAIS ....Childhood Agricultural Injury Survey
CATI.............computer-assisted telephone interview
CDC ....Centers for Disease Control and Prevention
CFOI ....Census of Fatal Occupational Injuries
CFR ....*Code of Federal Regulations*
CPS...............Current Population Survey
CPWR...........The Center to Protect Workers' Rights
CSTE ....Council of State and Territorial Epidemiologists
CTS ....carpal tunnel syndrome
CWP ....coal workers' pneumoconiosis
CWXSP ....Coal Workers' X-Ray Surveillance Program
dL.................deciliter(s)
DHHS ...........U.S. Department of Health and Human Services
DOL .............U.S. Department of Labor
EPA...............U.S. Environmental Protection Agency
EPO..............Epidemiology Program Office
FTE ....full-time equivalent worker
HARS ....HIV/AIDS Reporting System
HIV ....human immunodeficiency virus
ICD–8...........International Classification of Diseases, Eighth Revision (World Health Organization)
ICD–9...........International Classification of Diseases, Ninth Revision (World Health Organization)
ICD–10..........International Classification of Diseases, Tenth Revision (World Health Organization)
ILO...............International Labour Office
M–CAIS........Minority Farm Operation, Childhood Agricultural Injury Survey
MMWR..........*Morbidity and Mortality Weekly Report*
MSHA ....Mine Safety and Health Administration
MSD ....musculoskeletal disorder
NaSH............National Surveillance System for Health Care Workers
NASS ....National Agricultural Statistics Service
NAWS ....National Agricultural Workers Survey
NCHS............National Center for Health Statistics
NCHSTP ....National Center for HIV, STD, and TB Prevention
NCID............National Center for Infectious Diseases
n.e.c. ....not elsewhere classified
NEISS...........National Electronic Injury Surveillance System
NIOSH ....National Institute for Occupational Safety and Health
NNDSS..........National Notifiable Diseases Surveillance System
NNIS ....National Nosocomial Infections Surveillance System
NORMS ....National Occupational Respiratory Mortality System
NORA ....National Occupational Research Agenda
n.o.s...............not otherwise specified
NTOF............National Traumatic Occupational Fatalities Surveillance System
NSSPM ....National Surveillance System for Pneumoconiosis Mortality

OASP............Office of the Assistant Secretary for Policy
OMB ....Office of Management and Budget
OSHA...........Occupational Safety and Health Administration
PMR ....proportionate mortality ratio
SENSOR ....Sentinel Event Notification System for Occupational Risk
SIC................standard industrial classification
SOII..............Survey of Occupational Injuries and Illnesses
STD ....sexually transmitted disease
TB ....tuberculosis
TISF..............Traumatic Injury Surveillance of Farmers
TST ....tuberculin skin test
USDA ...........U.S. Department of Agriculture
WHO............World Health Organization
Work-RISQS..Work-Related Injury Statistics Query System
WoRLD ....work-related lung disease
WRA ....work-related asthma
µg ....microgram(s)

Glossary

Centers for Disease Control and Prevention (CDC): The Centers for Disease Control and Prevention (CDC) is headquartered in Atlanta, Georgia, and is an agency of the U.S. Department of Health and Human Services. CDC is recognized as the lead Federal agency for protecting the safety and health of people at home and abroad. CDC provides credible information to enhance health decisions and promote health through strong partnerships with other public and nongovernment organizations. CDC serves as the national focus for developing and applying disease prevention and control, occupational and environmental health, and health promotion and education activities designed to improve the health of the people of the United States.

Civilian labor force: The civilian labor force comprises all civilians classified as employed and unemployed.

Employed persons: Employed persons are all persons who fit into one of the following categories during the reference week of the U.S. Census Bureau's Current Population Survey: (1) persons who did any work at all as paid employees, worked in their own business or profession or on their own farm, or worked 15 or more hours as unpaid workers in a family-operated enterprise; and (2) all persons who did not work but had jobs or businesses from which they were temporarily absent because of illness, bad weather, vacation, child-care problems, labor disputes, maternity or paternity leave, or other family or personal obligations—whether or not they were paid by their employers for the time off and whether or not they were seeking other jobs.

Fatal occupational injury rate: Fatal occupational injury rates are determined by combining the number of fatal occupational injuries identified by the Census of Fatal Occupational Injuries (CFOI) with the average annual number of employed workers from the Current Population Survey (CPS). These rates depict the risk that certain workers (such as those in a given occupation or industry) have of incurring a fatal injury. The formula for calculating a fatal occupational injury rate is

$$\text{Fatal injury} = (N/W) \times 100{,}000$$

where N = the number of fatally injured workers aged 16 and older and W = the number of employed workers aged 16 and older.

For example, in computing the fatal occupational injury rate for 1994,

$$N = 6{,}588 - 25 \text{ workers under age 16}$$
$$= 6{,}563 \text{ (from 1994 CFOI)}$$

and

$$W = 124{,}469{,}000$$

(from Current Population Survey 1994 annual average plus resident military figures derived from Census Bureau data). Thus

$$\text{Fatality rate} = (6{,}563/124{,}469{,}000) \times 100{,}000$$
$$= 5 \text{ deaths per 100,000 workers}$$

Because neither hours nor employment figures are collected in the Bureau of Labor Statistics (BLS) census (CFOI), fatality rates are calculated using annual average employment estimates from the Current Population Survey, conducted for BLS by the Census Bureau. Employment-based fatality rates measure the incidence of a fatal injury for all workers in the group regardless of exposure time. Such measures do not reflect the movement of persons into and out of the labor force, the length of their workweek or work year, or the effect of multiple jobholders.

Hispanic workers: Hispanic workers are those who trace their origins to a Spanish-speaking country or culture. Origins may include the heritage, nationality group, ancestry, or country of birth of the person or person's parents or ancestors. People who identify their origin as Hispanic may be of any race.

Incidence rate for nonfatal injury or illness: Incidence rates for nonfatal injury or illness are calculated using the total obtained through the weighting and benchmarking procedures. The adjusted estimates for a particular characteristic (for example, for 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 (the base of hours worked by 100 full-time workers for 1 year). The product is then divided by the weighted and benchmarked estimate of hours worked as reported in the survey for a particular industry segment.

The formula for calculating the incidence rate at the lowest level of industry detail is

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

Incidence rates for higher levels of industry detail are produced using aggregated, weighted and benchmarked totals. Rates may be computed by industry, employment size, geographic area, extent or outcome of case, and case characteristic category. Rates for illnesses and rates for case characteristic categories are published per 10,000 full-time employees using 20 million hours instead of 200,000 hours in the above formula. Rates per 10,000 workers can be converted to rates per 100 workers by moving the decimal point two places to the left and rounding the resulting rate to the nearest tenth.

Industry: An industry consists of a group of establishments primarily engaged in producing or handling the same product or group of products or in rendering the same service or services. For more than 60 years, the Standard Industrial Classification (SIC) system has served as the structure for the collecting, aggregating, presenting, and analyzing data on the U.S. economy. Industry definitions used in BLS programs come from the *1987 Standard Industrial Classification (SIC) Manual* of the Office of Management and Budget. Because the SIC is used by many other Federal government statistical programs, it is possible for users to assemble a comprehensive statistical picture of an industry.

Lost-workday cases: Lost-workday cases are cases of nonfatal injury or illness that involve days away from work, or days of restricted work activity, or both.

Lost-workday cases involving days away from work: Lost-workday cases are cases that result in days away from work or a combination of days away from work and days of restricted work activity.

Lost-workday cases involving restricted work activity: Lost-workday cases involving restricted work activity are those cases that result in restricted work activity only.

Median: A median is a measure of central tendency: it constitutes the middle value in a distribution. The simplest division of a set of measurements is into two parts—the lower and the upper half. The point on the scale that divides the group in this way is the median. *Median days away from work* is the measure used in many *Chartbook* figures to summarize the varying lengths of absences from work among the cases with days away from work.

Noise-induced hearing loss: Noise-induced hearing loss refers to a sensorineural hearing loss caused by repeated exposure to high-intensity sound levels. Noise-induced hearing loss is characterized by irreversible damage to the sensory hair cells located in the inner ear. The condition is usually preventable by limiting noise exposures or by using personal hearing protection devices.

Occupation: Occupation is a set of activities or tasks that workers are paid to perform. Workers that perform essentially the same tasks are in the same occupation whether or not they are in the same industry. Some occupations are concentrated in a few industries, and others may be found in the majority of industries.

Current, recent, or usual job activity information is collected by many agencies to help characterize an occupation. Questions are used to obtain information about the kind of work and the most important activities or duties. This information, in conjunction with industry or employer and class of worker (e.g., private or public sector, nonprofit, self-employed), is used to classify jobs by occupational class. BLS data on the *occupation* of the injured or ill worker was coded from job titles supplied by the employer, supplemented at times by employer descriptions of how the incident occurred.

The 1990 Occupational Classification System developed by the Census Bureau was used to classify thousands of job titles supplied by employers into several hundred individual occupations such as registered nurse, licensed practical nurse, or nursing aide or orderly. Each occupation is tied to one of six major occupational groups: (1) managerial and professional specialty, (2) technical, sales, and administrative support, (3) service occupations, (4) farming, forestry, and fishing, (5) precision production, craft, and repair; and (3) operators, fabricators, and laborers.

Occupational injury: An occupational injury is any injury such as a cut, fracture, sprain, amputation, etc. that results from a work-related event or from a single instantaneous exposure in the work environment.

Occupational illness: An occupational illness is any abnormal condition or disorder (other than one resulting from an occupational injury) caused by exposure to factors associated with employment. Occupational illness includes acute and chronic illnesses and diseases that may be caused by inhalation, absorption, ingestion, or direct contact.

Proportionate mortality ratio (PMR): The proportionate mortality ratio (PMR) is defined as the observed number of deaths with the condition of interest (mentioned as either underlying or contributing) in an industry/occupation from selected States and years, divided by the expected number of deaths with that condition. The expected number of deaths is the total number of deaths in the industry or occupation classification of interest multiplied by a proportion. This proportion is defined as the number of cause-specific deaths for the condition of interest in all industries/occupations divided by the total number of deaths in all industries/occupations. The PMRs in this report have been internally adjusted by 5-year age groups (i.e., 15–19, 20–24, . . . , 110–114, and 115 years and over), sex, and race (i.e., white, black, and all other). Confidence intervals were calculated assuming Poisson distribution of the data. A PMR greater than 1.0 indicates that more deaths were associated with the condition in an occupation or industry than expected. This report includes only those industries/occupations with 5 or more decedents with the condition and a lower 95% confidence limit exceeding 1.0.

Race: Race refers to a human population distinguished as a group by certain physical characteristics. However, the concept of race involves self-identification. Racial categories are sociopolitical constructs and should not be interpreted as being scientific or anthropological. Racial categories include both racial and national-origin groups. The racial classifications used by most Federal agencies since 1997 follow the standards set forth in the October 30, 1997, *Federal Register Notice* entitled *Revisions to the Standard Classification of Federal Data on Race and Ethnicity*. The Office of Management and Budget (OMB) requires five minimum categories for race: white; black or African American; American Indian or Alaska Native; Asian; and Native Hawaiian or other Pacific Islander. OMB also states that respondents should be offered the option to select one or more races.

Reader: *Reader* is a designation granted by NIOSH to physicians who demonstrate proficiency in classifying chest X-rays for the pneumoconioses using the International Labour Office (ILO) Classification system. NIOSH has established a two-tier system for designating readers: A Readers have completed a training course or have otherwise demonstrated competence in the use of the ILO Classification; B Readers have successfully completed a certification examination and must be recertified every 4 years. A final determination about the classification of each X-ray requires agreement between at least two Readers, one of whom must be a B Reader.

Rates: See incidence rates or fatal occupational injury rates.

Sentinel Event Notification System for Occupational Risk (SENSOR): The Sensor program is a NIOSH cooperative agreement program with State health departments or other State agencies that develops generalizable, condition-specific strategies for State-based surveillance of occupational diseases and injuries. Efforts have focused on standardization of variables collected by the State programs, creation of software to facilitate adoption of the surveillance systems by additional States, comparison of SENSOR findings to other surveillance data sources, collaboration with the Council of State and Territorial Epidemiologists (CSTE) on building infrastructure for State-based surveillance, further development of State-based hazard surveillance, and publication and dissemination of SENSOR reports.

Severity: Severity of an injury or illness is estimated by using information provided by employers about the number of days away from work to recuperate from each disabling condition. If, as a result of injury or illness, the worker did not return to work by the end of the survey year, the employer reports an approximate return date that, in conjunction with the date of injury or illness, yields an estimated number of days away from work for that case. Two basic measures of severity are used with the characteristics of days-away-from-work cases: (1) median days away from work (the point at which half of the days-away-from-work cases have a longer duration and half have a shorter duration; and (2) the distribution of days-away-from-work cases involving various lengths of absences from work, ranging from 1 or 2 days to 31 days or longer.

Surveillance: Surveillance is the systematic, ongoing collection or acquisition of information about occupational diseases, injuries, and hazards. Surveillance includes the analysis and interpretation of surveillance data, the dissemination of data or information derived from surveillance to appropriate audiences for prevention and control, and the development of surveillance methodology.

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Chapter 1 • Characteristics of U.S. Workers

Introduction

Background

The health status of U.S. workers continues to improve with time. As illustrated in this 2004 edition of the National Institute for Occupational Safety and Health (NIOSH) *Worker Health Chartbook*, the rates of fatal occupational injuries and nonfatal occupational injuries and illnesses have declined significantly, and Americans are living longer, healthier lives [Arias 2004; Molla et al. 2003].

Despite these positive statistics, occupational safety and health surveillance faces significant challenges. The data presented here attest to the depth of current surveillance programs, but a comprehensive and integrated surveillance program remains a long-term goal [NIOSH 2001]. Current surveys and surveillance programs do not adequately track occupational illnesses because of problems in recognition, recording, and reporting. These limitations hinder a complete and accurate assessment of the Nation's occupational injury and illness burden.

The U.S. population is becoming increasingly diverse. The labor force is constantly evolving and being affected by new technology, services, and types of work and work organization. With so many changes, it is difficult to assure that the designs and contents of our household and establishment surveys capture this dynamic labor force. Many segments of the labor force (e.g., self-employed public-sector workers, workers in small-scale businesses, migrant workers, and youths under age 16) are beyond the scope of the only ongoing establishment survey of nonfatal occupational injuries and illnesses. Other segments of the labor force (part-time, temporary, disabled, and immigrant workers) are not a focus of ongoing surveillance or research programs. These priority populations are important segments of the labor force. Better tracking would (1) advance our understanding of health disparities and the needs of priority populations, (2) help us focus research, intervention, and communication efforts to prevent injuries and illnesses, and (3) promote the safety and health of these groups.

NIOSH compiled the first *Worker Health Chartbook* in 2000 to provide a variety of occupational health surveillance data and information in a single volume [NIOSH 2000]. In January 2001, NIOSH published its strategic plan for surveillance to provide a guide within NIOSH and a framework for occupational safety and health surveillance [NIOSH 2001]. Central to this vision is the concept of public health surveillance, "the ongoing systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practices, closely integrated with the timely dissemination of these data to those who need to know" [NIOSH 2001]. This 2004 edition of the *Worker Health Chartbook* exemplifies these strategic goals for ongoing surveillance and periodic dissemination of data that track occupational injuries and illnesses.

Scope

This edition of the *Worker Health Chartbook* describes the magnitude of the Nation's occupational health problem by providing a view of the distribution and trends for occupational injuries, illnesses, fatalities, and other measures of health status. The document presents national and State data to the extent possible. Data are presented from the U.S. Department of Labor (DOL) Bureau of Labor Statistics (BLS) on labor force demographics [BLS 2001] and employment projections [BLS 2002a]. Health status measures are described by age, race/ethnicity, severity of injury or illness, occupation, and industry of the affected workers [BLS 2003b,c]. The breadth of the data sources precludes a thorough discussion of them or of their methods and limitations. The following comments highlight the limits of the employment data and demographic variables used.

The *Worker Health Chartbook* makes extensive references to the BLS Current Population Survey (CPS) [BLS 2001], which is a household sample survey of the civilian noninstitutionalized population that requests information about the employment status of each household member aged 15 or older. The CPS provides estimates of employment, unemployment, and other characteristics of the labor force, the population as a whole, and various other population subgroups. These employment statistics are available for various demographic characteristics, including age, sex, race, occupation, industry, and class of worker. The lack of labor force data for youths aged 15 and younger (Chapter 5) limits occupational surveillance of working youths.

Employment-based fatality rates measure the incidence of fatal occupational injury for all workers in a group (usually an industry) regardless of exposure time. These rates do not reflect the movement of persons into and out of the labor force, the length of their work week (i.e., variation in hours worked) or work year, or the effect of multiple jobholders. The use of employment-based fatality rates has been shown to underestimate fatality risk for workers aged 20 and younger and for workers aged 65 and older [Ruser 1998].

Information about age, sex, and race/ethnicity are typical variables used for epidemiologic and statistical comparisons. The race/ethnicity categories used in the *Chartbook* are taken from the original data sources. In contrast to household surveys (in which respondents are likely to be more familiar with the race/ethnicity of a household member), workplace fatality, injury, or illness data may not be supplied by persons with such knowledge. For the Census of Fatal Occupational Injuries (CFOI) [BLS 2003a] and the annual Survey of Occupational Injuries and Illnesses (SOII) [BLS 2003b,c], these categories follow the guidance in the October 30, 1997 *Federal Register* Notice entitled *Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity,* issued by the Office of Management and Budget (OMB). These categories permit respondents to be classified as multiracial or multiethnic, which is important for improved description of Hispanic workers. Chapter 1 contains data from Census 2000 to permit comparisons between the general population and the occupational health data presented here.

Chapter 1 Overview

The *Worker Health Chartbook, 2004* focuses on worker health and the injury and illness statistics that measure the work-related health status of workers in the United States. The magnitude and patterns of injury and illness are influenced by labor force trends that may reflect general population changes. Such changes are illustrated in the charts presented here.

This chapter provides charts that illustrate the status of worker health as measured by occupational fatalities, injuries, illnesses, and disorders. Included are illustrations and discussions of (1) the demographic characteristics of the labor force (age, sex, race/ ethnicity, occupation, and industry), (2) the work-related health status of workers (fatal and nonfatal injury and illness rates), and (3) the characteristics of injured and ill workers, their injuries, and their illnesses. Both national and State data are presented when they are available.

Since 1992, improved data collection by the BLS permits better descriptions of the injured or ill workers' demographics (age, sex, race/ethnicity, occupation, and industry) as well as their work-related injuries and illnesses. This document illustrates the extensive statistical resources available for describing work-related injuries and illnesses.

Worker Demographics

Throughout the *Chartbook*, work-related injury, illness, and fatality data for U.S. workers are presented relative to their age, sex, race/ ethnicity, occupation, and industry. To provide some perspective on the employed population, these demographic data are included for employed persons from the 2001 CPS [BLS 2001].

In 2001, most U.S. workers (nearly 71.4%) fell within the prime working ages of 25 to 54; 15% were younger than 25, and 13.6% were 55 or older (Table 1–1). By 2010, the baby boom generation will reach the ages of 45–64, and middle and older age groups in the labor force will outnumber younger workers (Figure 1–1).

Male workers represented more than half (53.4%) of the working population in 2001: white male workers accounted for 54.2% of all white workers, and Hispanic male workers represented 58.1% of all Hispanic workers (Table 1–2). Black male workers accounted for slightly fewer than half of all black workers (46.7%). Though male workers accounted for a larger share of jobs in 2001, their distribution in the labor force is projected to decrease to 52.1% in 2010. With corresponding increases for female workers, women are projected to account for 47.9% of the labor force in 2010 (Figure 1–2).

In 2001, white workers accounted for 83.8% of the civilian labor force, black workers for 11.3%, and Hispanic workers for 10.9% [BLS 2001]. As the number of white workers decreases, BLS projects corresponding job growth for minority groups: black workers are projected to account for 12.7% of the labor force and Asian and other workers for 6.1% by 2010 (Figure 1–3). The percentage of Hispanic workers is projected to more than double during this period, increasing from 5.7% in 1980 to 13.3% in 2010 (Figure 1–4).

Data for 2001 indicate that two major occupational groups (managerial and professional specialty; and technical, sales, and administrative support) account for more than 60% of employed persons in the United States (Table 1–3). The percentage of female workers is smallest in precision production, craft, and repair jobs (8.7%) and greatest in technical, sales, and administrative support (63.7%). The percentage of black workers is smallest in farming, forestry, and fishing (5.0%) and greatest in public administration (16.2%). The percentage of Hispanic workers is smallest in the managerial and professional specialty group (5.1%) and greatest in farming, forestry, and fishing (21.5%). BLS projects employment to increase by 22 million workers by 2010, with the largest numbers of workers employed in professional and related occupations and service (Figure 1–5).

Among industry sectors, services employed the most workers in 2001 (37.4% of the labor force, or 50.5 million workers), followed by retail trade (16.7%) and manufacturing (14.0%) (Table 1–4). BLS estimates that these industrial sectors will have the greatest growth between 2000 and 2010: employment will increase to 52.2 million for services and to 34.2 million for wholesale and retail trade (Figure 1–6). As shown in Table 1–4, the high-risk industries of agriculture, mining, and construction accounted for only 9.8% of employed workers. Construction and mining contained the smallest percentages of female workers (9.7% and 14.6%, respectively), and the services sector contained the largest (62.1%). Forestry and fisheries contained the smallest percentage of black workers (1.7%), and public administration contained the largest (16.2%). Forestry and fisheries also contained the smallest percentage of Hispanic workers (5.1%), and agriculture contained the largest (20.3%).

The BLS estimated that the labor force consisted of 135 million employed workers in 2001, a figure projected to increase by 17 million during the next decade [BLS 2002a]. How the characteristics of the labor force will affect future rates of fatal and nonfatal injuries and illnesses is unclear. However, a review of these characteristics is useful for understanding changes in the demographic composition of at-risk populations and for predicting occupations and industries that will experience future job growth. The data presented here are based on annual estimates and projections produced by the CPS of the BLS [BLS 2001].

Age

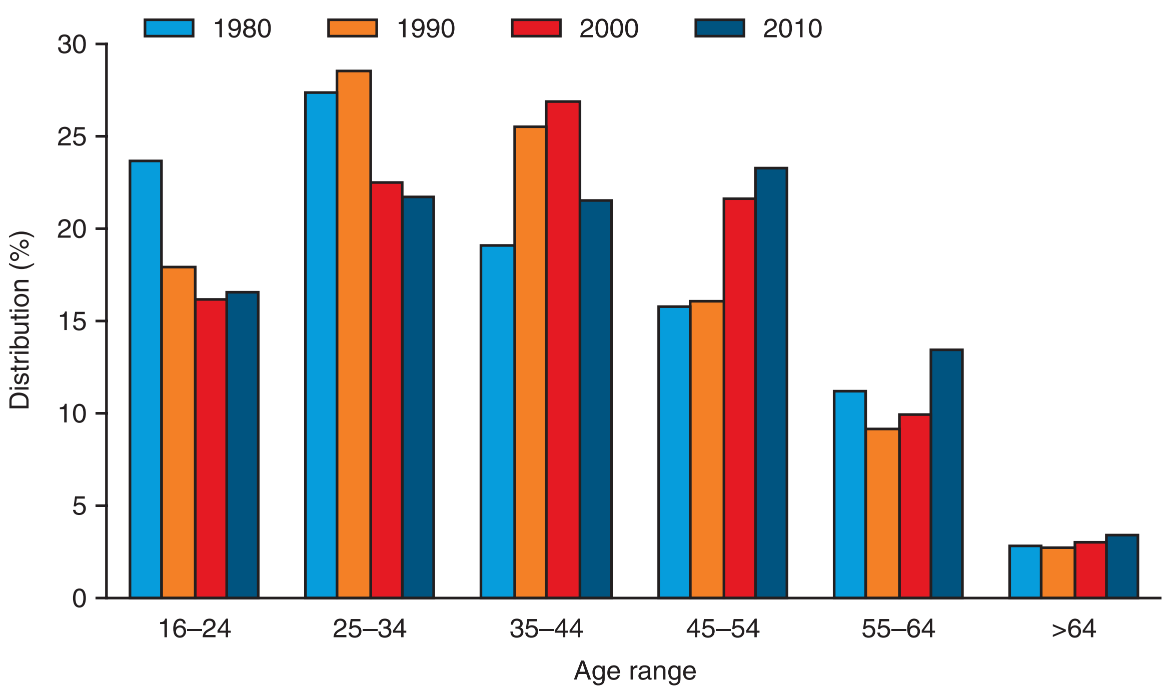
How did employed U.S. workers differ by age in 2001?

Table 1–1. Number and distribution of employed U.S. workers by age, 2001. U.S. workers aged 25–54 accounted for 96.5 million workers in 2001, or 71.5% of all employed U.S. workers. *(Source: BLS [2001].)*

Age (years)	Number (thousands)	Distribution (%)
16–19	6,889	5.1
20–24	13,361	9.9
25–34	29,697	22.0
35–44	36,226	26.8
45–54	30,592	22.6
55–64	14,133	10.5
65 and older	4,174	3.1

How did the labor force differ by age?

Figure 1–1. Distribution of the civilian labor force by age, 1980–2000 and projected to 2010. Since 1980, the age distribution of the labor force has shifted. By 2010, middle and older age groups in the labor force will outnumber younger workers. *(Sources: BLS [2002a]; Fullerton and Toossi [2001].)*



Sex of worker	Total: Number (thousands)	Total: Distribution (%)	White workers: Number (thousands)	White workers: Distribution (%)	Black workers: Number (thousands)	Black workers: Distribution (%)	Hispanic workers: Number (thousands)	Hispanic workers: Distribution (%)
Male workers	72,080	53.4	61,411	54.2	7,127	46.7	8,556	58.1
Female workers	62,992	46.6	51,810	45.8	8,143	53.3	6,159	41.9
Totals	135,073	100.0	113,220	100.0	15,270	100.0	14,714	100.0

Source: BLS [2001].
*Totals may not add up because of rounding.

Sex

How did the labor force differ by sex of worker?

Table 1–2. Number and distribution of employed white, black, and Hispanic workers by sex, 2001. Overall, more male workers (53.4%) than female workers (46.6%) were employed in 2001, though 53.3% of all employed black workers were female; 41.9% of all employed Hispanic workers were female. ***(Source: BLS [2001].)***

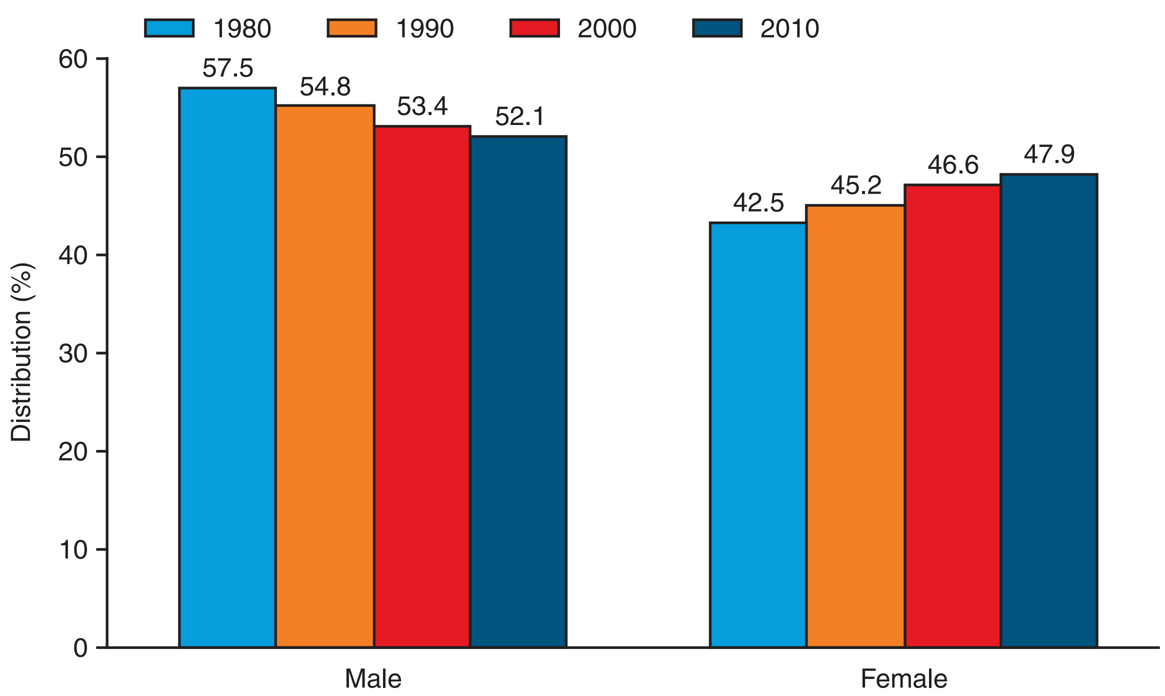


Figure 1–2. Distribution of the civilian labor force by sex, 1980–2000 and projected to 2010. The labor force participation of male workers is projected to decrease from 57% in 1980 to 52% in 2010. Corresponding increases are shown for female workers, who are projected to account for 48% of the labor force in 2010. ***(Sources: BLS [2002a]; Fullerton and Toossi [2001].)***

Race/Ethnicity

How did the labor force differ by race/ethnicity during 1980–2000 and what is the projection for 2010?

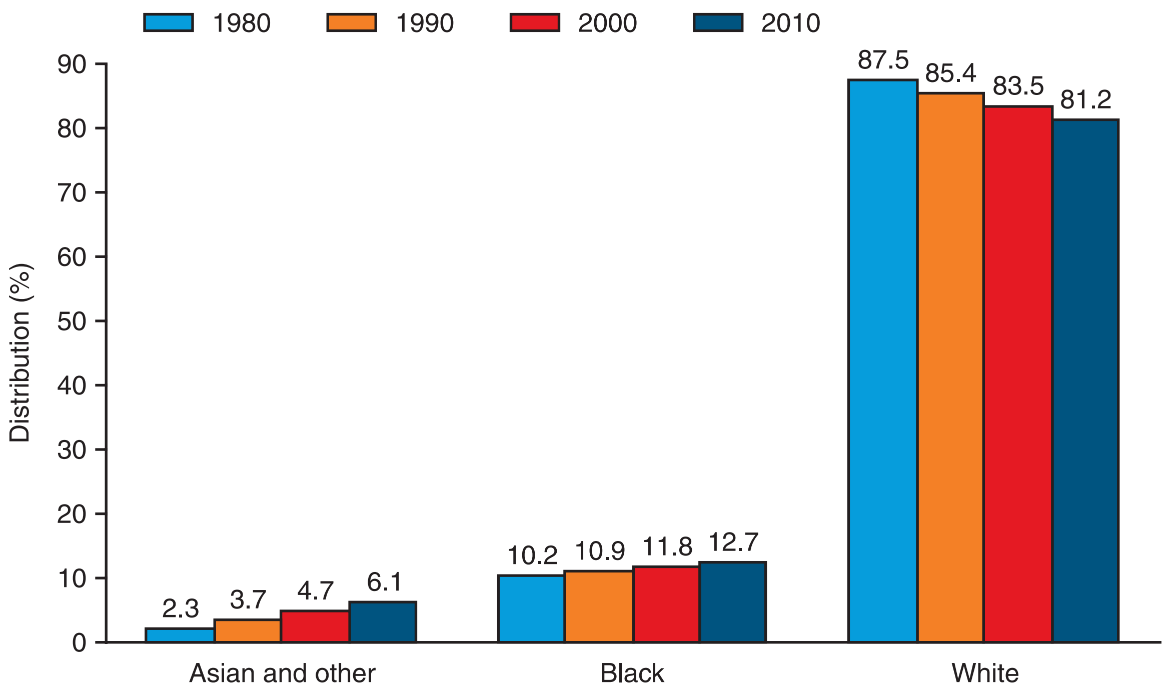


Figure 1–3. Distribution of the civilian labor force by race, 1980–2000 and projected to 2010. The labor force participation of black workers and Asian and other workers has increased since 1980, with black workers projected to account for 12.7% of the labor force and Asian and other workers for 6.1% by 2010. Corresponding decreases are shown for white workers, whose labor force participation is projected to decline to 81.2% by 2010. *(Sources: BLS [2002a]; Fullerton and Toossi [2001].)*

How did the labor force differ by Hispanic and non-Hispanic ethnicity during 1980–2000 and what is the projection for 2010?

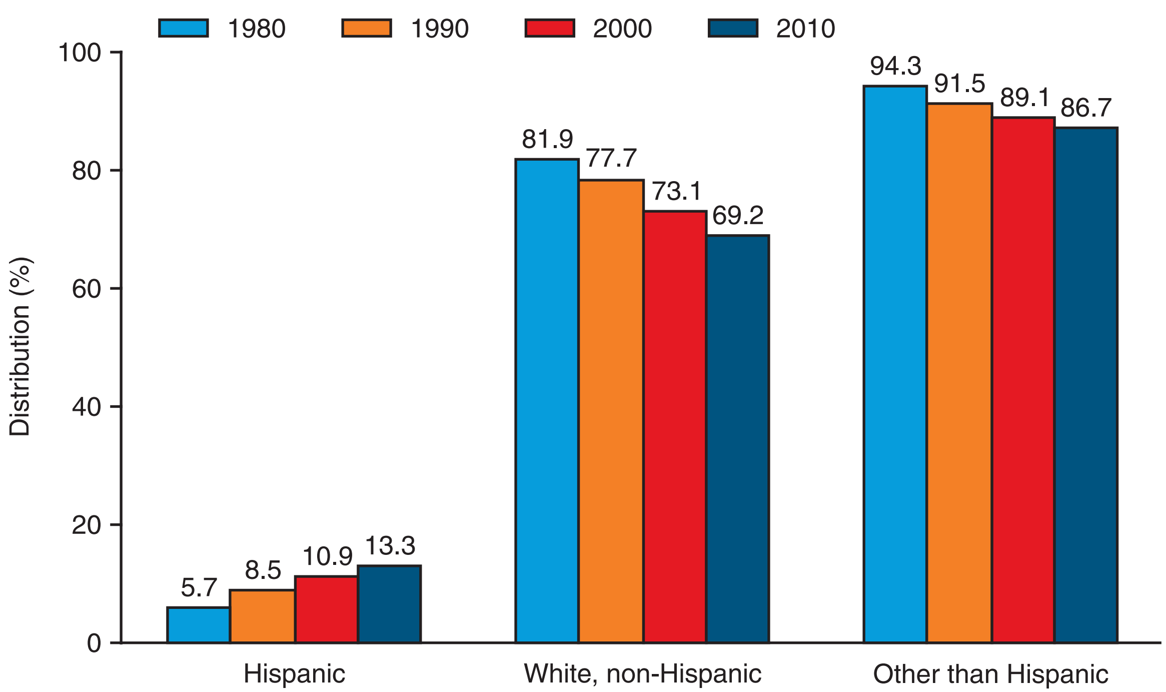


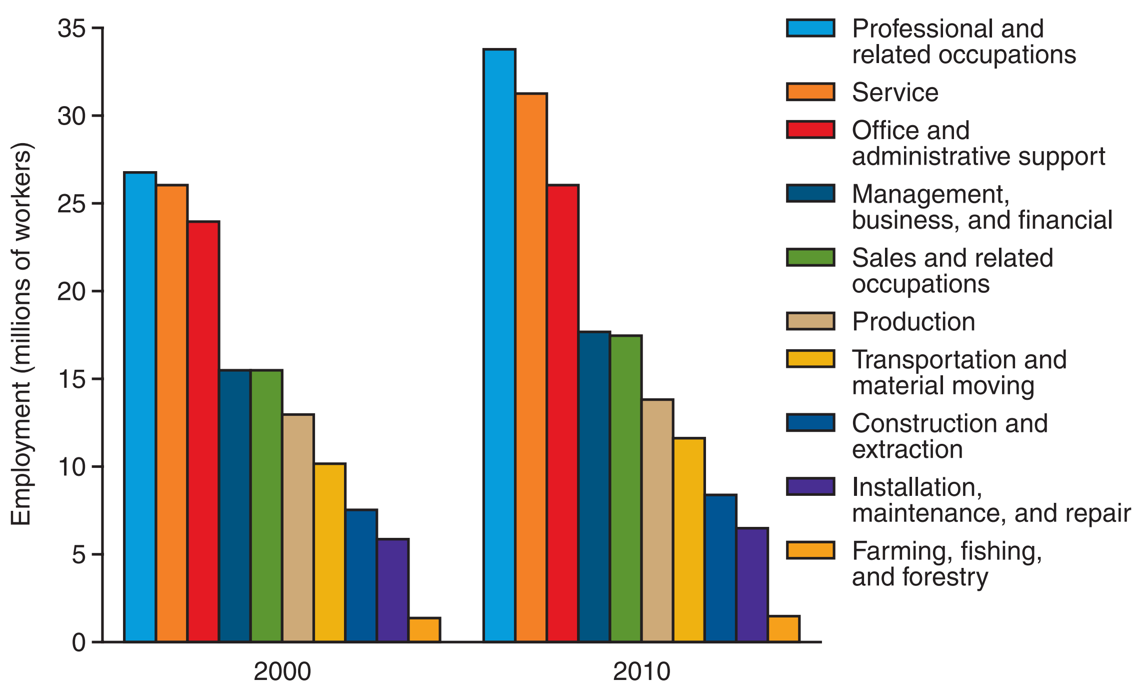
Figure 1–4. Distribution of the civilian labor force by Hispanic and non-Hispanic ethnicity, 1980–2000 and projected to 2010. The percentage of Hispanic workers is projected to more than double during this period, increasing from 5.7% in 1980 to 13.3% in 2010. Corresponding decreases are shown for non-Hispanic white workers and other than Hispanic workers. *(Sources: BLS [2002a]; Fullerton and Toossi [2001].)*

Occupation	Number (thousands)	Distribution (%)		
		Women	Black	Hispanic
All	135,073	46.6	11.3	10.9
Managerial and professional specialty	41,894	50.0	8.3	5.1
Technical, sales, and administrative support	39,044	63.7	11.4	9.1
Service occupations	18,359	60.4	17.9	16.3
Precision production, craft, and repair	14,833	8.7	7.8	14.7
Operators, fabricators, and laborers	17,698	23.3	15.8	17.7
Farming, forestry, and fishing	3,245	20.8	5.0	21.5

Occupation

Which occupational groups employed the most workers in 2001?

Table 1–3. Number of employed workers by major occupational group and percentage of female, black, and Hispanic workers, 2001. Two occupational groups (managerial and professional specialty; and technical, sales, and administrative support) employed 60% of all workers (or 80.9 million workers). Female workers accounted for nearly half (46.6%) of all employed workers and more than half of workers in technical, sales, and administrative support (63.7%) and in service occupations (60.4%). Black workers accounted for 11.3% of all workers, and service occupations had the greatest proportion of black workers (17.9%). Hispanic workers accounted for 10.3% of all workers, and farming, forestry, and fishing had the greatest proportion of Hispanic workers (21.5%). ***(Source: BLS [2001].)***



What changes are expected during 2001–2010?

Figure 1–5. Employment by major occupational group, 2000 and projected to 2010. BLS projects employment to increase by 22 million workers (to a total of 167.7 million) over the period 2000 to 2010. The largest numbers of workers will be employed in professional and related occupations and service. BLS estimates that these occupational groups will experience the greatest growth between 2000 and 2010, with employment increasing to 33.7 million for professional and related occupations and 31.2 million for service occupations. ***(Source: BLS [2002a].)***

Industry

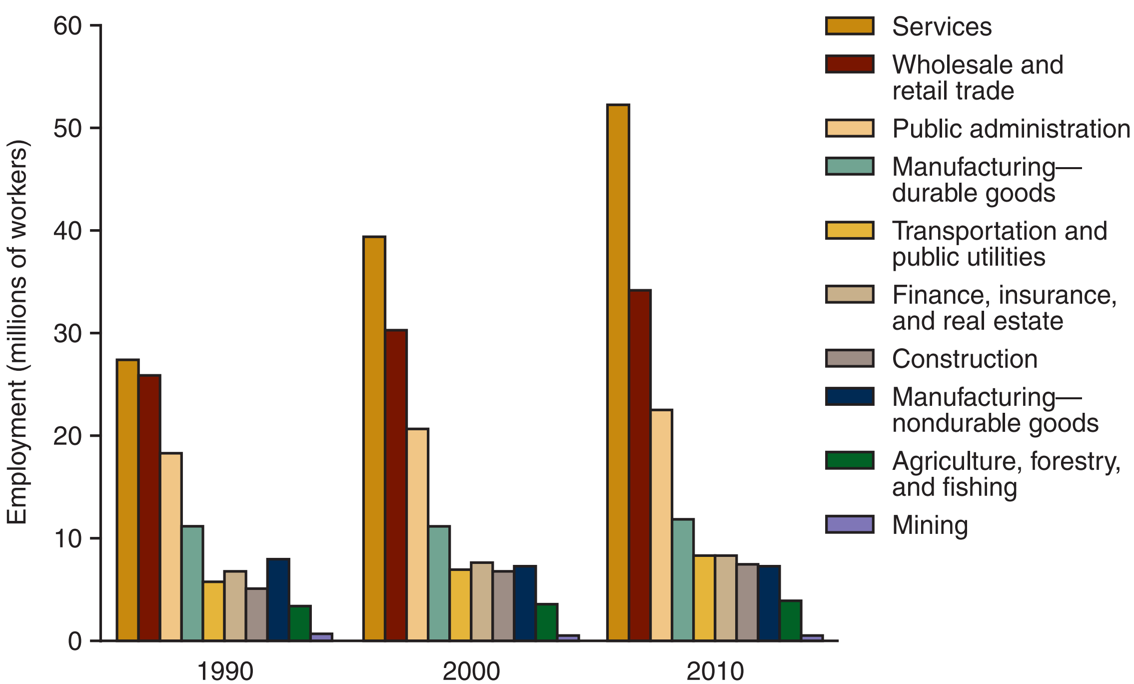
Which industries employed the most workers in 2001?

Table 1–4. Number of employed workers by major industry sector and percentage of female, black, and Hispanic workers, 2001. Most workers (71.9%, or 97.1 million) were employed by the services, wholesale and retail trade, and manufacturing sectors. Female workers accounted for nearly half of all workers (46.6%) and for more than half the workers in services; finance, insurance, and real estate; and retail trade. Black workers accounted for 11.3% of all workers, but public administration and transportation and public utilities had the greatest proportions of black workers (16.2% and 15.8%, respectively). Hispanic workers accounted for 10.9% of all workers, but agriculture and construction had the greatest proportions of Hispanic workers (20.3% and 15.8%, respectively). ***(Source: BLS [2001].)***

Industry	Number (thousands)	Distribution (%)		
		Women	Black	Hispanic
All	135,073	46.6	11.3	10.9
Agriculture	3,144	27.6	3.6	20.3
Forestry and fisheries	133	23.5	1.7	5.1
Mining	567	14.6	4.2	7.6
Construction	9,581	9.7	6.4	15.8
Manufacturing	18,970	31.8	10.1	12.3
Durable goods	11,588	27.3	9.0	10.6
Nondurable goods	7,381	38.8	11.8	15.1
Transportation, communications, and other public utilities	9,738	29.2	15.8	9.6
Wholesale and retail trade	27,672	47.0	10.0	12.4
Wholesale trade	5,102	30.1	7.5	11.1
Retail trade	22,571	50.8	10.6	12.7
Finance, insurance, and real estate	8,797	58.3	10.8	7.2
Services	50,478	62.1	12.6	9.3
Public administration	6,126	45.1	16.2	8.0

What changes are expected during 2000–2010?

Figure 1–6. Employment by major industry division, 1990, 2000, and projected to 2010. BLS projects employment to increase by 22 million workers (to a total of 167.7 million) during 2000–2010. The largest numbers of workers will be employed in the services and wholesale and retail trade sectors. BLS estimates that these industrial sectors will have the greatest growth between 2000 and 2010, with employment increasing to 52.2 million for services and 34.2 million for wholesale and retail trade. ***(Source: BLS [2002a].)***



Fastest Growing Occupations

Which occupations will have the most rapid growth during 2000–2010?

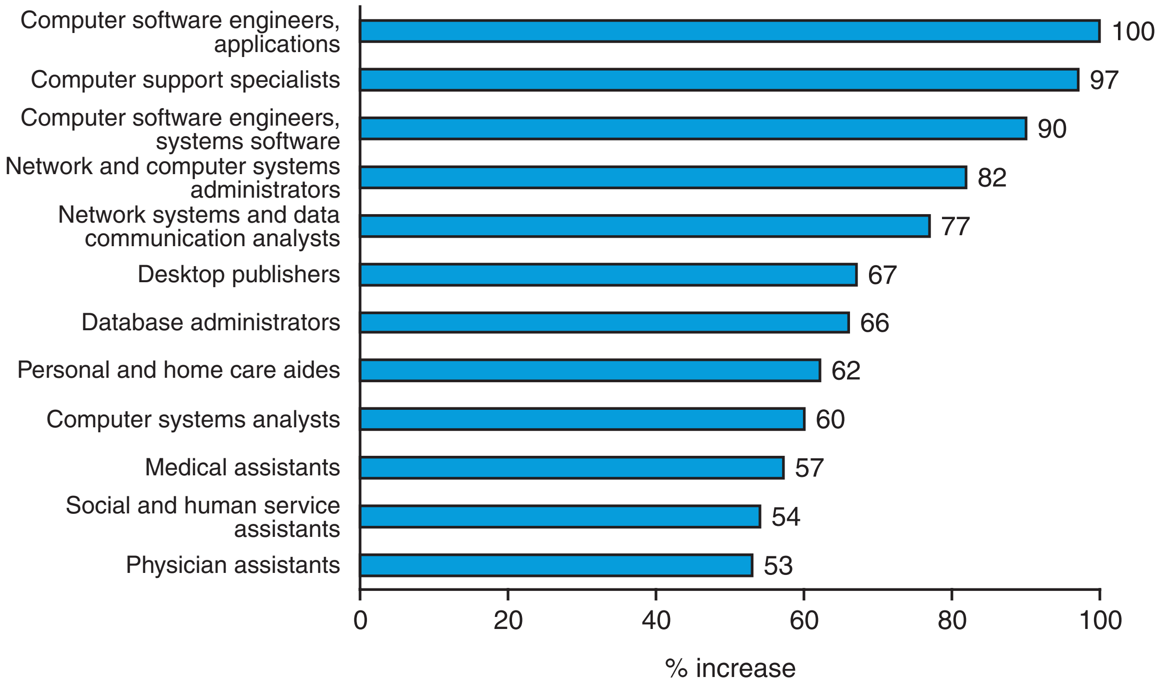


Figure 1–7. Occupations projected to have the most rapid growth during the period 2000–2010. The fastest growing occupations are computer- and health-care-related jobs. The numbers of computer software engineers and support specialists are expected to increase 100% and 97%, respectively. The numbers of medical and physician assistants are expected to increase 57% and 53%, respectively. ***(Sources:*** ***BLS [2002a]; Hecker [2001].)***

Which occupations are expected to add the most jobs during 2000–2010?

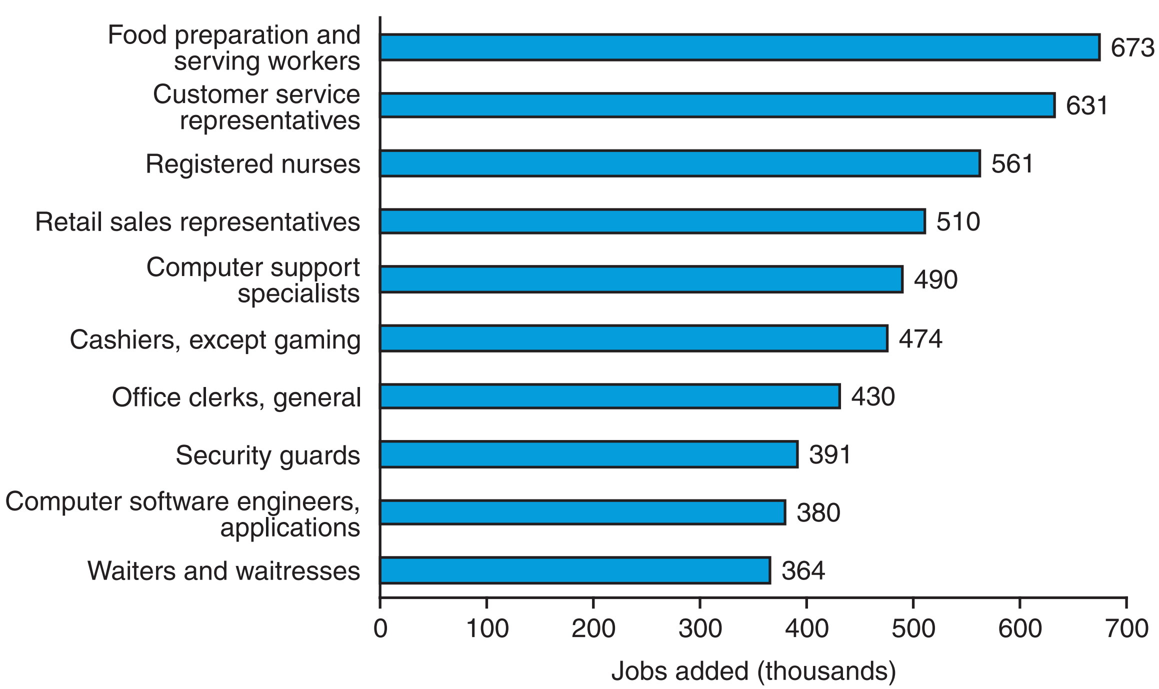


Figure 1–8. Occupations expected to add the most jobs during 2000–2010. Service- and computer-related jobs are expected to predominate during 2000–2010. These include food preparation workers, customer service representatives, registered nurses, and retail sales representatives. ***(Sources: BLS [2002a]; Hecker [2001].)***

Worker Health Status

The responsibility for collecting statistics on occupational injuries and illnesses is delegated to the BLS, which has reported annually since 1972 on the number and frequency of fatal and nonfatal occupational injuries and illnesses in private industry. Before the 1992 SOII [BLS 1995], BLS statistics counted injuries and illnesses that included fatalities. Since 1992, BLS has been able to count fatal injuries more effectively through the use of a separate census—CFOI. And beginning with the 1992 SOII [BLS 1995], BLS has collected additional statistics from private industry regarding worker and case characteristics for seriously injured or ill workers (i.e., those requiring recuperation away from work beyond the day of the incident).

Data for Figures 1–9 through 1–26 come from CFOI and SOII. CFOI provides the most complete count of fatal occupational injuries available. BLS uses diverse State and Federal data sources to identify, verify, and profile fatal occupational injuries. The overall fatal occupational injury count for 2002 (5,524) was 6.4% lower than the count for 2001 (Figure 1–9). The fatal occupational injury rate for 2002 was 4.0 per 100,000 employed workers. The trend in rates reflects a decline beginning in 1993. Rates varied among States from 1.4 to 14.1 per 100,000 employed workers. Fatal occupational injuries exceeded 10 per 100,000 employed workers in Alaska, Wyoming, and Montana (Figure 1–10).

SOII measures the number of new occupational illness cases that are recognized, diagnosed, and reported each year. Some conditions (for example, chronic or latent illnesses caused by exposure to carcinogens) are difficult to identify as work-related and are not adequately recognized and reported. These chronic or latent illnesses are believed to be understated in the survey's illness measures. The overwhelming majority of the reported new illnesses are those that are easier to relate directly to workplace activity (for example, contact dermatitis or carpal tunnel syndrome).

Private industry reported 5.2 million nonfatal occupational injuries and illnesses in 2001, resulting in an overall incidence rate of 5.7 cases per 100 full-time workers (Figure 1–11). The number of injuries and illnesses resulting in time away from work (1.54 million cases in 2001) represents a decrease of 34% since 1992 (Figure 1–12). Nonfatal occupational injury and illness rates varied by State from 2.3 to 8.7 per 100 full-time workers. Lower rates are reported for States in the South, southern coastal States, and the Southwest (Figure 1–18).

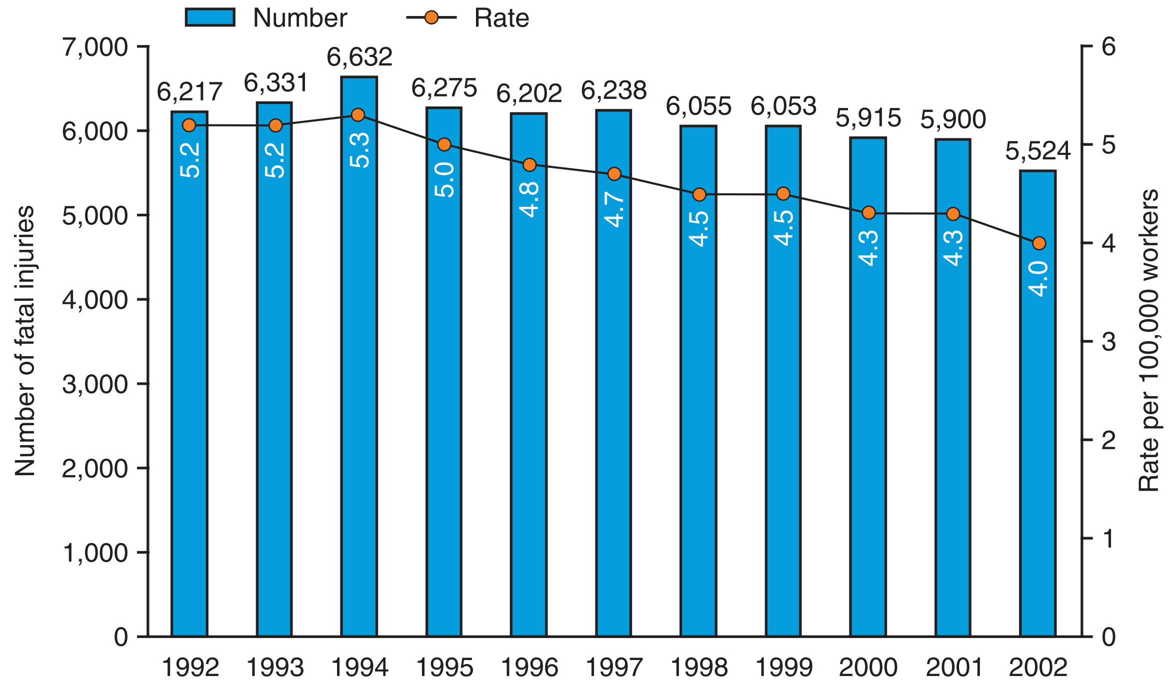
Durable goods manufacturing accounted for the highest rate of nonfatal occupational injuries and illnesses reported in 2001 (8.8 per 100 workers), followed by construction (7.9), and agriculture, forestry, and fishing (7.3). The Services industry reported approximately 1.3 million cases, or 25% of all nonfatal occupational injuries and illnesses in 2001 (Figure 1–14). Eight industries, each reporting at least 100,000 injuries, accounted for about 1.4 million injuries or 29% of the 4.9 million total (Figure 1–15). Injury rates were higher for mid-size establishments (those employing 50 to 249 workers) than for smaller or larger establishments (Figure 1–16).

About 333,800 new cases of occupational illness were reported in private industry in 2001 (Figure 1–21). From 1972 to 1982, the number of illness cases declined gradually from 210,500 to 105,600. This number increased and peaked sharply in 1994 at 514,700 cases (Figure 1–22). Disorders associated with repeated trauma (such as carpal tunnel syndrome and noise-induced hearing loss) affected 216,400 workers or 4% of the 5.2 million occupational injuries and illnesses and 64.8% of the 333,800 illness cases in 2001. These disorders declined for 7 consecutive years dating from 1995 (Figure 1–23). Occupational illness rates varied widely among the States, from 8.8 per 10,000 full-time workers in New Mexico to 142.6 in Maine. Higher rates were reported in the Midwest. Lower rates were reported for States in the South and in the southern coastal and western mountain States (Figure 1–26).

Fatal Injuries

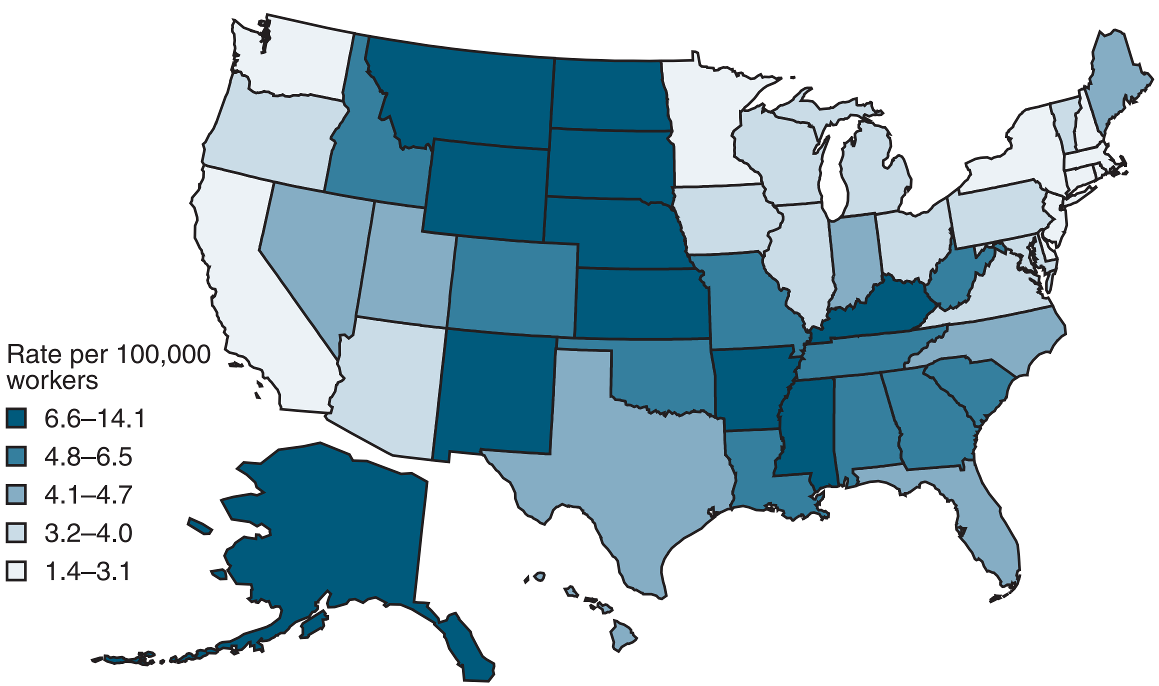
How did the numbers and rates of fatal occupational injuries change during 1992–2002?

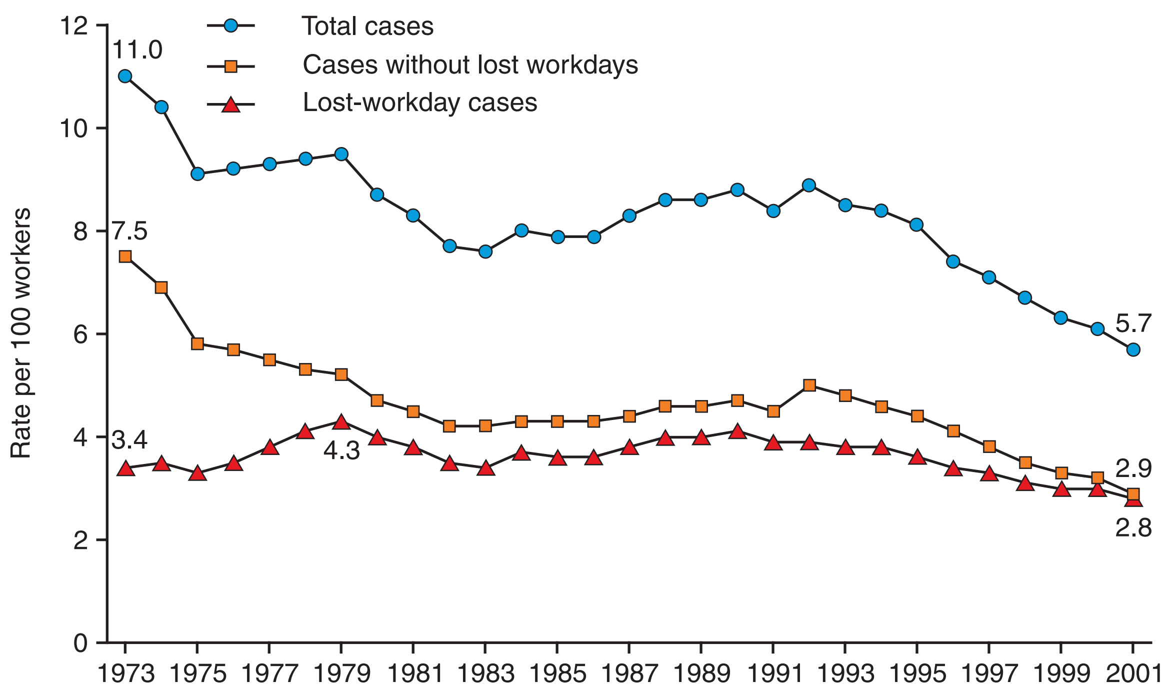
Figure 1–9. Numbers and rates of fatal occupational injuries, 1992–2002. The fatal occupational injury rate has varied from 5.3 per 100,000 workers in 1994 (6,632 fatal injuries) to 4.0 in 2002 (5,524 fatal injuries). Since 1993, the trend in rates reflects a steady decline. (*Note:* Charts using data for calendar year from the CFOI exclude deaths from the September 11 terrorist attacks.) ***(Source: BLS [2003a].)***

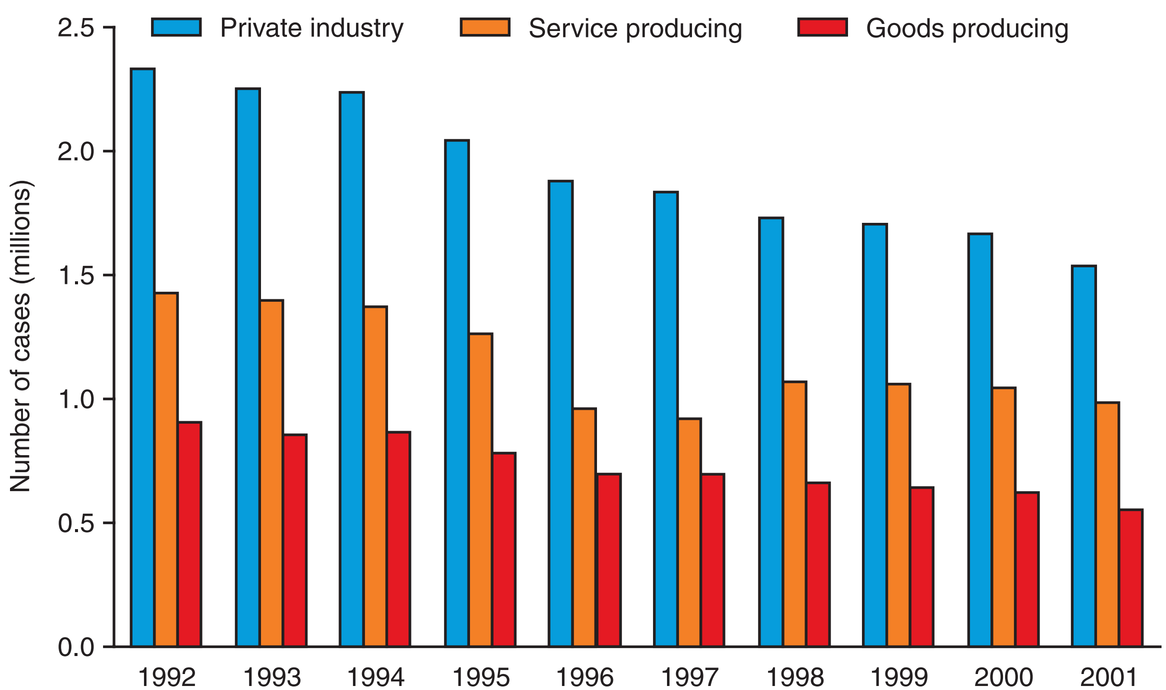


How did the rates of fatal occupational injuries differ by State in 2002?

Figure 1–10. Fatal occupational injury rates by State, 2002. Fatal occupational injury rates varied by State from 1.4 to 14.1 per 100,000 employed workers. (The U.S. rate was 4.0 per 100,000 employed workers in 2002.) Fatal occupational injuries exceeded 10 per 100,000 employed workers in Alaska, Wyoming, and Montana. ***(Sources: BLS [2003a]; BLS [2003b].)***







Injuries and Illnesses

Magnitude and Trend

How frequently did occupational injuries and illnesses occur during 1973–2001?

Figure 1–11. Incidence rates of occupational injuries and illnesses in private industry by case type, 1973–2001. The private-industry sector reported 5.2 million nonfatal occupational injuries and illnesses during 2001, corresponding with an overall rate of 5.7 cases per 100 full-time workers. Approximately 2.6 million were lost-workday cases requiring recuperation away from work or restricted duties at work. The total occupational injury and illness incidence rate continues to decline. This trend is reflected in the private-sector data reported to BLS since 1973. (*Note:* Lost-workday cases include cases with days away from work and cases with restricted work activity only—that is, cases in which workers report to their jobs for limited duty. See Appendix B for details about case types.) ***(Source: BLS [2002b].)***

Figure 1–12. Number of nonfatal occupational injury and illness cases with days away from work in private industry, 1992–2001. The number of injuries and illnesses resulting in time away from work continues to decline. The 1.54 million cases in 2001 represent a decrease of 34% since 1992. Over the same period, the goods-producing segment of private industry experienced a 38.7% decrease, which is notably greater than the 31.1% decrease recorded for the service-producing segment of the private sector. ***(Source: BLS [2002b].)***

How did the rate of lost-workday injuries and illnesses change during 1973–2001?

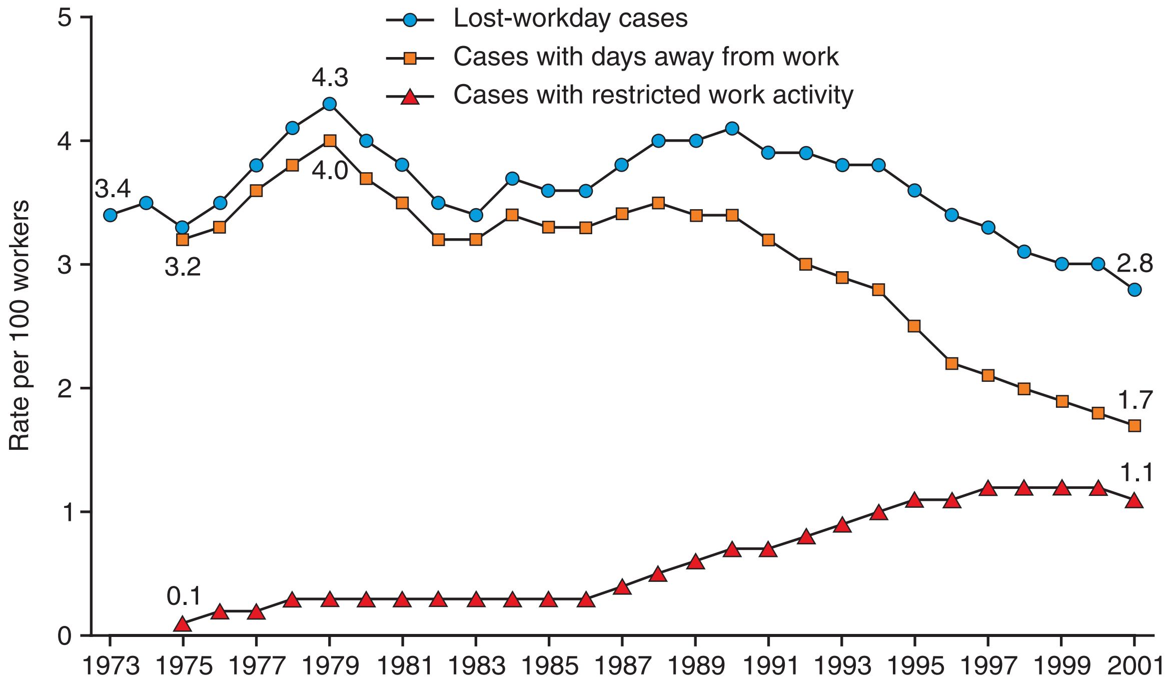


Figure 1–13. Incidence rates for lost-workday cases of nonfatal occupational injuries and illnesses in private industry, 1973–2001. Since 1973, the incidence rate for lost-workday cases has varied from 4.3 per 100 full-time workers in 1979 to 2.8 cases per 100 full-time workers in 2001. Lost-workday case rates have been declining since 1990, with a strong contribution from decreases in cases with days away from work. The decline is offset by increases in restricted work activity cases, which have increased steadily since 1987. These cases include those with shortened workdays, temporary job changes, or temporary restrictions of job duties. ***(Source: BLS [2002b].)***

Industry

How were nonfatal occupational injuries and illnesses distributed by major private-sector industry groups in 2001?

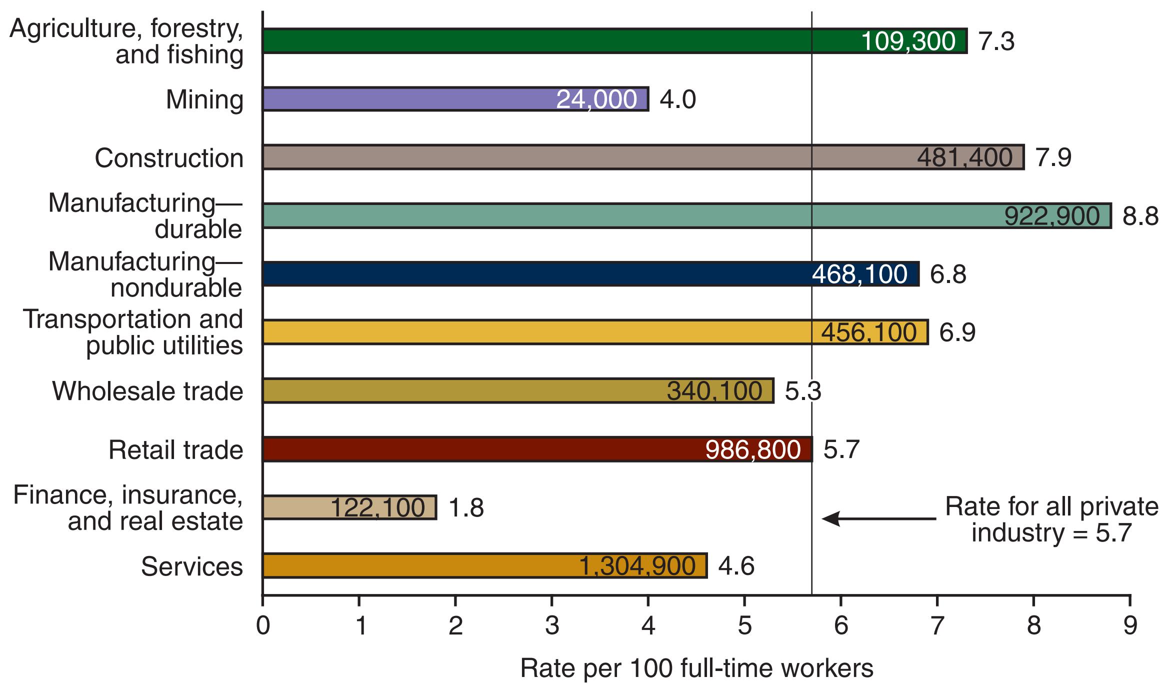
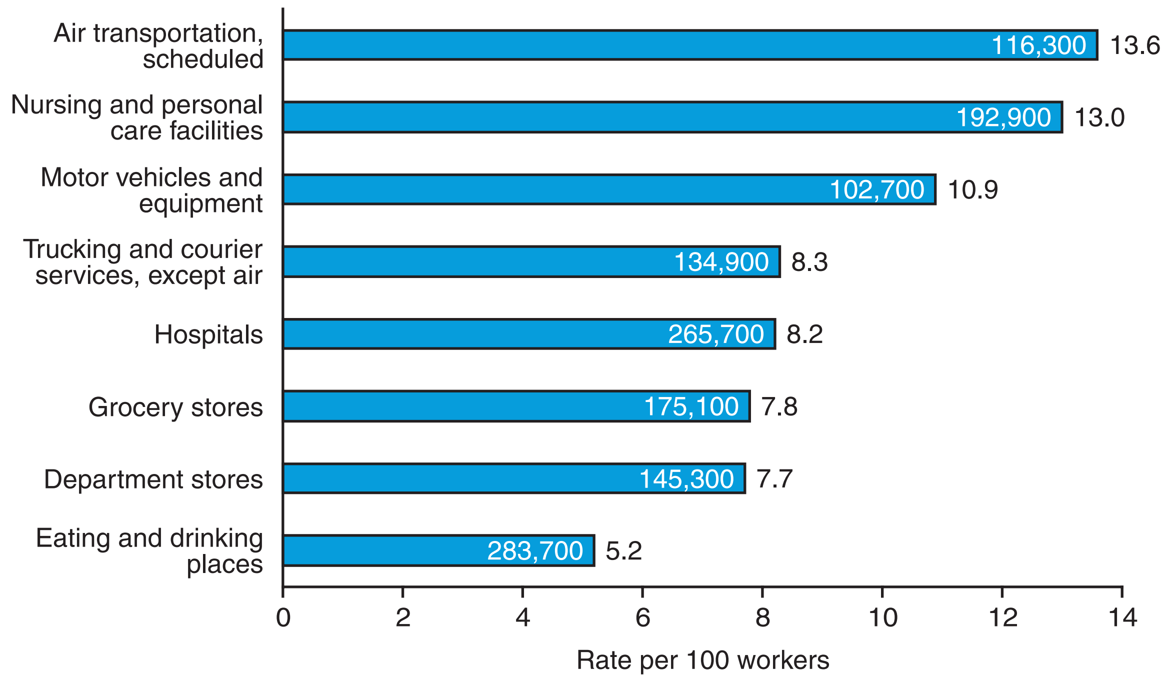
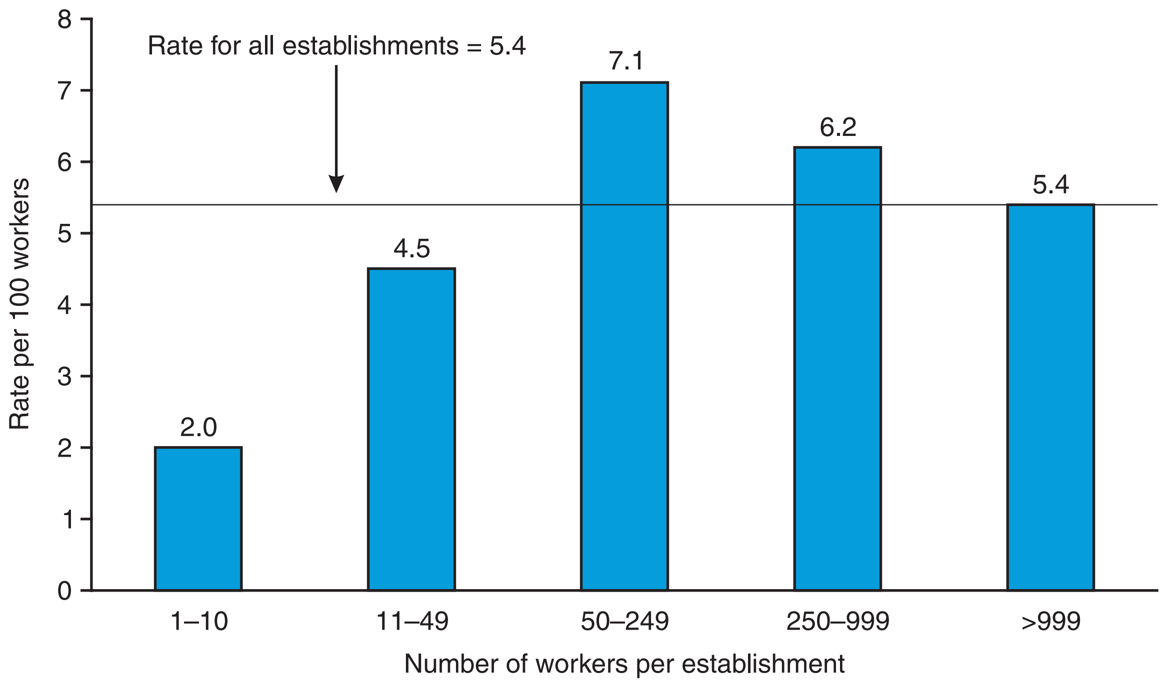


Figure 1–14. Number and rate of nonfatal occupational injuries and illnesses in private industry by industry, 2001. Durable goods manufacturing accounted for the highest rate of nonfatal occupational injuries and illnesses (8.8 per 100 workers) reported in 2001, followed by construction (7.9) and agriculture, forestry and fishing (7.3). Services reported approximately 1.3 million cases, or 25% of all nonfatal occupational injuries and illnesses in 2001. (*Note:* Numbers of nonfatal injuries and illnesses are inside the bars.) ***(Source: BLS [2002b].)***



Which industry sectors accounted for the most nonfatal injury cases in 2001?

Figure 1–15. Number and rate of total nonfatal occupational injuries in private-industry sectors with at least 100,000 cases, 2001. Each of these eight industry sectors (ranked by occupational injury rate) reported more than 100,000 injuries in 2001. Air transportation reported the highest rate in the group (13.6 per 100 workers), followed by nursing and personal care facilities (13.0). Together, these eight industry sectors accounted for about 1.4 million nonfatal injuries, or 29% of the 4.9 million total. *(Source: BLS [2002b].)*



How did nonfatal injury rates vary by establishment size in 2001?

Figure 1–16. Incidence rates for nonfatal occupational injuries in private industry by establishment size, 2001. By establishment size, nonfatal occupational injury rates varied from 7.1 to 2.0 per 100 full-time workers. Incidence rates were higher for establishments employing 50–249 workers than for smaller or larger establishments. This pattern did not hold for all industries. *(Source: BLS [2002b].)*

How did the trends in nonfatal injuries and illnesses change within industries during 1992–2001?

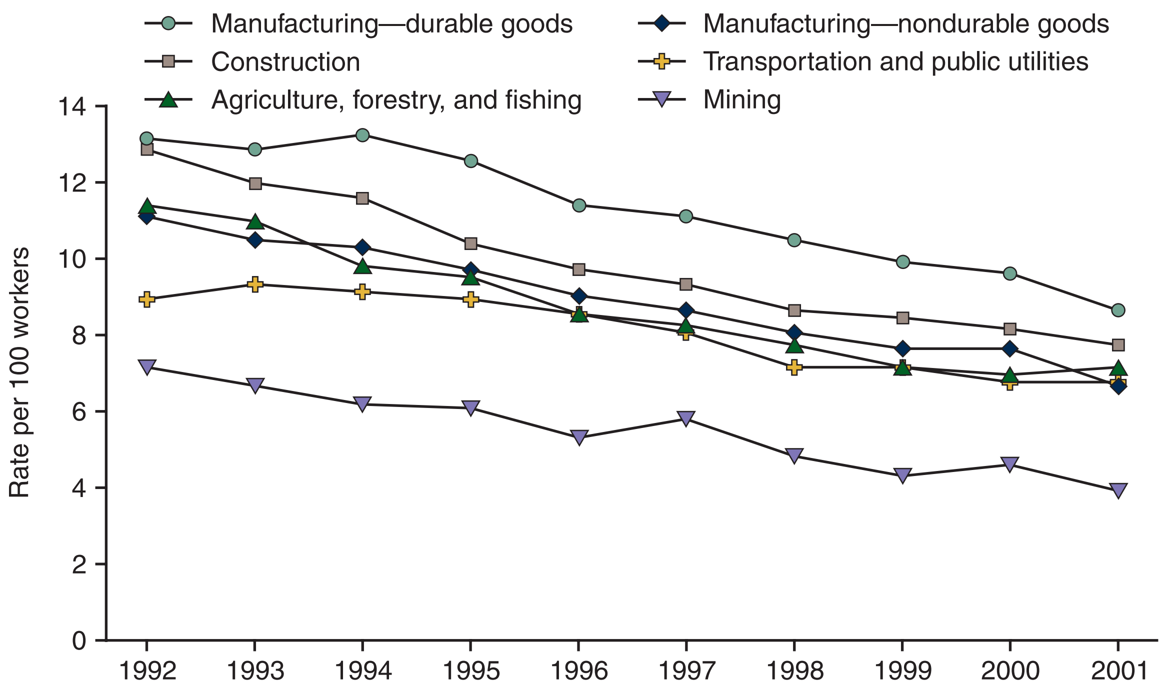


Figure 1–17. Incidence rates of injuries and illnesses in six major industry sectors, 1992–2001. Overall, incidence rates declined for each of the selected industry sectors during 1992–2001. The highest rates occurred within durable goods manufacturing, construction, and nondurable goods manufacturing. ***(Source:*** ***BLS [2002b].)***

Rates among States

How did the rates of nonfatal injuries and illnesses differ by State in 2001?

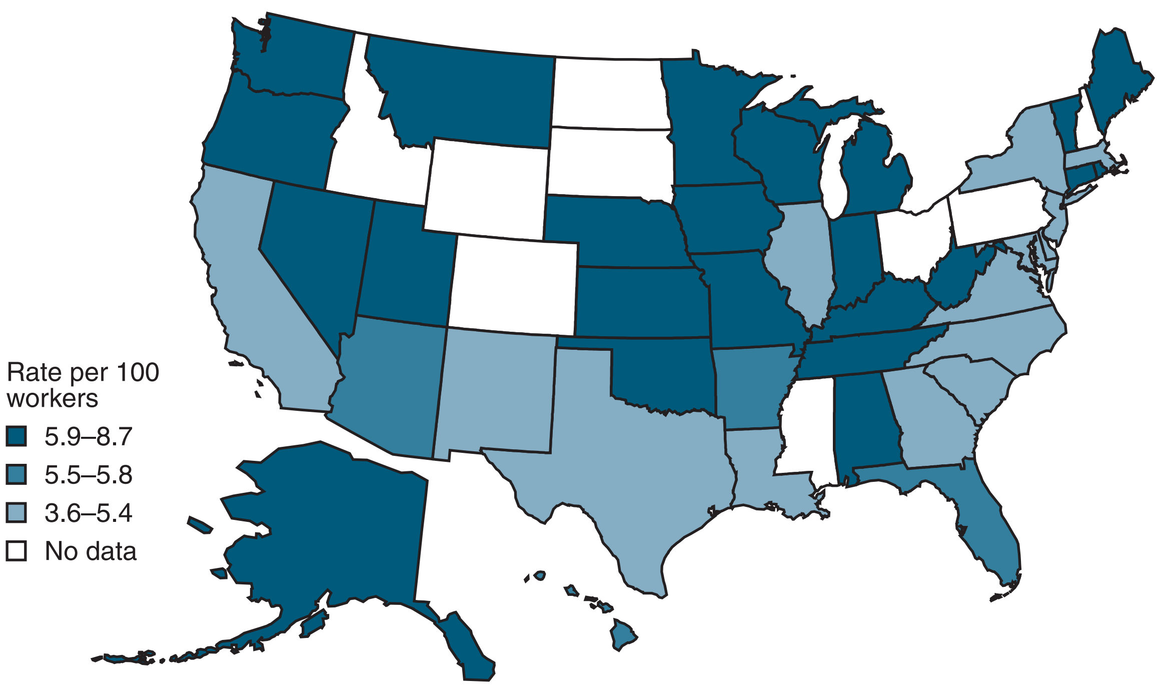
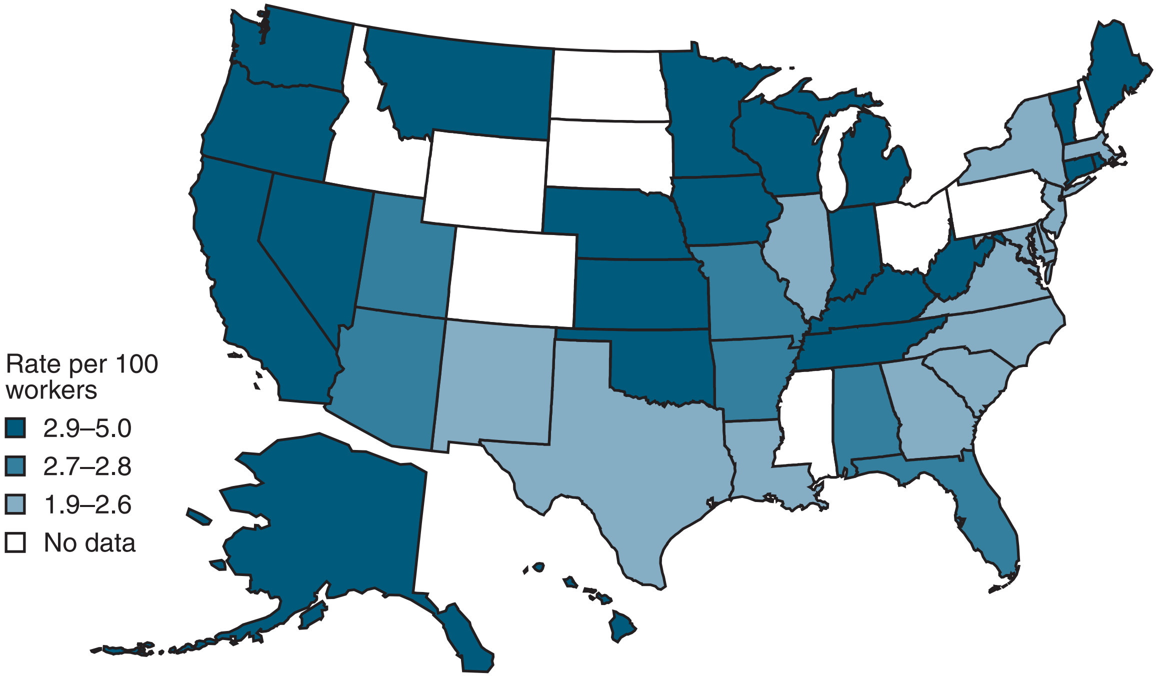
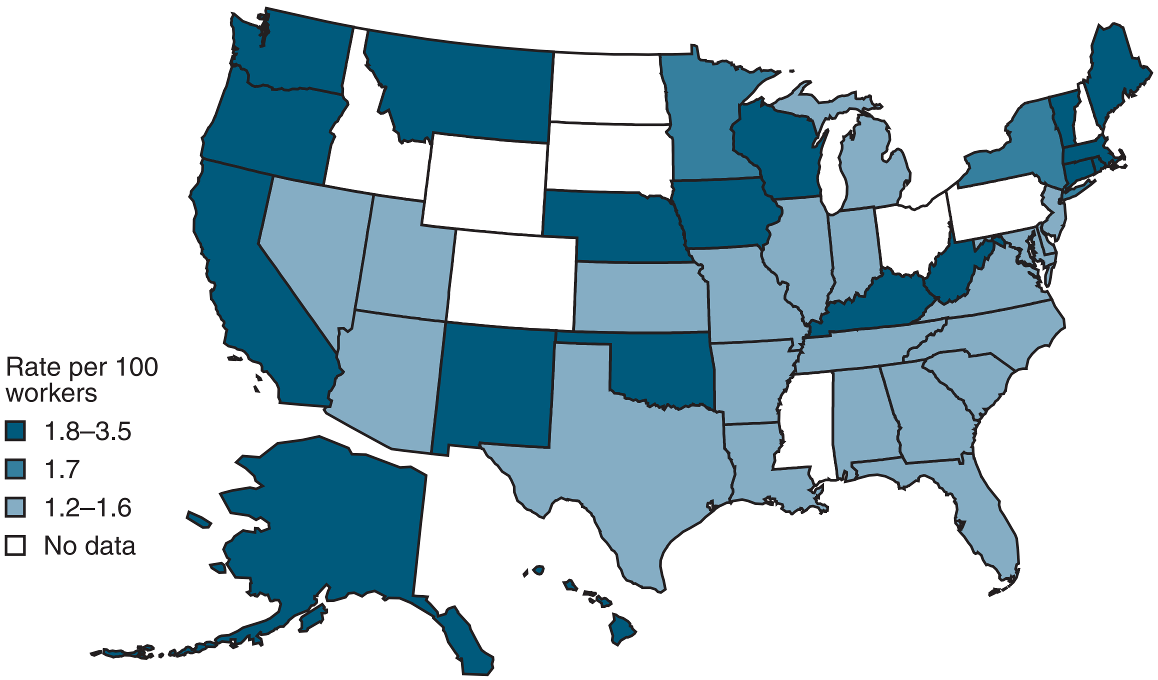


Figure 1–18. Incidence rates of nonfatal occupational injuries and illnesses in private industry by State, 2001. Nonfatal occupational injury and illness rates varied by State from 2.3 to 8.7 per 100 full-time workers. (The U.S. rate was 5.7 per 100 full-time workers.) Lower rates were reported for States in the South, southern coastal States, and the Southwest. ***(Source: BLS [2003d].)***



How did the rate of lost-workday cases differ by State in 2001?

Figure 1–19. Incidence rates for lost-workday cases of nonfatal occupational injury and illness in private industry by State, 2001. Rates of lost-workday cases of nonfatal occupational injury and illness varied among the States from 1.9 to 5.0 per 100 full-time workers, with an overall U.S. rate of 2.8. Lower rates were reported for the South, southern coastal States, and the Southwest. *(Source: BLS [2003d].)*



How did the rates of nonfatal injuries and illnesses involving days away from work differ by State in 2001?

Figure 1–20. Incidence rates for nonfatal occupational injury and illness cases involving days away from work in private industry by State, 2001. Rates of nonfatal occupational injury and illness cases with days away from work varied among the States from 1.2 to 3.5 per 100 full-time workers. (The U.S. rate was 1.7 per 100 full-time workers.) Lower rates were reported for the South, southern coastal States, Mississippi Delta, and western mountain States. *(Source: BLS [2003d].)*

Illnesses

How many occupational illnesses occurred in 2001? What percentage of total occupational injuries and illnesses did they account for that year?

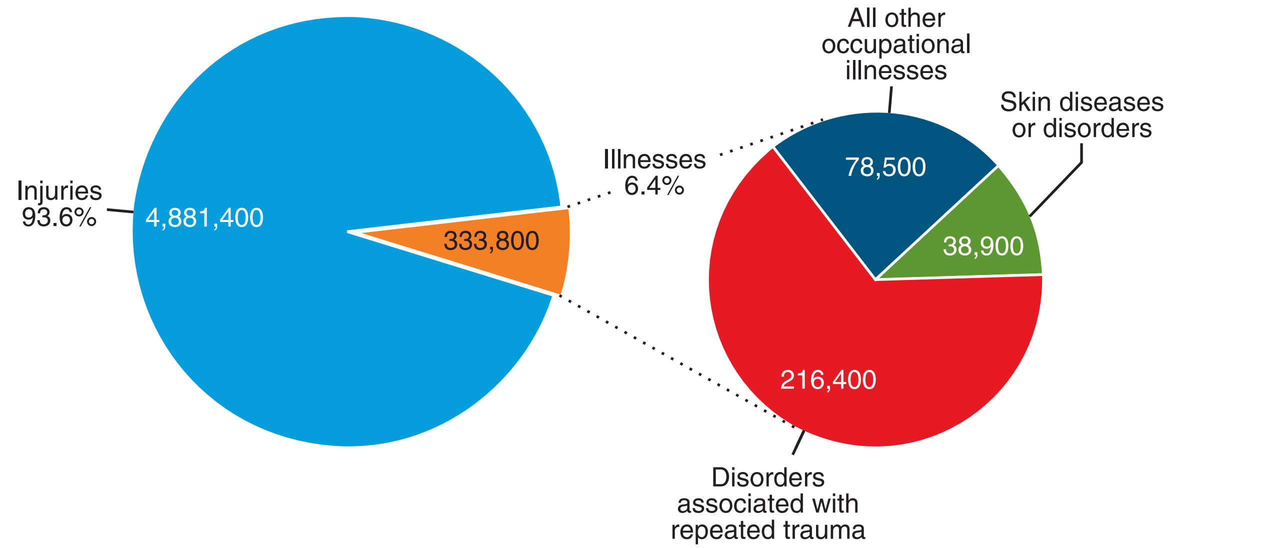


Figure 1–21. Injuries and illnesses in private industry, 2001. Of the 5.2 million nonfatal occupational injuries and illnesses reported in 2001, 4.9 million or 93.6% were injuries. The remainder (333,800 cases or 6.4%) were work-related illnesses. Sixty-five percent (216,400 cases) of the nonfatal occupational illnesses were disorders associated with repeated trauma. ***(Source: BLS [2002b].)***

Magnitude and Trend

How did the numbers and types of occupational illness cases change between 1972 and 2001?

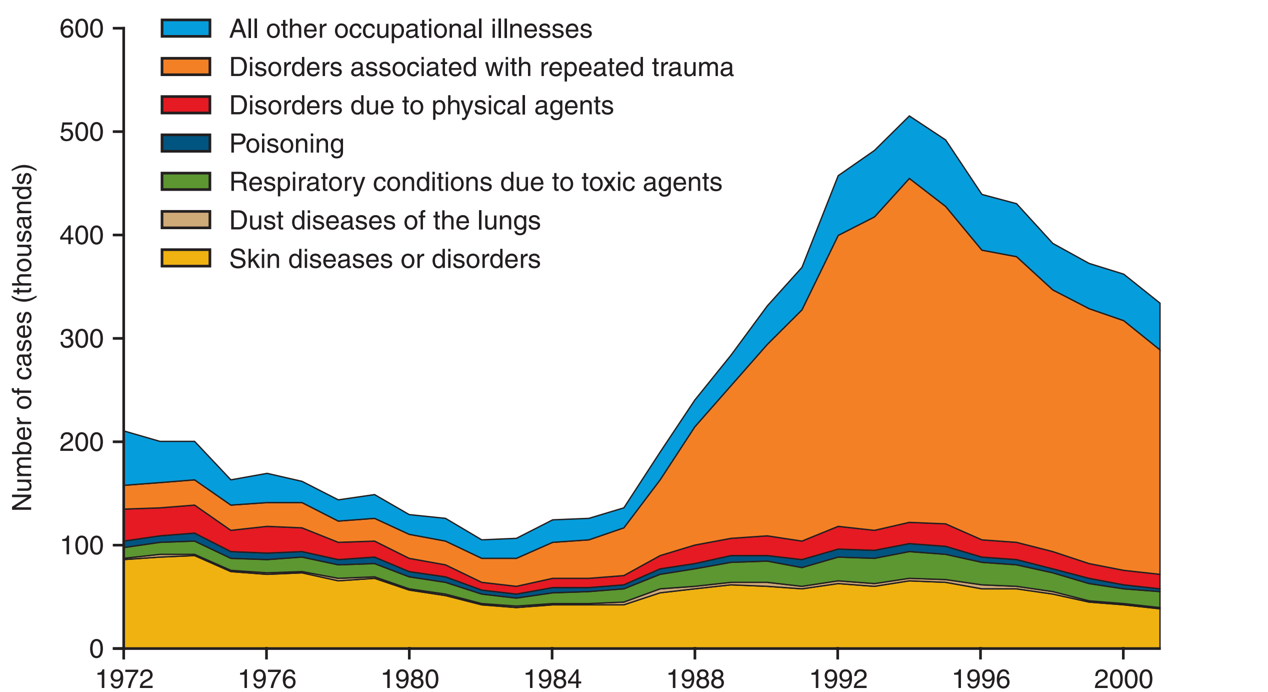
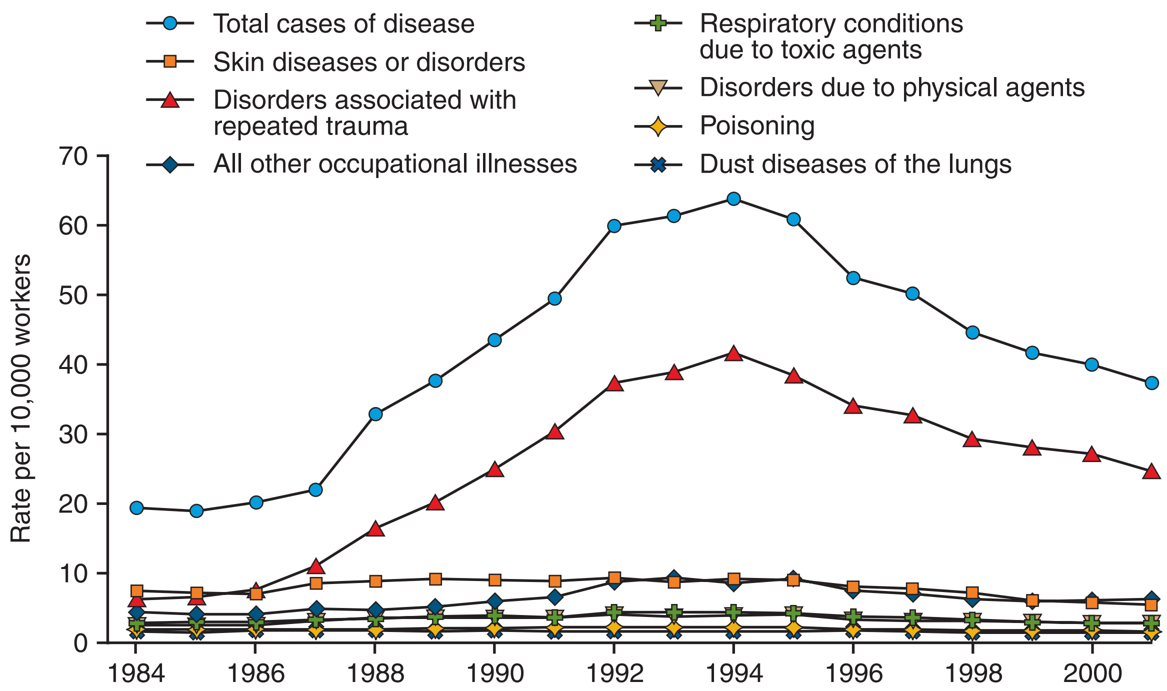
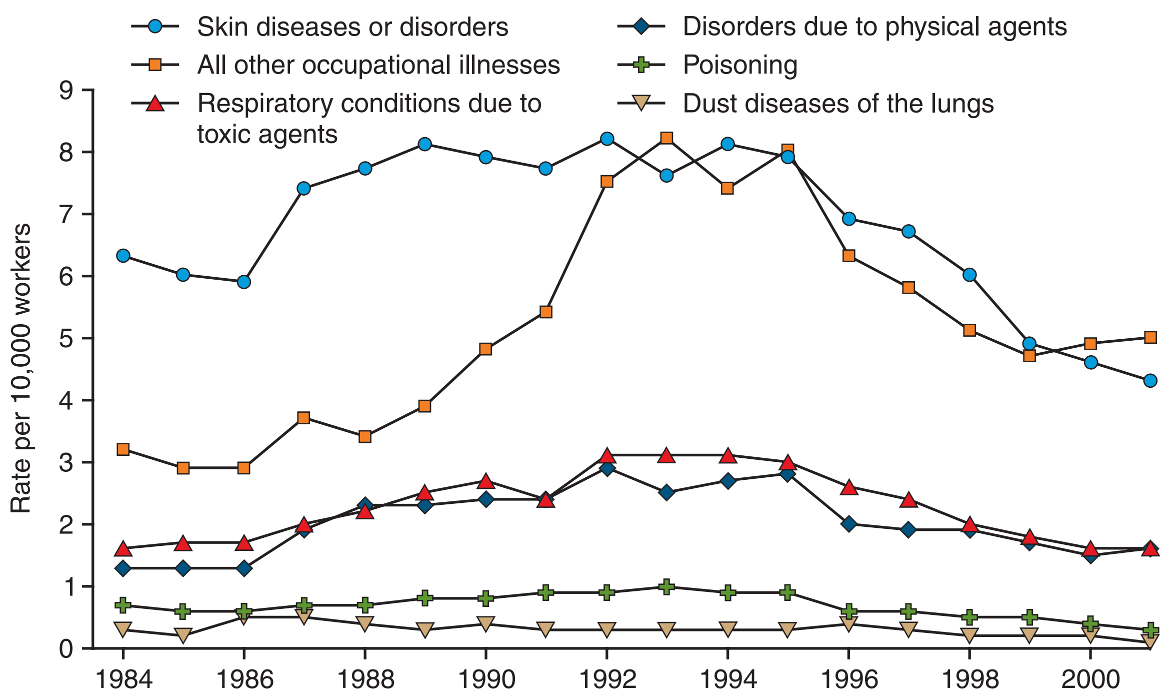


Figure 1–22. Number of illness cases in private industry by type of illness, 1972–2001. Since 1972, BLS data illustrate significant variation in the number of reported illness cases. From 1972 to 1982, the number of illness cases declined gradually from 210,500 to 105,600. This number increased and peaked sharply in 1994 at 514,700 cases. The number of cases declined steadily to 333,800 in 2001. Disorders associated with repeated trauma declined for 7 consecutive years dating from 1995. About 216,400 cases were reported in 2001, compared with a high of 332,100 cases in 1994. ***(Source: BLS [2002b].)***



How did the rates and types of occupational illnesses change between 1983 and 2000?

Figure 1–23. Incidence rates of occupational illness in private industry by illness category, 1984–2001. Since first reporting illness category rates in 1984, BLS has tracked the steep increase in overall illness rates that began in the mid-1980s and peaked in 1994. The overall pattern reflects the trends for disorders associated with repeated trauma. ***(Source: BLS [2002b].)***



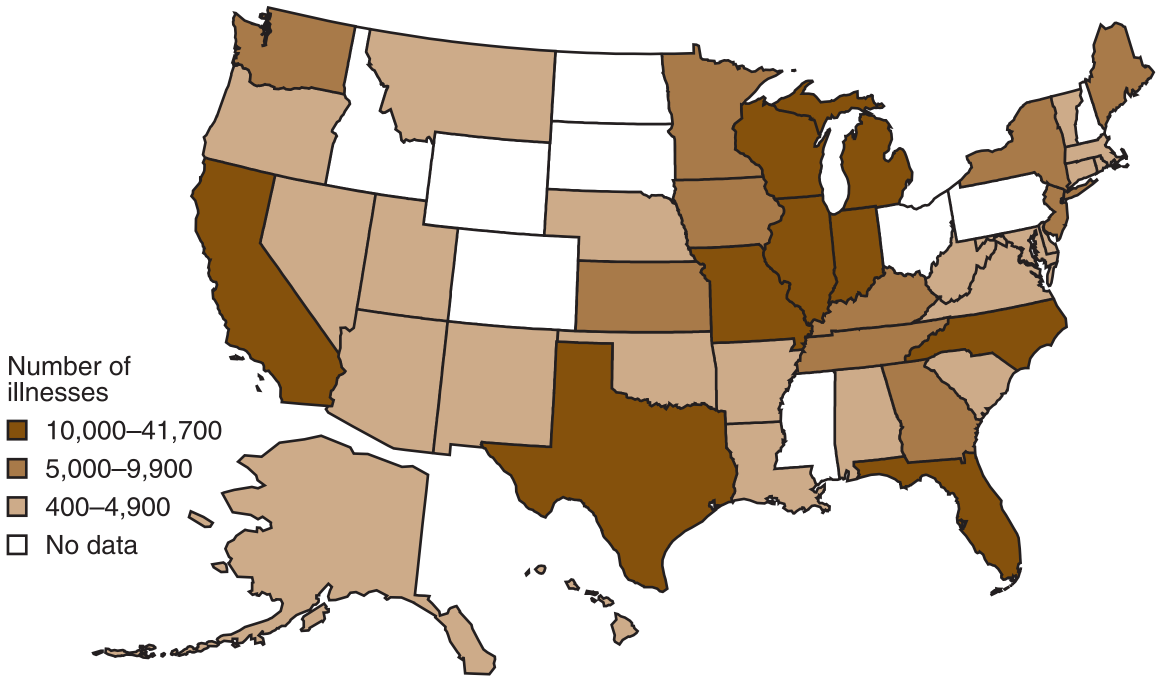
How did the rates of selected occupational illnesses change between 1984 and 2001?

Figure 1–24. Incidence rates of occupational illness in private industry by illness category other than disorders associated with repeated trauma, 1984–2001. Rates for other categories of illness were smaller than for disorders associated with repeated trauma. These diseases and disorders represent approximately one-third of all reported occupational illnesses. Skin diseases or disorders have consistently accounted for 12%–14% of all occupational illness cases, with rates ranging from 8.2 to 4.3 per 10,000 full-time workers between 1992 and 2001. ***(Source: BLS [2002b].)***

Numbers and Rates among States

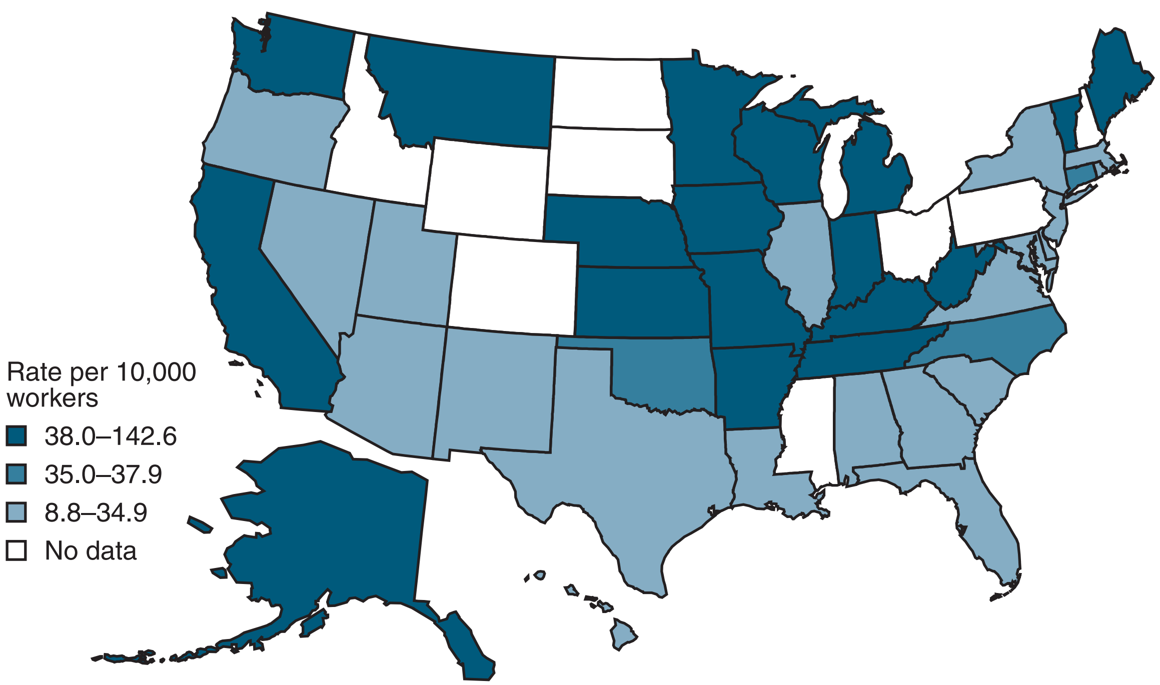
How did the number of occupational illness cases differ by State in 2001?

Figure 1–25. Number of occupational illness cases in private industry by State, 2001. The number of new cases among reporting States ranged from 400 to 41,700. States with the highest numbers included California (41,700), Michigan (30,200), Texas (17,200), and Illinois (14,500). ***(Source: BLS [2003d].)***



How did occupational illness rates differ by State in 2001?

Figure 1–26. Incidence rates for occupational illness in private industry by State, 2001. Occupational illness rates varied widely among the States, from 8.8 per 10,000 full-time workers in New Mexico to 142.6 in Maine. (The U.S. rate was 36.7 per 10,000 full-time workers.) Higher rates were reported in the Midwest. Lower rates were reported for States in the South and in the southern coastal and western mountain States. ***(Source: BLS [2003d].)***



Characteristics of Injured and Ill Workers and Their Injuries and Illnesses

BLS began collecting additional information from employers about seriously injured or ill workers (i.e., injuries or illnesses requiring recuperation away from work beyond the day of the incident) in 1992. Employers answer several questions about these cases, including questions about the demographic characteristics of the injured or ill worker (for example, age, sex, and race/ethnicity), the worker's occupation, length of service with the employer at the time of the incident, the nature of the disabling condition, and the event and source producing the condition.

BLS reported 1.5 million cases involving days away from work in 2001 [BLS 2003c]. Most cases were aged 20–44 (65%) (Figure 1–27), male (66.1%) (Figure 1–29), and white, non-Hispanic (68.2%) [Figure 1–30]. Operators, fabricators, and laborers accounted for nearly 40% of all occupational injuries and illnesses (Figure 1–31). Between 1993 and 2001, truck drivers experienced the most injuries and illnesses involving days away from work (Figure 1–32). Services industries accounted for 24% of the cases in each case category (injury cases and injury plus illness cases) (Figure 1–33). Among the occupations with at least 0.5% of the total cases involving days away from work, bus drivers had a median of 11 days. Truck drivers; plumbers, pipefitters, and steamfitters; and industrial machinery repairers each had a median of 10 days. For all occupations, the median was 6 days (Figure 1–34). Workers with 1 or more years of service with their employer accounted for 57.9% of all injuries and illnesses involving days away from work (Figure 1–35).

Case characteristics help describe each event leading to an injury or illness involving 1 or more days away from work. These characteristics include (1) the physical characteristics of the disabling injury or illness (nature); (2) the body part affected; (3) what directly produced or inflicted the condition (source); and (4) the way in which the incident occurred (event or exposure).

Sprains and strains were the leading type of nonfatal occupational injury/illness in 2001, accounting for more than 669,889 cases—or nearly 43.6% of all nonfatal occupational injuries and illnesses (Figure 1–36). Among injuries and illnesses, median days away from work were highest for carpal tunnel syndrome (25 days), fractures (21 days), and amputations (18 days) (Figure 1–37). The back was the body part most frequently affected in cases involving days away from work (Figure 1–38). Four sources accounted for more than half of all nonfatal occupational injuries and illnesses with days away from work: floors, walkways, ground surfaces (17.2%); worker motion or position (16%); containers (13.6%); and parts and materials (10.6%) (Figure 1–40). Bodily reaction and exertion, contact with objects and equipment, and falls were the leading events or exposures, accounting for nearly 90% of cases (Figure 1–41). Repetitive motion injuries (with a median of 18 days away from work) resulted in the longest absences from work among the leading events and exposures (Figure 1–42).

Characteristics of Injured and Ill Workers

Age

How did nonfatally injured and ill workers differ by age in 2001?

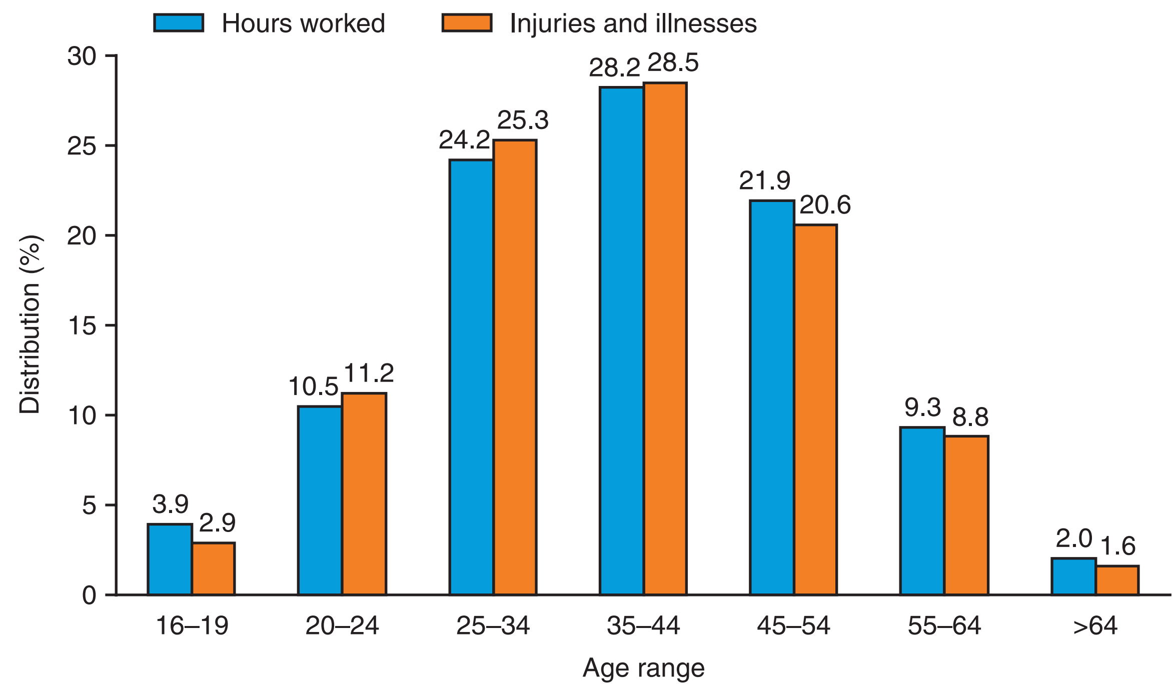


Figure 1–27. Distribution of hours worked and occupational injury and illness cases with days away from work in private industry by age of worker, 2001. For workers aged 20–44, the percentage of total injuries and illnesses was greater than the percentage of total hours worked. Together, these workers accounted for the majority of injured or ill workers. *(Source: BLS [2001]; BLS [2003c].)*

How did the severity of the nonfatal injury or illness vary by age in 2001?

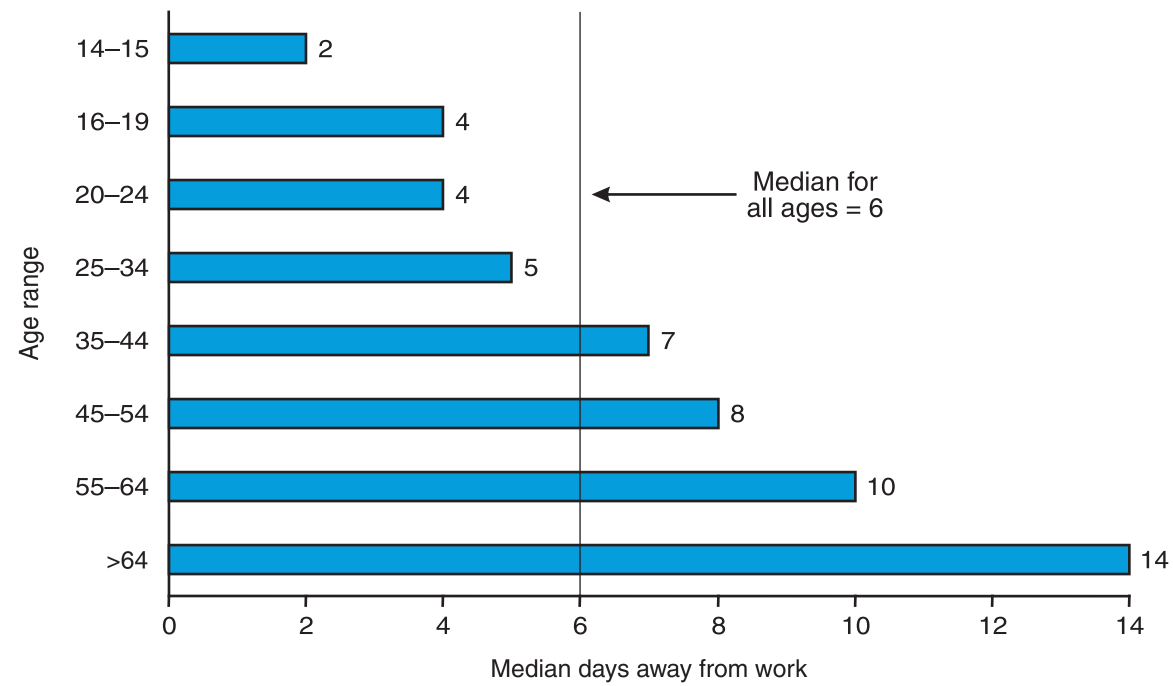
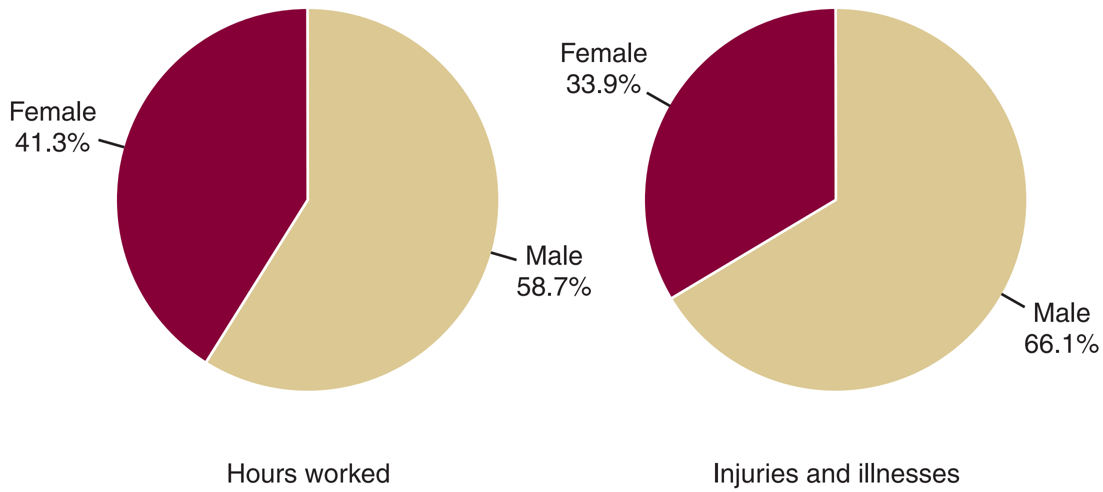


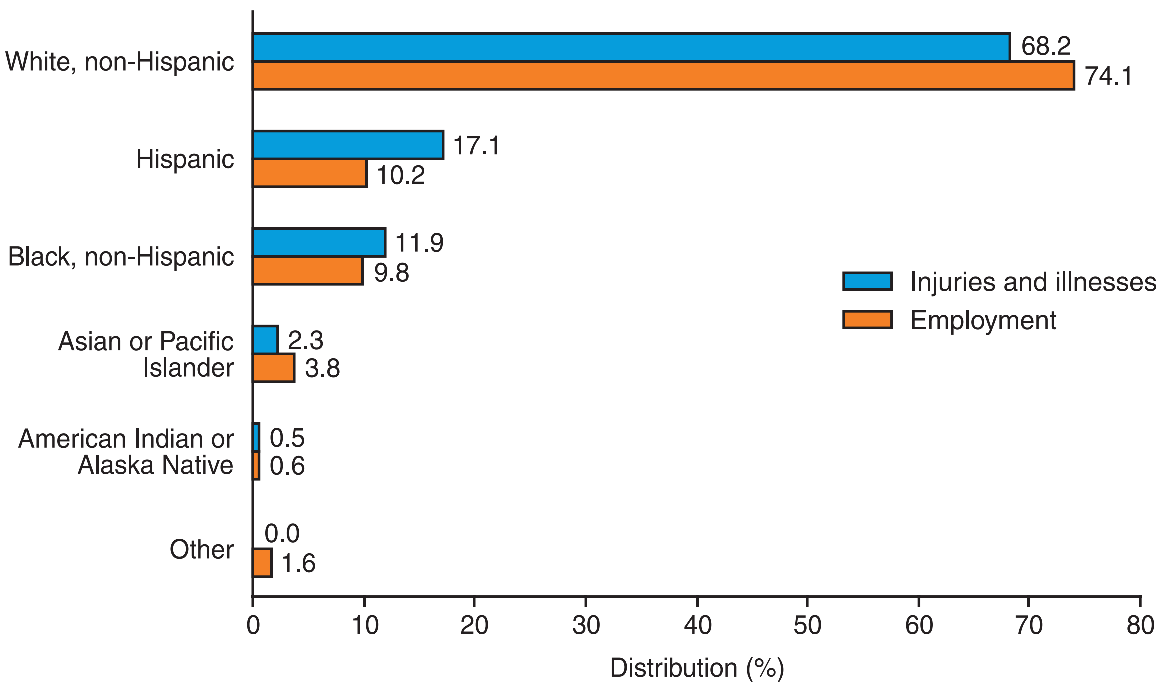
Figure 1–28. Median days away from work due to occupational injuries and illnesses in private industry by age of worker, 2001. The median number of days away from work due to nonfatal occupational injuries and illnesses increased as the age of the worker increased. The median number of days away from work was 6 for all cases in 2001. *(Source: BLS [2003c].)*



Sex

How did nonfatal injuries and illnesses differ by sex of worker in 2001?

Figure 1–29. Distribution of hours worked and occupational injury and illness cases with days away from work in private industry by sex, 2001. Nearly two-thirds (66.1%) of the injured or ill workers were male. ***(Sources: BLS [2001]; BLS [2003c].)***



Race/Ethnicity

How did the distribution of employed U.S. workers in 2000 compare with the distribution of nonfatally injured or ill workers by race/ethnicity in 2001?

Figure 1–30. Distribution of employed U.S. workers in 2000 and nonfatal occupational injury and illness cases with days away from work in private industry in 2001 by race/ethnicity. Hispanic workers accounted for 10.2% of employed U.S. workers in 2000 but 17.1% of all nonfatal injury and illness cases in 2001. White, non-Hispanic workers accounted for 74.1% of employed U.S. workers in 2000 but 68.2% of nonfatal injury and illness cases with days away from work in 2001. ***(Sources: Census [2003]; BLS [2003c].)***

Occupation

How did the distribution of nonfatal injuries and illnesses differ by occupational group in 2001?

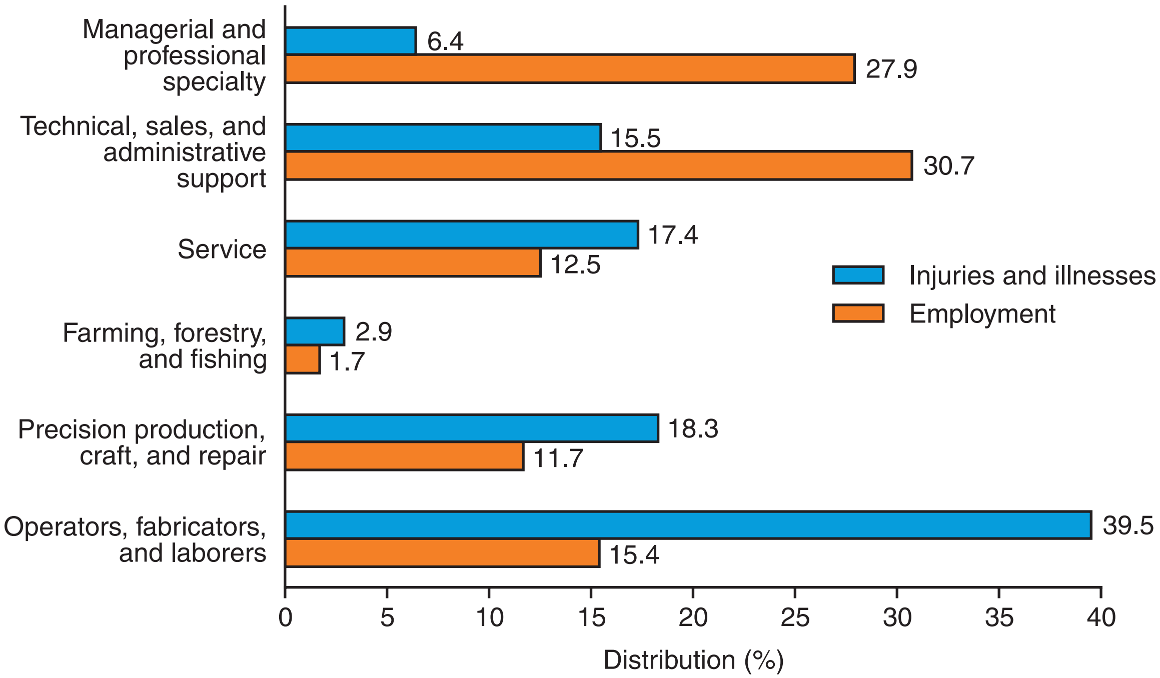


Figure 1–31. Distribution of employed workers and injury and illness cases with days away from work in private industry by occupation, 2001. Operators, fabricators, and laborers accounted for nearly 40% of all occupational injuries and illnesses, well above the percentage of employed workers they represent (15.4%). ***(Sources: BLS [2001]; BLS [2003c].)***

Which occupations had the most nonfatal injuries and illnesses during 1992–2001?

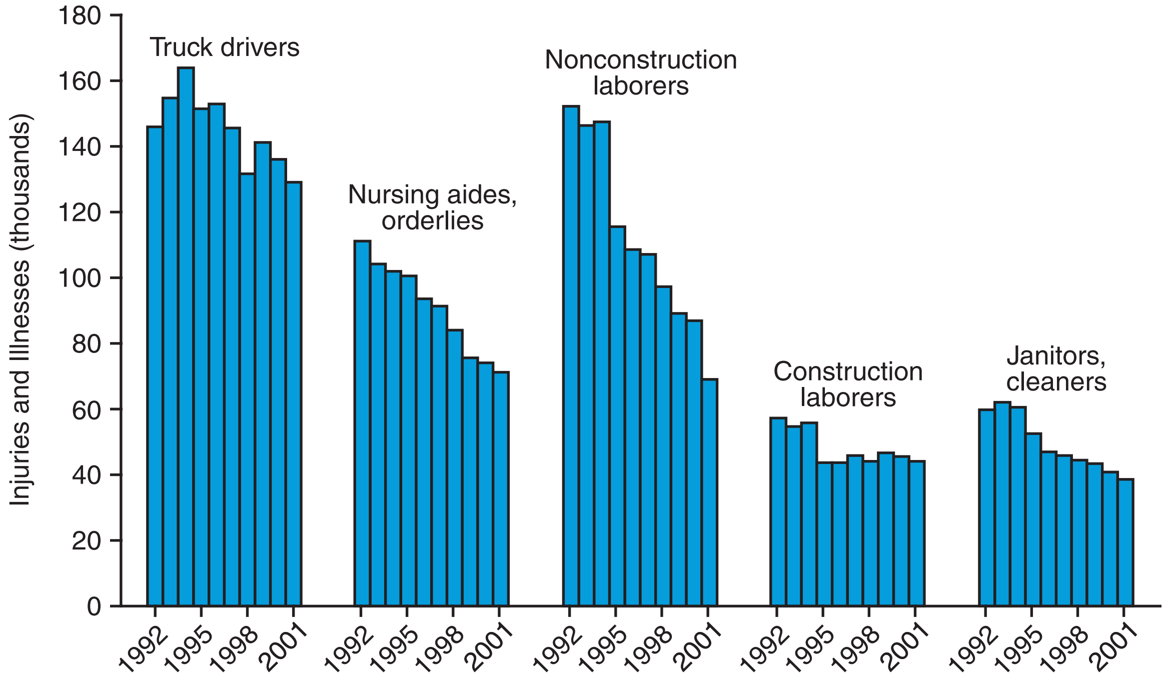
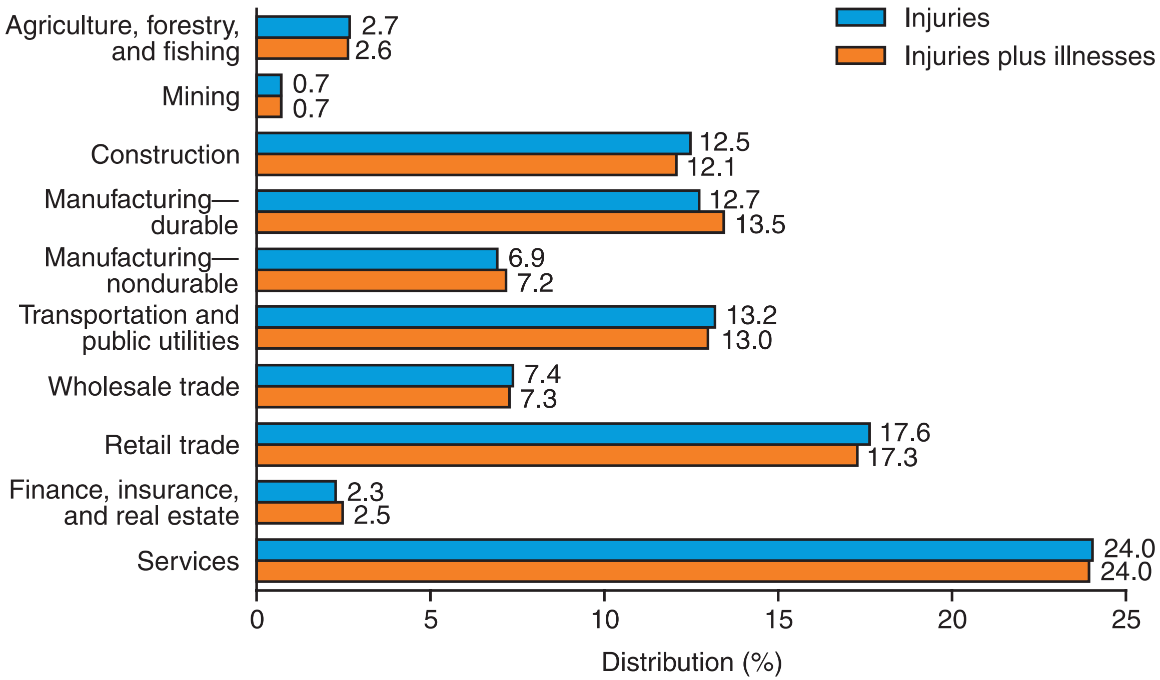


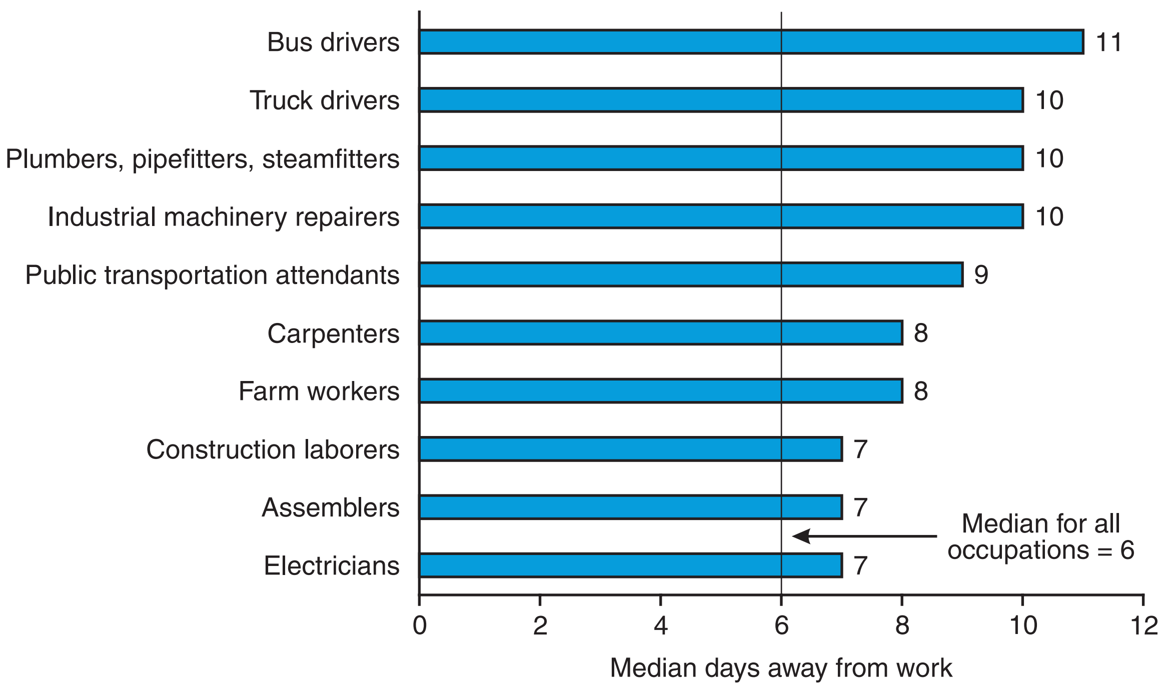
Figure 1–32. Number of occupational injuries and illnesses with days away from work in private industry for selected occupations, 1992–2001. In 1992, nonconstruction laborers suffered more injuries than any other occupational group. From 1993 to 2001, truck drivers suffered the most injuries involving time away from work. ***(Source: BLS [2003c].)***



Industry

How did the distribution of nonfatal injuries compare with the distribution of nonfatal injuries plus illnesses by industry sector in 2001?

Figure 1–33. Distribution of nonfatal injury cases with days away from work and nonfatal injury plus illness cases by private industry sector, 2001. For most private industry sectors in 2001, distribution of the 1.47 million nonfatal injury cases was comparable with that of the 1.54 million nonfatal injury plus illness cases. Services accounted for 24% of the cases in each case category. Manufacturing accounted for 19.6% of injury cases and 20.7% of injury plus illness cases. The difference was greatest for durable manufacturing, which accounted for 12.7% of injury cases and 13.5% of injury plus illness cases. ***(Source: BLS [2003c].)***



Severity of Injuries and Illnesses

Which occupations experienced the most severe work loss in 2001?

Figure 1–34. Occupations with the highest median days away from work due to occupational injuries or illnesses in private industry, 2001. Among the occupations with at least 0.5% of the total cases involving days away from work, bus drivers had a median of 11 days. Truck drivers; plumbers, pipefitters, and steamfitters; and industrial machinery repairers each had a median of 10 days. The median number of days away from work was 6 for all cases in 2001. ***(Source: BLS [2003c].)***

Length of Service

How did nonfatal injuries and illnesses vary by the worker's length of service in 2001?

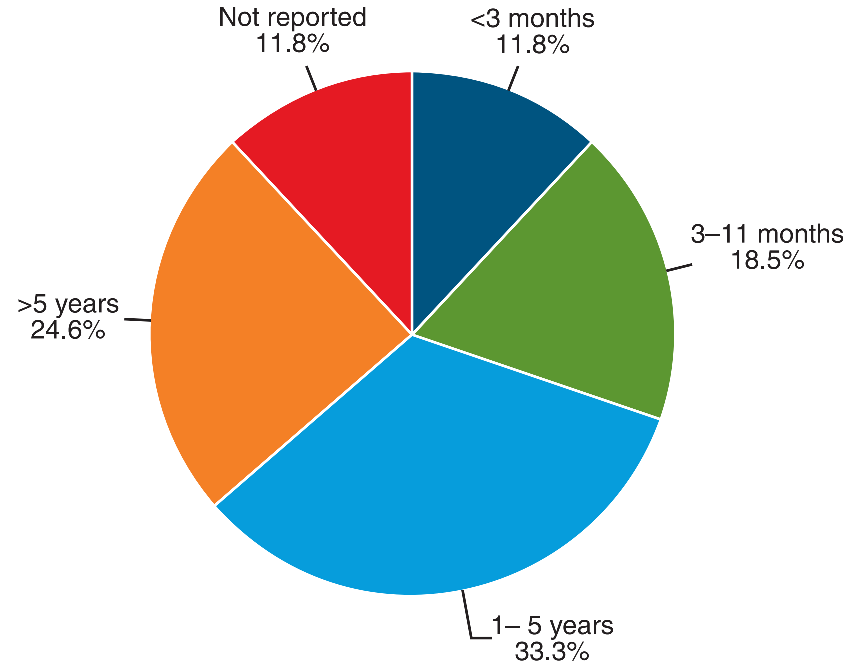


Figure 1–35. Distribution of occupational injury and illness cases with days away from work in private industry by length of service, 2001. Most injuries and illnesses (63.6%) occurred within the first 5 years of service with an employer. ***(Source:*** *BLS [2003c].)*

Characteristics of the Injury or Illness

Nature of Injury or Illness

How were nonfatal injuries and illnesses distributed by nature of injury or illness in 2001?

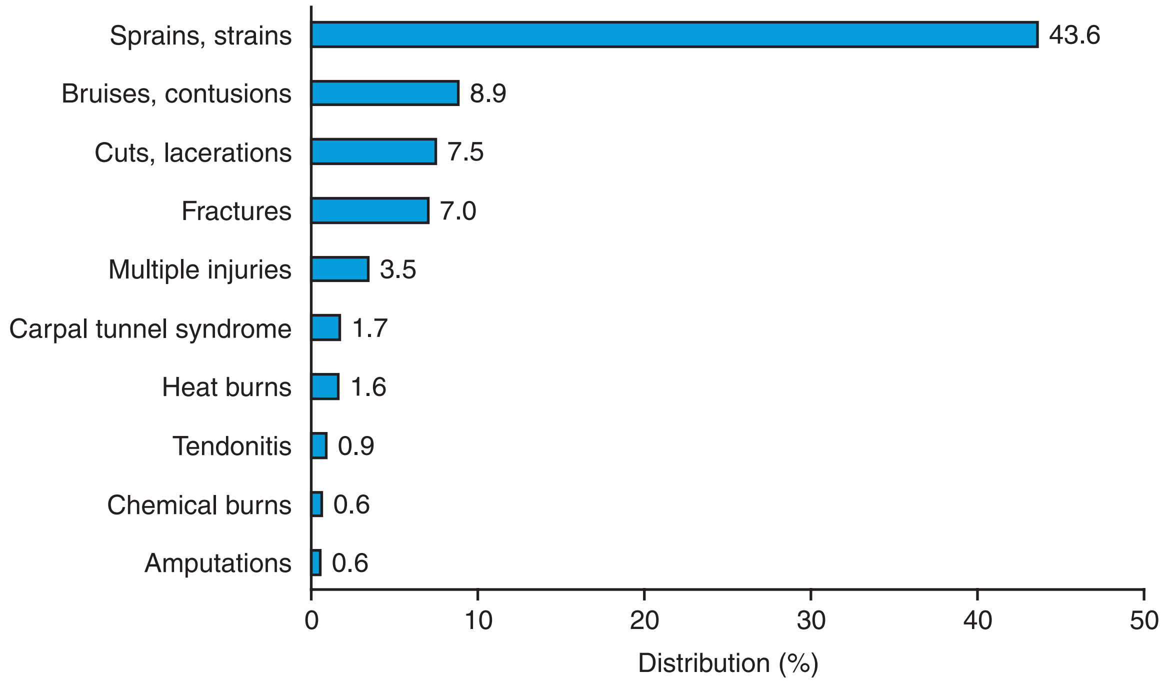
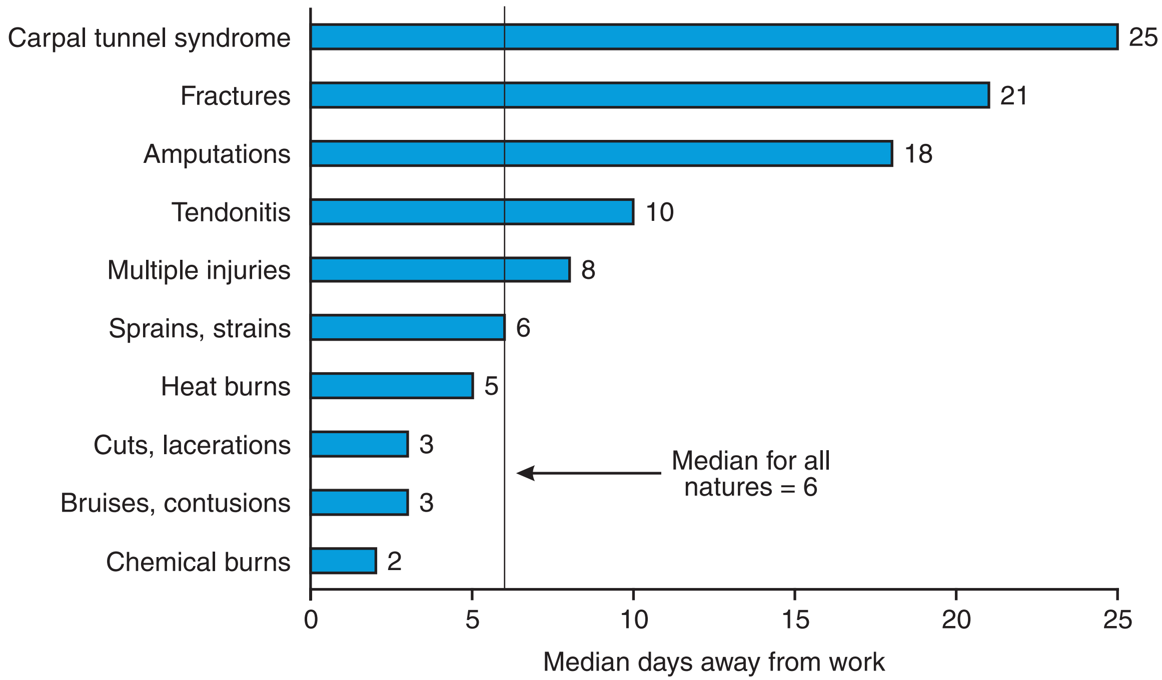
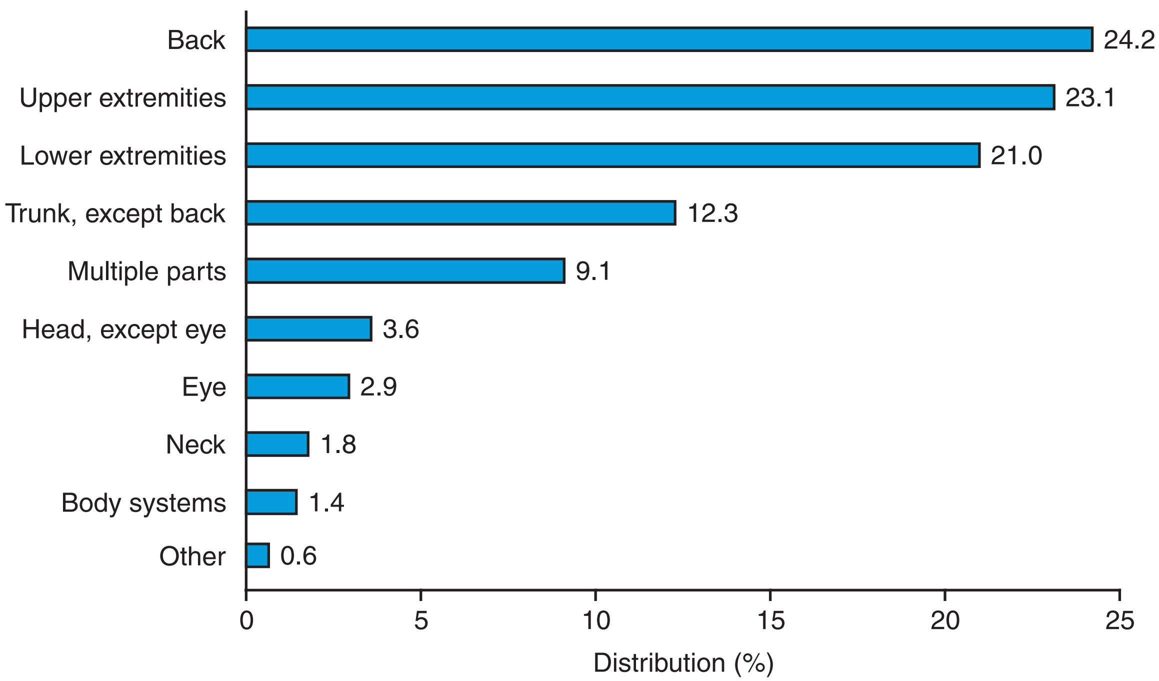


Figure 1–36. Distribution of occupational injury and illness cases with days away from work in private industry by nature of injury or illness, 2001. Sprains and strains accounted for more than 669,889—or nearly 43.6% of all nonfatal occupational injuries and illnesses. ***(Source:*** *BLS [2003c].)*



Which injuries and illnesses accounted for the most severe work loss in 2001?

Figure 1–37. Median days away from work due to occupational injuries or illnesses in private industry by nature of injury or illness, 2001. Among major disabling injuries and illnesses, median days away from work were highest for carpal tunnel syndrome (25 days), fractures (21 days), and amputations (18 days). The median number of days away from work was 6 for all cases in 2001. *(Source: BLS [2003c].)*



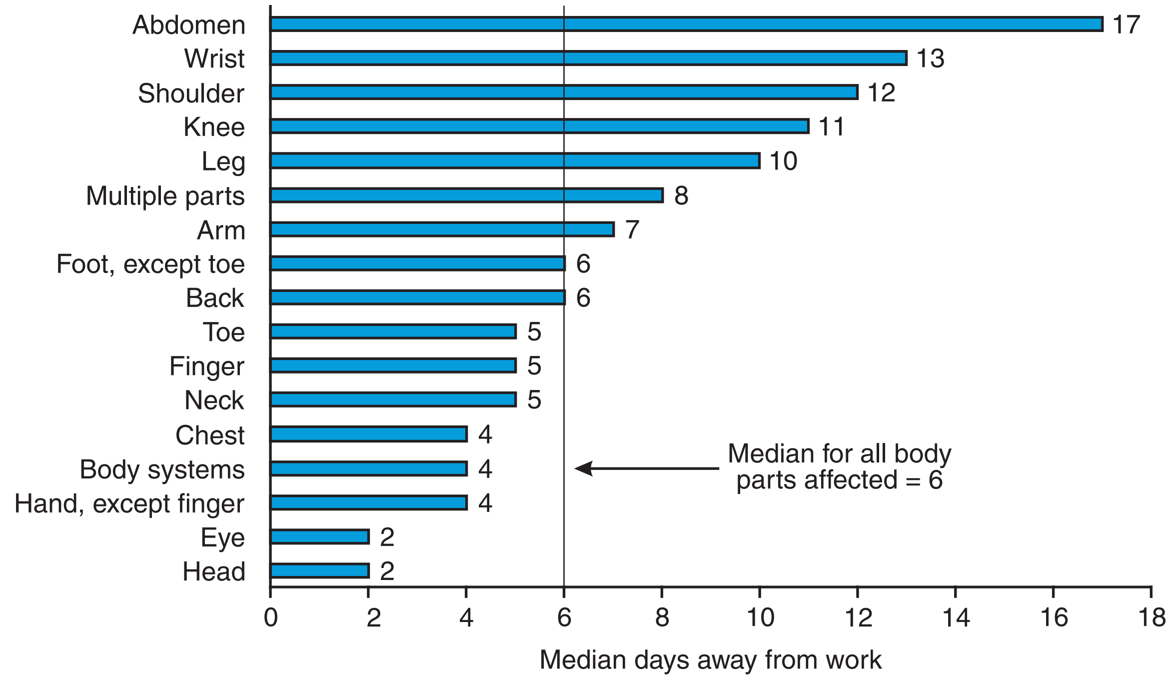
Body Part Affected

How were nonfatal injuries and illnesses distributed by body part affected in 2001?

Figure 1–38. Distribution of occupational injury and illness cases with days away from work in private industry by body part affected, 2001. The back was involved in nearly a fourth of all occupational injuries and illnesses. Conditions involving the upper and lower extremities each accounted for more than one-fifth of the cases. *(Source: BLS [2003c].)*

How did the body part affected relate to days away from work in 2001?

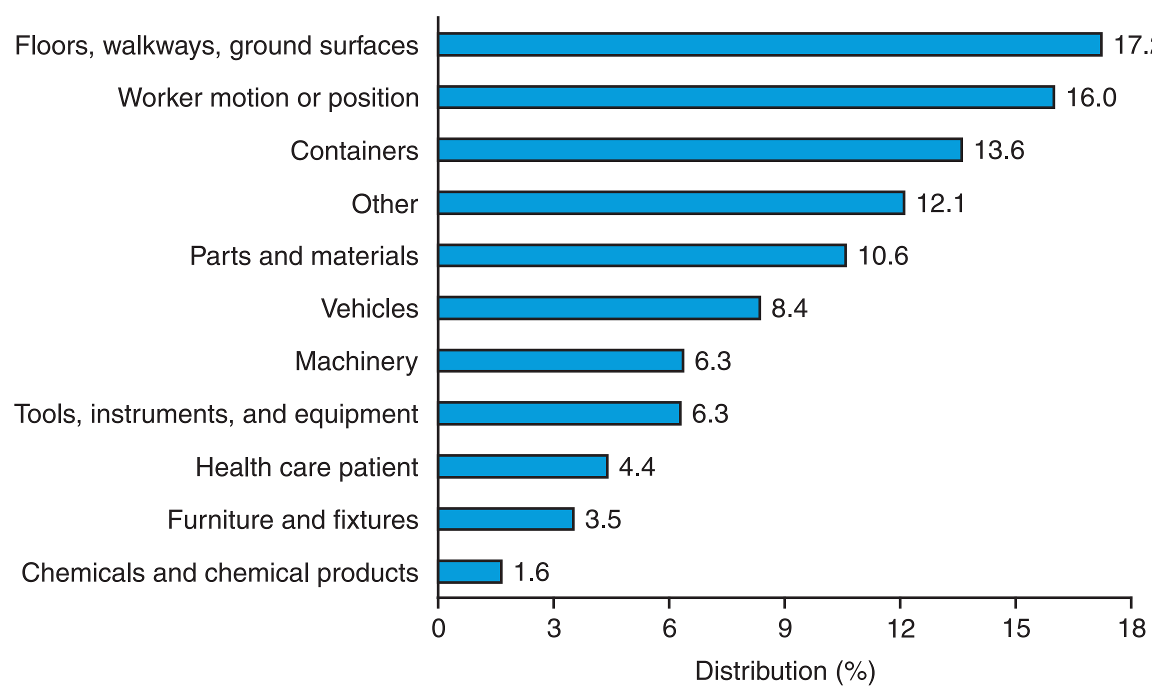
Figure 1–39. **Median days away from work due to occupational injuries or illnesses in private industry by body part affected, 2001.** Workers with injuries and illnesses to the abdomen and to the wrist had the highest median number of days away from work—17 and 13 days, respectively. The median number of days away from work was 6 for all cases in 2001. ***(Source: BLS [2003c].)***



Source of Injury or Illness

How were nonfatal injuries and illnesses distributed by source of injury or illness in 2001?

Figure 1–40. **Distribution of occupational injury and illness cases with days away from work in private industry by source of injury or illness, 2001.** Together, four sources accounted for more than half of all nonfatal occupational injuries and illnesses with days away from work: floors, walkways, ground surfaces (17.2%); worker motion or position (16%); containers (13.6%); and parts and materials (10.6%). ***(Source: BLS [2003c].)***



Event or Exposure

How were nonfatal injuries and illnesses distributed by event or exposure in 2001?

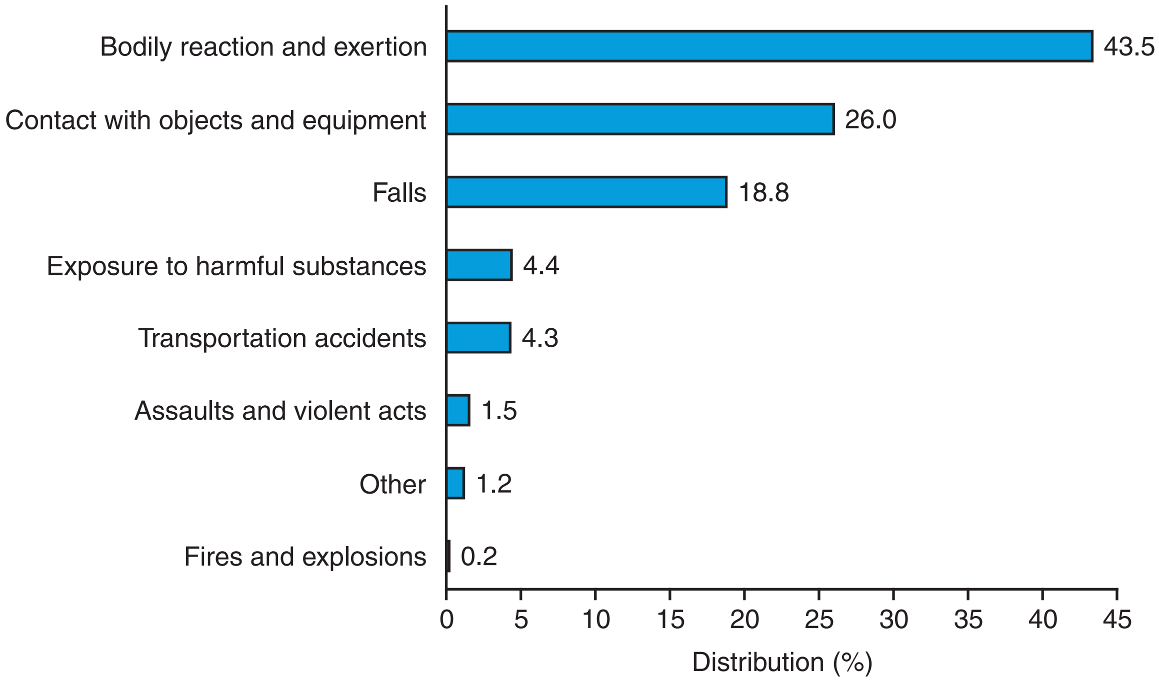


Figure 1–41. Distribution of occupational injury and illness cases with days away from work in private industry by event or exposure, 2001. Bodily reaction and exertion, contact with objects and equipment, and falls accounted for nearly 90% of nonfatal injuries and illnesses that resulted in days away from work in 2001. ***(Source: BLS [2003c].)***

How did event or exposure differ by median days away from work in 2001?

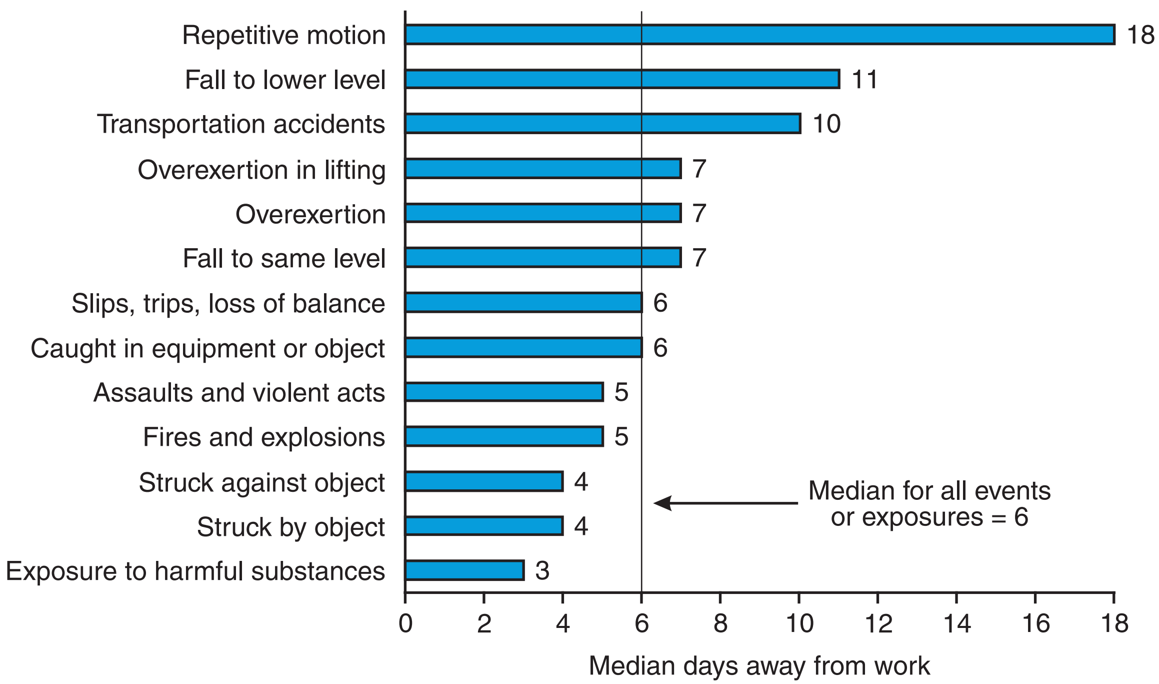


Figure 1–42. Median days away from work due to occupational injuries or illnesses in private industry by event or exposure, 2001. Repetitive motion injuries (with a median of 18 days away from work) resulted in the longest absences from work among the leading events and exposures in 2001. Falls to a lower level and transportation accidents both resulted in median days away that were well above the overall median of 6 days. ***(Source: BLS [2003c].)***

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Chapter 2 • Fatal and Nonfatal Injuries, and Selected Illnesses and Conditions

This chapter provides data describing the magnitude, distribution, and major demographic characteristics of fatal and nonfatal occupational injuries and selected occupational illnesses and conditions. The data and figures are presented in the following 11 sections, which correspond with surveillance and research areas within the National Institute for Occupational Safety and Health (NIOSH):

- Anxiety, stress, and neurotic disorders
- Bloodborne infections and percutaneous exposures
- Fatal injuries
- Hearing loss
- Lead toxicity
- Musculoskeletal disorders
- Nonfatal injury
- Disorders due to physical agents
- Poisoning
- Respiratory diseases
- Skin diseases and disorders

Data for the figures came from epidemiologic surveillance programs in the Centers for Disease Control and Prevention (CDC), the Bureau of Labor Statistics (BLS), our State-based surveillance partners under the Sentinel Event Notification System for Occupational Risks (SENSOR) program, and NIOSH.

CDC provided case data reported from State and local health authorities and from collaborating health care institutions on occupational hepatitis B, occupational human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS), percutaneous injuries, and occupational tuberculosis (TB).

BLS provided data from their Census of Fatal Occupational Injuries (CFOI) and Survey of Occupational Injuries and Illnesses (SOII). CFOI provides the most complete count of fatal occupational injuries available. BLS uses diverse State and Federal data sources to identify, verify, and profile fatal occupational injuries. SOII measures the number, demographic, and case characteristics of new occupational illness cases that are recognized, diagnosed, and reported.

NIOSH supports State-based occupational injury surveillance activities through the SENSOR program to develop model surveillance and related outreach activities for preventing occupational illness and injury. Our State-based partners contributed data on carpal tunnel syndrome, adult lead poisoning, hearing loss, pesticide poisoning, occupational asthma, and silicosis. Case data from these programs provided a unique perspective from our State-based partners.

NIOSH contributions included analyses from the many CDC data sources, the BLS CFOI and SOII data sources, surveys of hospital emergency departments, and fatal injuries and disease mortality from State and national vital statistics programs.

Anxiety, Stress, and Neurotic Disorders

Anxiety, stress, and neurotic disorders are associated with acute and chronic post-traumatic anxiety, reaction to stress, panic disorders, and other neurotic disorders not elsewhere classified. These disorders are more severe than the average injury or illness. Affected workers experience a much greater work loss than those with all nonfatal injuries or illnesses—25 days away from work compared with 6 in 2001 (Figure 2–6).

BLS reported 5,659 anxiety, stress, and neurotic disorder cases involving days away from work in 2001 (Figure 2–1). Rates declined 25% between 1992 and 2001, from 0.8 per 10,000 full-time workers in 1992 to 0.6 in 2001 (Figure 2–2). In 2001, most cases involved workers who were aged 25–54 (78.3%) (Figure 2–3), female (Figure 2–4), and white, non-Hispanic (64.8%) (Figure 2–5). Two occupational groups accounted for more than 63% of all anxiety, stress, and neurotic disorder cases in 2001: technical, sales, and administrative support (39.9% or 2,250 cases) and managerial and professional specialty occupations (23.6% or 1,331 cases) (Figure 2–7). Incidence rates for anxiety, stress, and neurotic disorders exceeding the private-sector rate were reported in 2001 for finance, insurance, and real estate (1.1 per 10,000 full-time workers), transportation and public utilities (1.1), and services (0.7) (Figure 2–8). Finance, insurance, and real estate had consistently higher incidence rates than other industry sectors during 1992–2001 and experienced a 42.1% reduction over this period (Figure 2–9).

Magnitude and Trend

How did the number of anxiety, stress, and neurotic disorders change during 1992–2001?

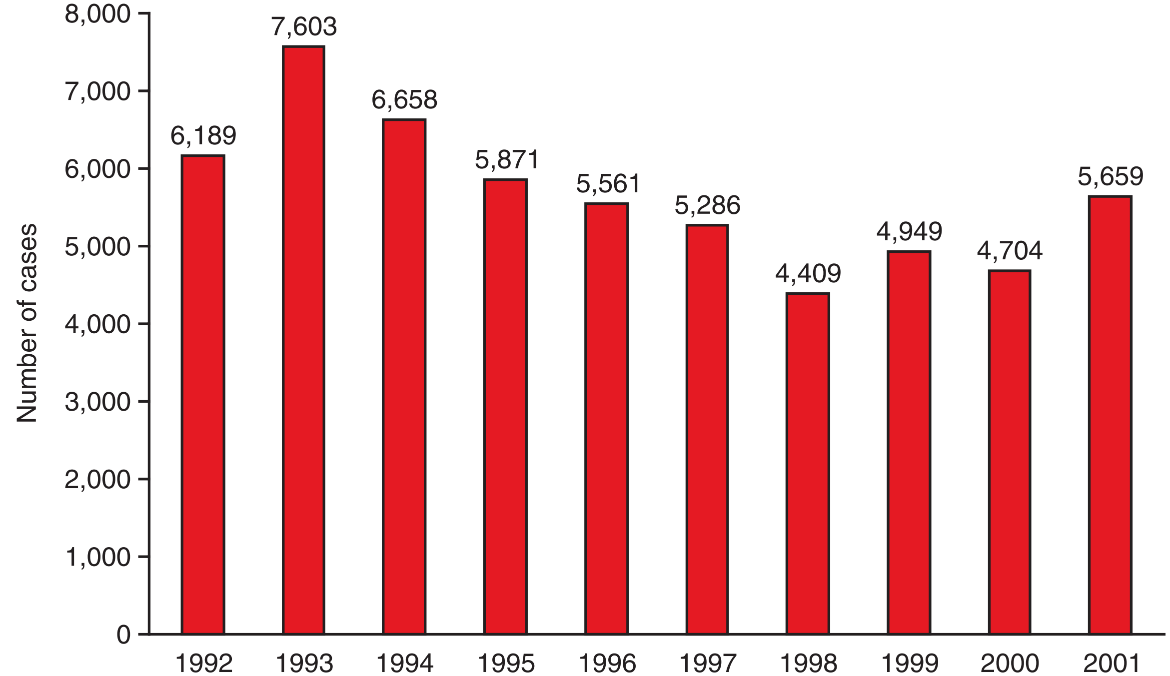


Figure 2–1. Number of anxiety, stress, and neurotic disorder cases involving days away from work in private industry, 1992–2001. During 1992–2001, the annual number of anxiety, stress, and neurotic disorder cases involving days away from work ranged from a high of 7,603 cases in 1993 to a low of 4,409 in 1998. Numbers declined 8.6% between 1992 and 2001—from 6,189 to 5,659 cases. ***(Sources: BLS [2003a,b].)***

How did the rates of anxiety, stress, and neurotic disorders change during 1992–2001?

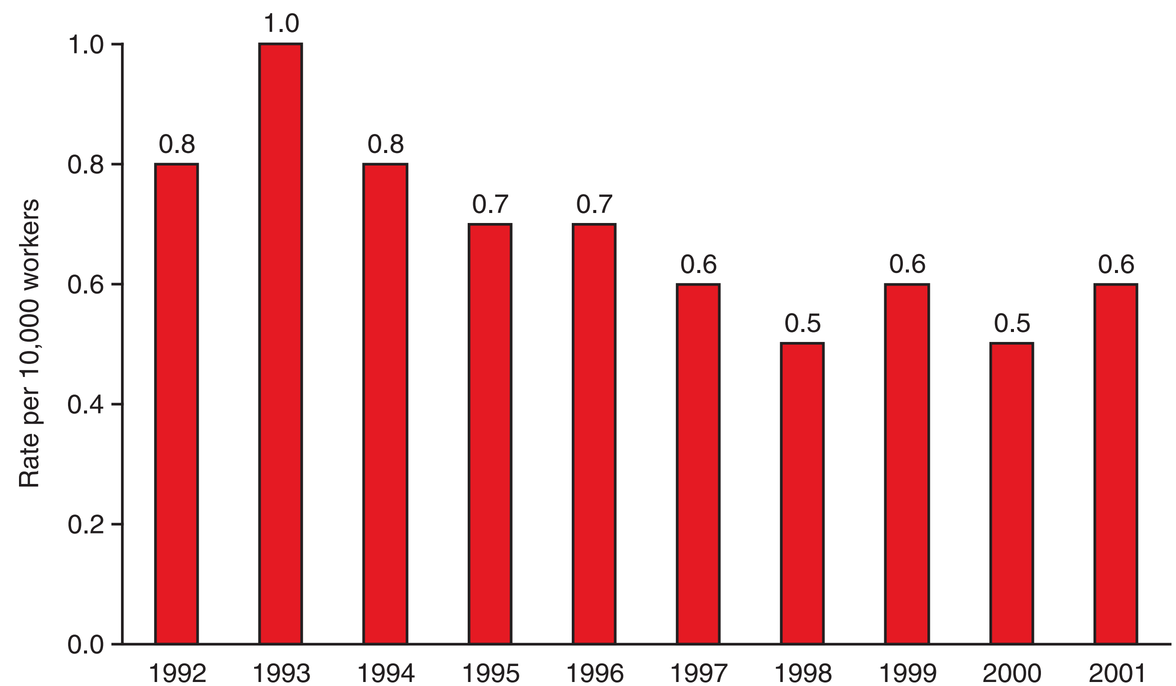
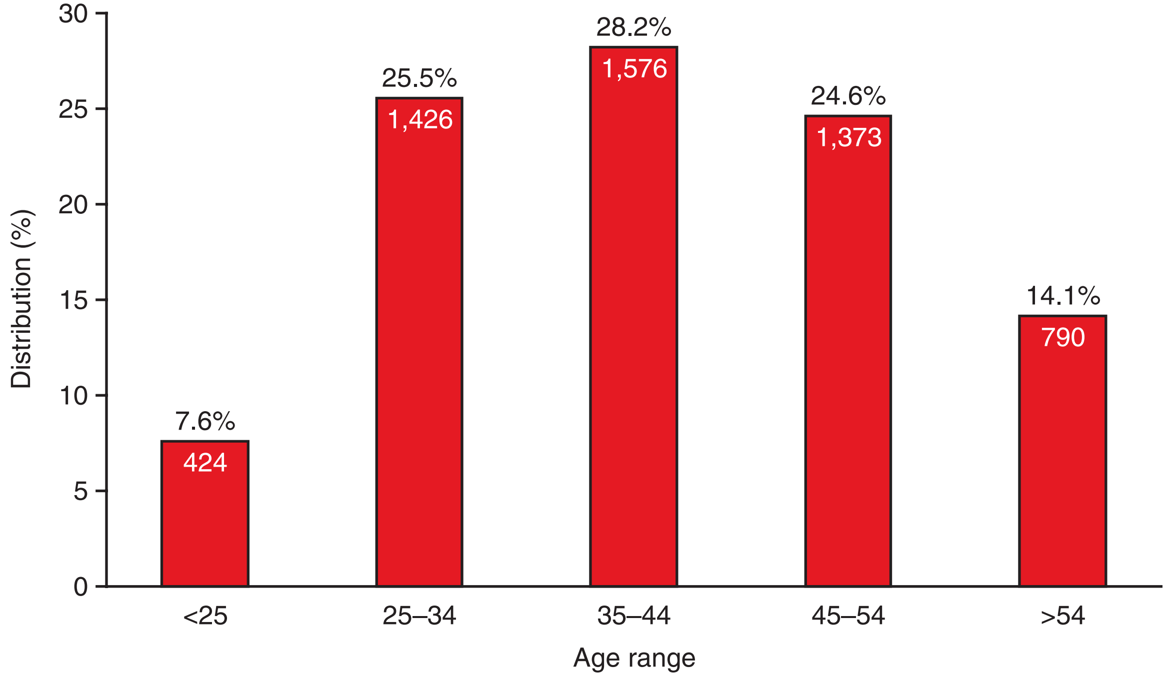


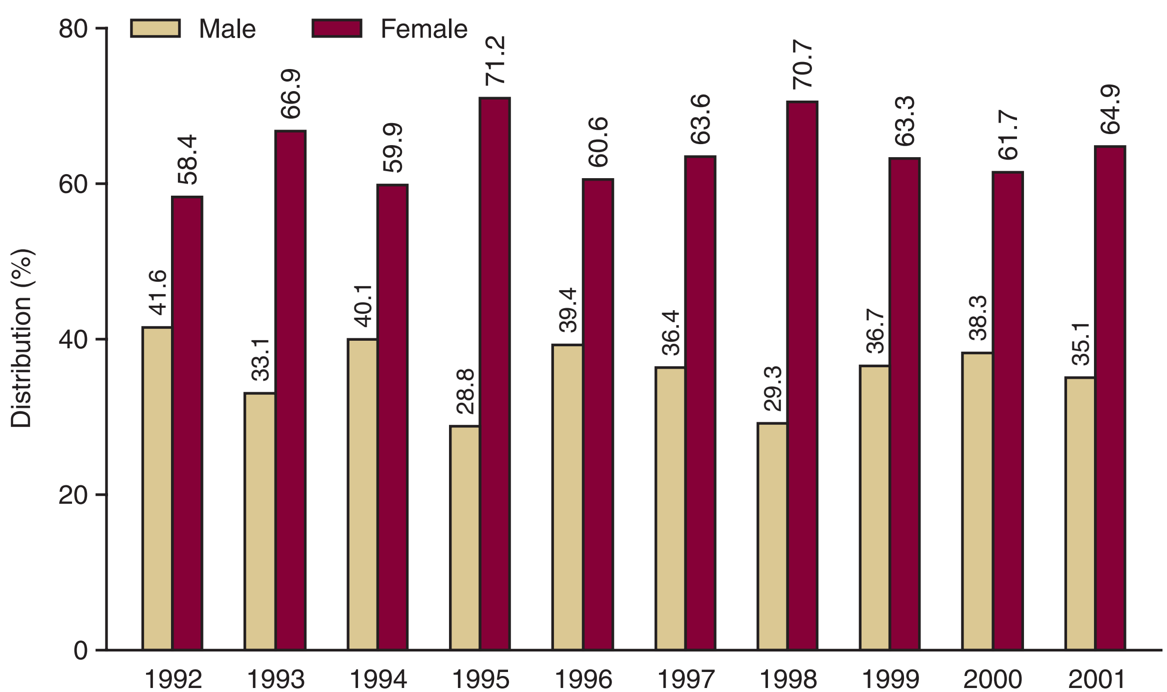
Figure 2–2. Annual rates of anxiety, stress, and neurotic disorder cases involving days away from work in private industry, 1992–2001. The annual rate of anxiety, stress, and neurotic disorder cases involving days away from work declined 25% between 1992 and 2001—from 0.8 to 0.6 per 10,000 full-time workers. ***(Sources: BLS [2003a,b].)***



Age

How did anxiety, stress, and neurotic disorders differ by age of worker in 2001?

Figure 2–3. Distribution and number of anxiety, stress, and neurotic disorder cases involving days away from work in private industry by age, 2001. Age data are available for 5,589 of the 5,659 BLS-estimated anxiety, stress, and neurotic disorder cases involving days away from work in 2001. Younger age groups accounted for the majority of cases. Workers aged 25–34 accounted for 1,426 or 25.5% of cases, and workers aged 35–44 accounted for 1,576 or 28.2% of cases. *(Sources: BLS [2003a,b]; Booth-Jones et al. [2003a].)*



Sex

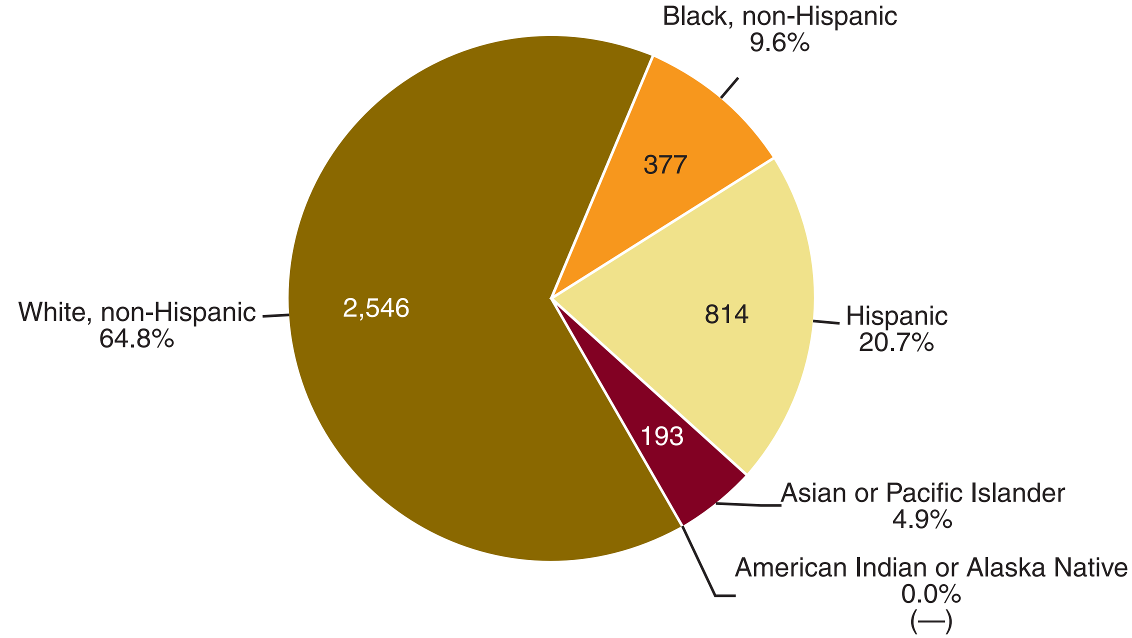
How did anxiety, stress, and neurotic disorders differ by sex of worker during 1992–2001?

Figure 2–4. Distribution of anxiety, stress, and neurotic disorder cases involving days away from work in private industry by sex, 1992–2001. Female workers accounted for the majority of anxiety, stress, and neurotic disorder cases during 1992–2001—from a low of 58.4% in 1992 to a high of 71.2% in 1995. *(Sources: BLS [2003a,b]; Booth-Jones et al. [2003a].)*

Race/Ethnicity

How did anxiety, stress, and neurotic disorders differ by race/ethnicity in 2001?

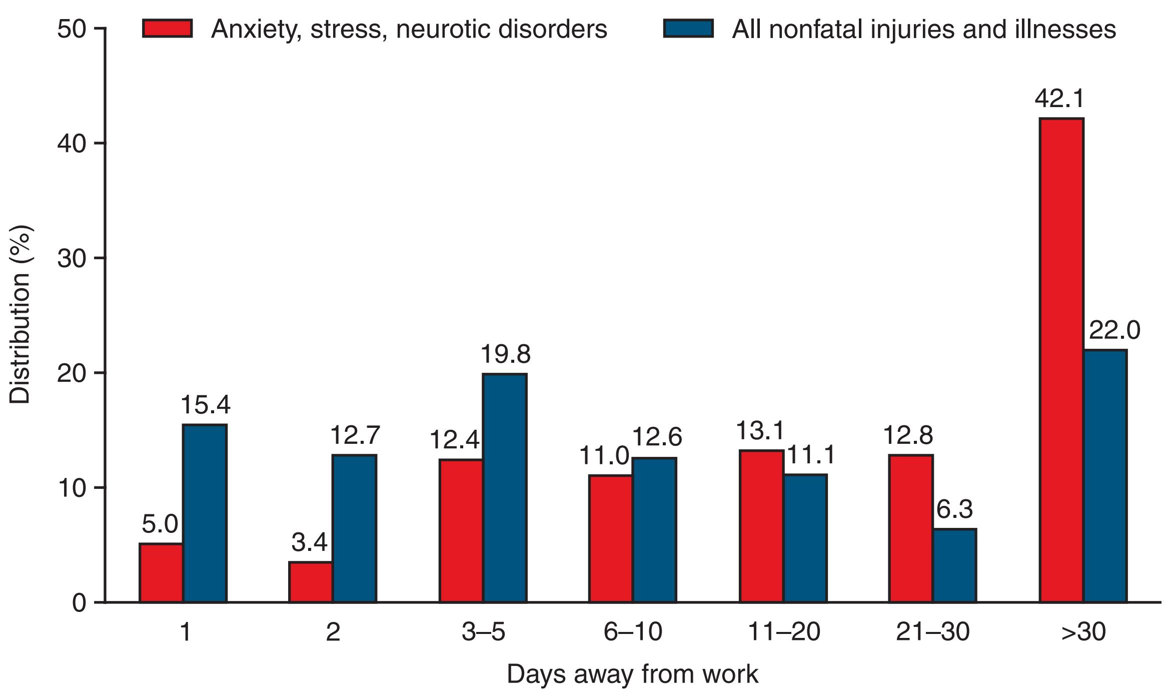
Figure 2–5. Distribution and number of anxiety, stress, and neurotic disorder cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 3,930 of the 5,659 BLS-estimated anxiety, stress, and neurotic disorder cases involving days away from work in 2001. White, non-Hispanic workers accounted for the majority of cases (64.8%). Black, non-Hispanic and Hispanic workers accounted for 9.6% and 20.7% of the cases, respectively. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003a].)***

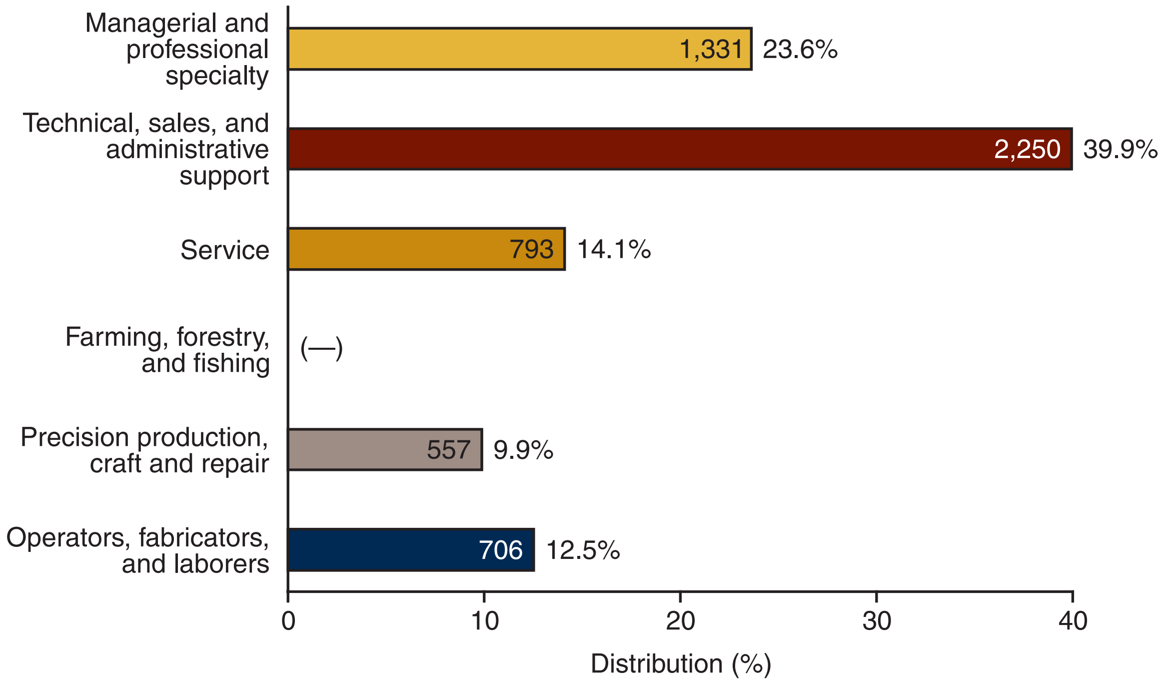


Severity

How did anxiety, stress, and neurotic disorders compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–6. Distribution of anxiety, stress, and neurotic disorder cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Compared with all nonfatal injury and illness cases in 2001, anxiety, stress, and neurotic disorder cases tended to involve higher percentages of long-term work loss (11–20, 21–30, and 31 or more days away from work). In 2001, 42.1% of these cases involved 31 or more days away from work. The median number of days away from work was 25 for anxiety, stress, and neurotic disorders—substantially greater than the median of 6 for all nonfatal injury and illness cases. ***(Sources: BLS [2003a]; Booth-Jones et al. [2003a].)***

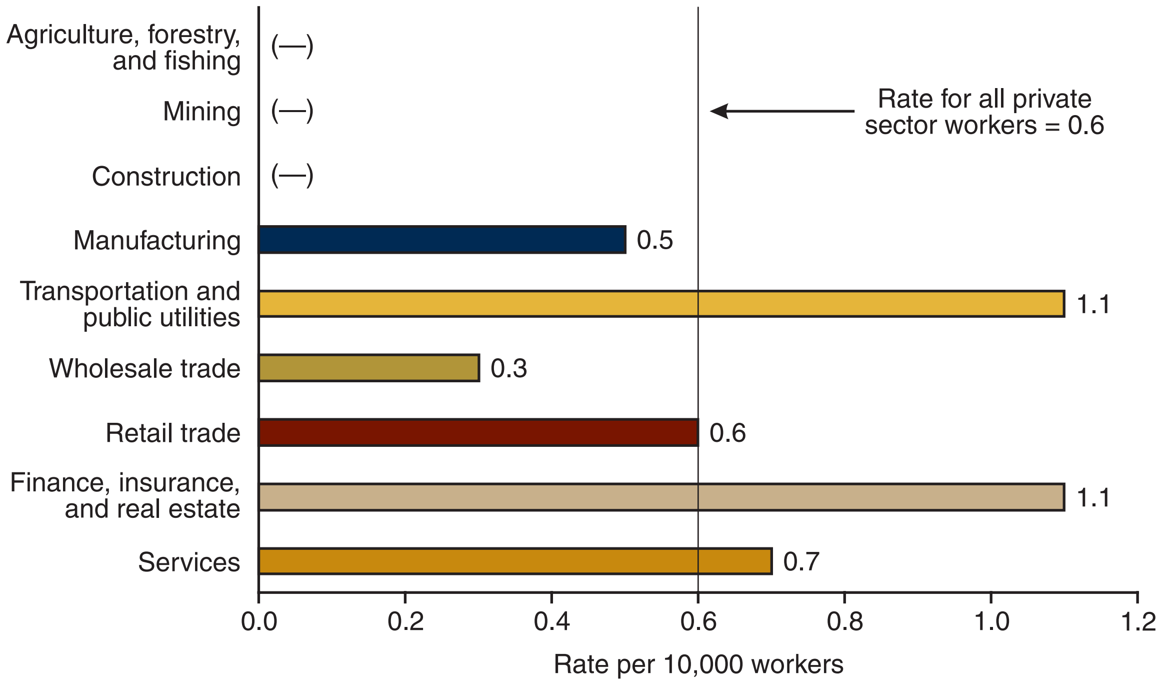




Occupation

How were anxiety, stress, and neurotic disorders distributed by occupation in 2001?

Figure 2–7. Distribution and number of anxiety, stress, and neurotic disorder cases involving days away from work in private industry by occupation, 2001. Technical, sales, and administrative support along with managerial and professional specialty occupations constituted 63.5% of anxiety, stress, and neurotic disorder cases in 2001. ***(Sources:*** ***BLS [2003a,b]; Booth-Jones et al. [2003a].)***



Industry

How did rates of anxiety, stress, and neurotic disorders differ by private industry sector in 2001?

Figure 2–8. Incidence rate of anxiety, stress, and neurotic disorder cases by private industry sector, 2001. For anxiety, stress, and neurotic disorders, private industry reported an overall incidence rate of 0.6 per 10,000 full-time workers in 2001. Higher rates were reported for transportation and public utilities (1.1), finance, insurance, and real estate (1.1), and services (0.7) (*Note:* A dash in parentheses indicates that no data were reported or that data do not meet BLS publication criteria). ***(Source: BLS [2003a].)***

How did the rates of anxiety, stress, and neurotic disorders change by private industry sector during 1992–2001?

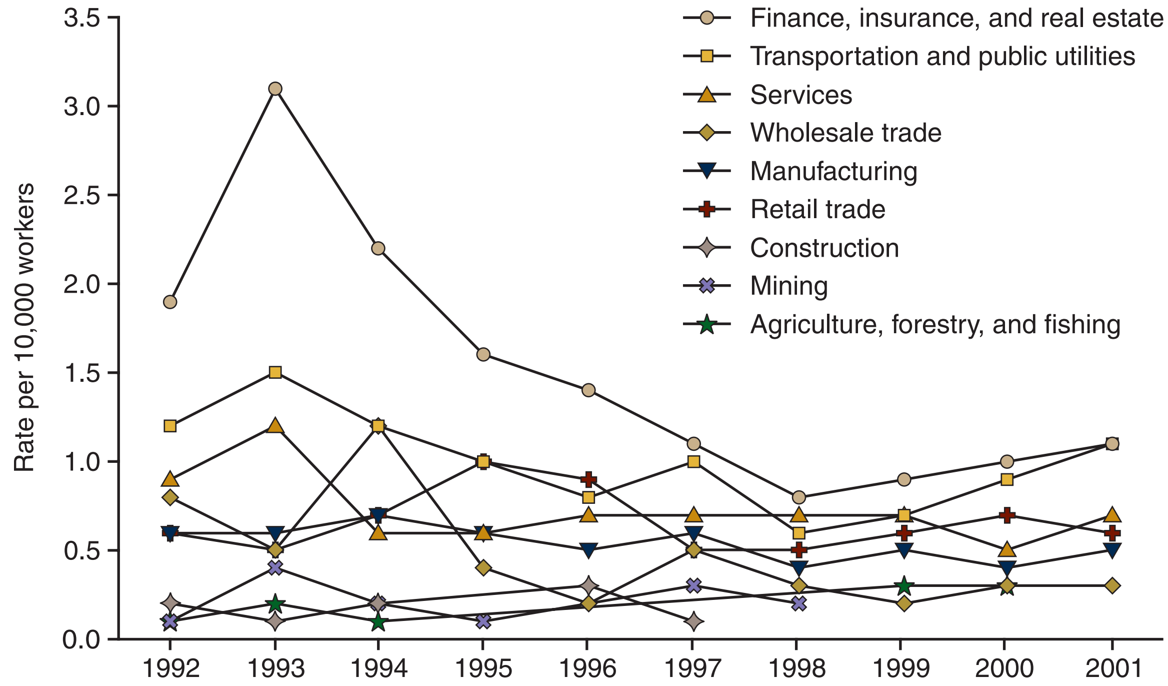


Figure 2–9. Annual rates of anxiety, stress, and neurotic disorder cases involving days away from work by private industry sector, 1992–2001. The annual rate for these disorders declined 25% in the private sector during 1992–2001, and rates declined for each industry sector except retail trade. Finance, insurance, and real estate had consistently higher rates than other industry sectors during the 10-year period and experienced a 42.1% rate reduction. ***(Sources: BLS [2003a,b].)***

Bloodborne Infections and Percutaneous Exposures

This section provides information from the CDC about two of the major occupational bloodborne infections—hepatitis B and HIV, the virus that causes AIDS. Both infections are potentially fatal. Most occupational exposures to these bloodborne illnesses occur among health care workers.

More than 8 million U.S. health care workers in hospitals may be exposed to blood or other body fluids through the following types of contact:

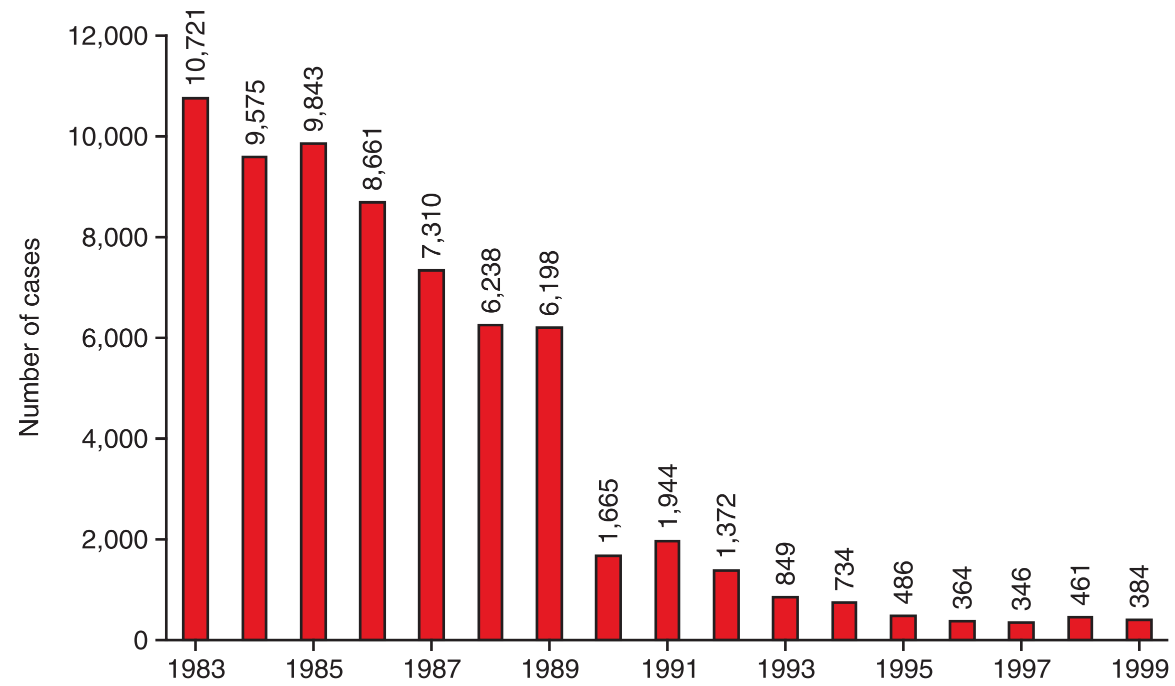
- Percutaneous injuries (injuries through the skin) with contaminated sharp instruments such as needles and scalpels (82%)
- Contact with mucous membranes of the eyes, nose, or mouth (14%)
- Exposure of broken or abraded skin (3%)
- Human bites (1%)

Up to 800,000 percutaneous injuries may occur annually among all U.S. health care workers (both hospital-based workers and those in other health care settings). After percutaneous injury with a contaminated sharp instrument, the average risk of infection is 0.3% for HIV and ranges from 6% to 30% for hepatitis B.

Magnitude and Trend

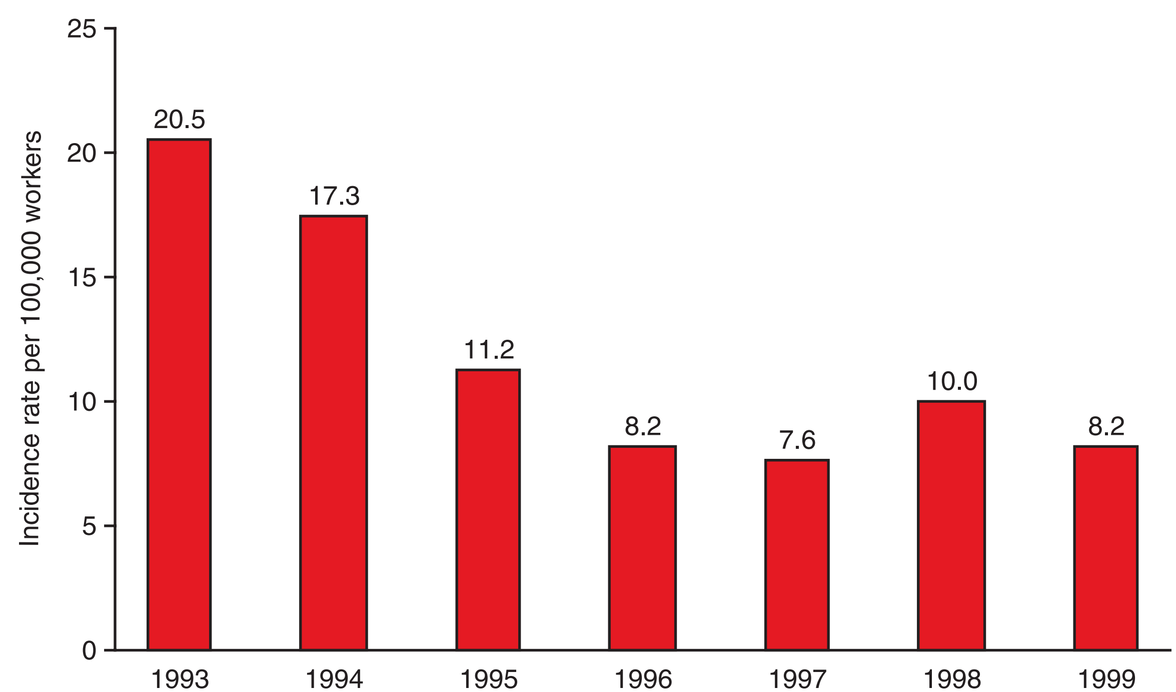
How many health care workers were infected with hepatitis B during 1983–1999?

Figure 2–10. Estimated number of occupational hepatitis B infections among U.S. health care workers, 1983–1999. Hepatitis B infections include symptomatic and asymptomatic cases. The National Notifiable Diseases Surveillance System (NNDSS) indicates a 96% decline in hepatitis B viral infections among health care workers over a 17-year period—from nearly 11,000 cases in 1983 to fewer than 400 in 1999. (*Note:* In the mid-1980s, health care facilities began adopting recommended universal precautions against exposure to body fluids. These were followed in 1992 with the OSHA Bloodborne Pathogens Standard [29 CFR* 1910.1030], which required employers to offer hepatitis B vaccinations to exposed workers.) ***(Source: CDC [2002a].)***



What were the rates of hepatitis B infection among U.S. health care workers during 1993–1999?

Figure 2–11. Incidence rates of hepatitis B infection per 100,000 U.S. health care workers, 1993–1999. The incidence rate (rate of new infections) of hepatitis B infections generally declined about 60% from 1993 to 1999 among U.S. health care workers. These infections include both symptomatic and asymptomatic cases. ***(Source: CDC [2002a].)***



**Code of Federal Regulations*. See CFR in references.

Occupation

Which health care workers acquired HIV/AIDS at work during 1981–2002?

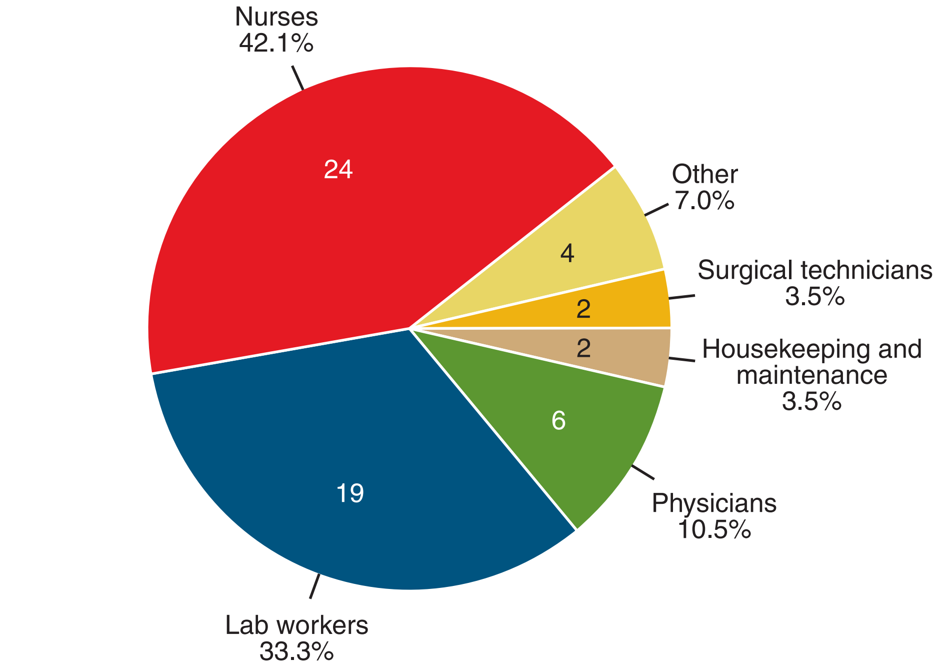


Figure 2–12. Distribution and number of documented cases of occupational transmission of HIV among health care workers by occupation, 1981–2002. Among the cases of occupational HIV transmission reported to the HIV/AIDS Reporting System (HARS) from 1981 through December 2002, 57 cases were documented and 139 cases were possible. Most documented cases of occupational HIV transmission occurred among nurses (24 cases or 42.1%) and laboratory workers (19 cases or 33.3%). Among the documented cases of HIV following occupational exposure, 84% resulted from percutaneous exposure. ***(Source: CDC [2003].)***

Medical Devices

What medical devices were associated with percutaneous injuries during 1995–2000?

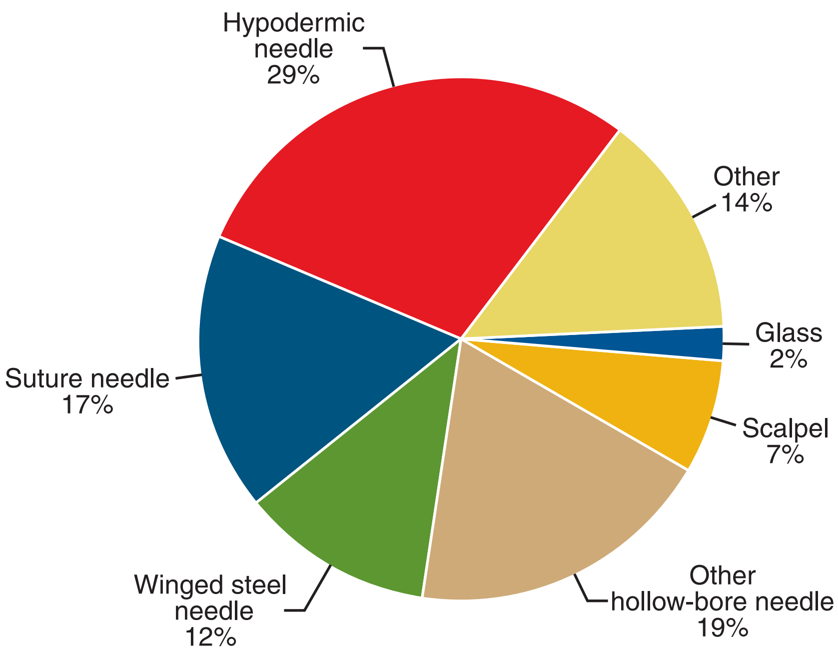
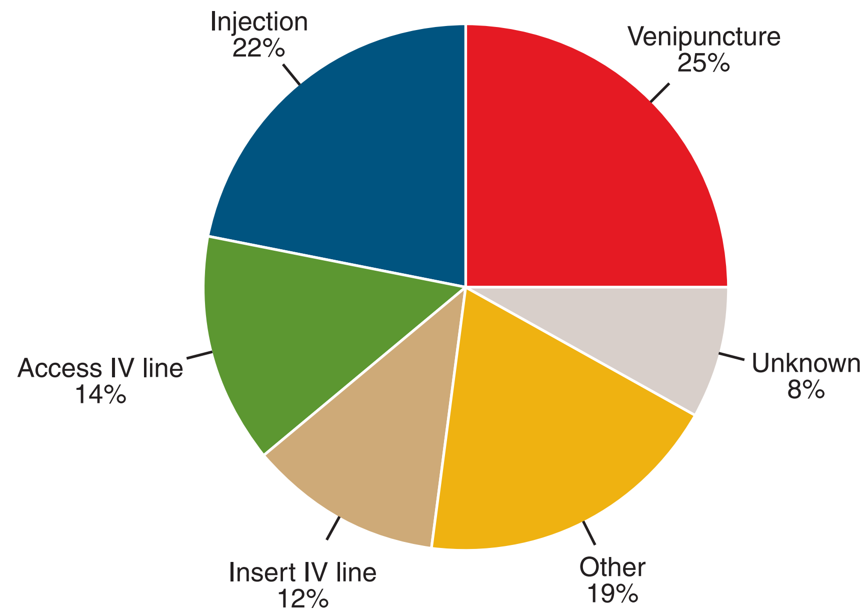


Figure 2–13. Distribution of 10,378 reported percutaneous injuries among hospital workers by medical device associated with the injury, 1995–2000. The devices most associated with percutaneous injuries among hospital workers during 1995–2000 were hypodermic needles (29% of injuries), suture needles (17%), winged steel needles (12%), and scalpels (7%). Other hollow-bore needles together accounted for 19% of injuries, glass items for 2%, and other items for 14%. ***(Source: CDC [2002b].)***

Hollow-Bore Needles

What medical procedures involving hollow-bore needles were associated with percutaneous injuries during 1995–2000?

Figure 2–14. Distribution of 6,212 reported percutaneous injuries involving hollow-bore needles in hospital workers by associated medical procedure, 1995–2000. Drawing blood from a vein (venipuncture) was responsible for 25% of percutaneous injuries involving hollow-bore needles during 1995–2000, and injections were responsible for 22%. ***(Source: CDC [2002b].)***



Fatal Injuries

Data for the figures come from two sources: (1) the NIOSH National Traumatic Occupational Fatalities (NTOF) Surveillance System, which is a death-certificate-based census of occupational deaths for U.S. workers aged 16 or older, and (2) the BLS Census of Fatal Occupational Injuries (CFOI) Surveillance System.

BLS reported 5,524 fatal occupational injuries in 2002. Rates of these injuries declined 23.1% during 1992–2002, from 5.2 per 100,000 full-time workers in 1992 to 4.0 in 2002 (Figure 2–16). During 1980–2000, the States with the highest rates of occupational injury death were Alaska, Wyoming, Montana, Idaho, West Virginia, and Mississippi (Figure 2–17). Most fatal injuries occurred among workers who were aged 25–54 (66.6%) (Figure 2–19), male (92.0%) (Figure 2–20), and white, non-Hispanic (71.0%) (Figure 2–22). The majority of fatal injuries (55.2% or 2,999 cases) occurred among two occupational groups: operators, fabricators, and laborers (34.9% or 1,895 cases) and precision production, craft, and repair workers (20.3% or 1,104 cases) (Figure 2–24). Two industry sectors accounted for more than 40% of fatal occupational injuries: construction (22.6% or 1,121 cases) and transportation and public utilities (18.3% or 910 cases) (Figure 2–25). Deaths due to motor vehicle incidents had the highest rates from 1980 through 1998 (Figure 2–23). During 1992–2000, the number of fatal occupational injuries associated with highway incidents increased 18.5% (Figure 2–28).

Magnitude and Trend

How many workers were fatally injured during 1980–2000 and what was the fatality rate each year?

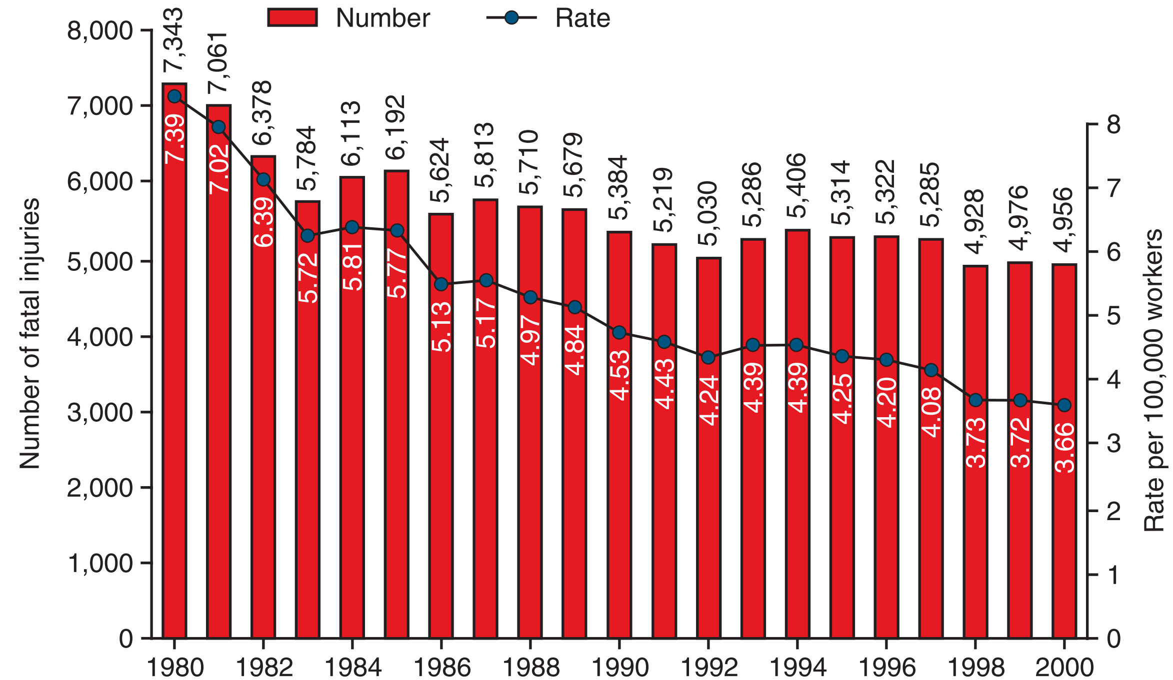


Figure 2–15. Numbers and rates of traumatic occupational fatalities, 1980–2000. (All data for 1980–2000 exclude New York City.) The numbers of traumatic occupational fatalities decreased 33% during 1980–2000, from 7,343 fatalities in 1980 to 4,956 in 2000. During this period, the average annual rate for traumatic occupational fatalities decreased 50%—from 7.4 per 100,000 civilian workers in 1980 to 3.7 in 2000. ***(Source: NIOSH [2003].)***

How did the numbers and rates of fatal occupational injuries change during 1992–2002?

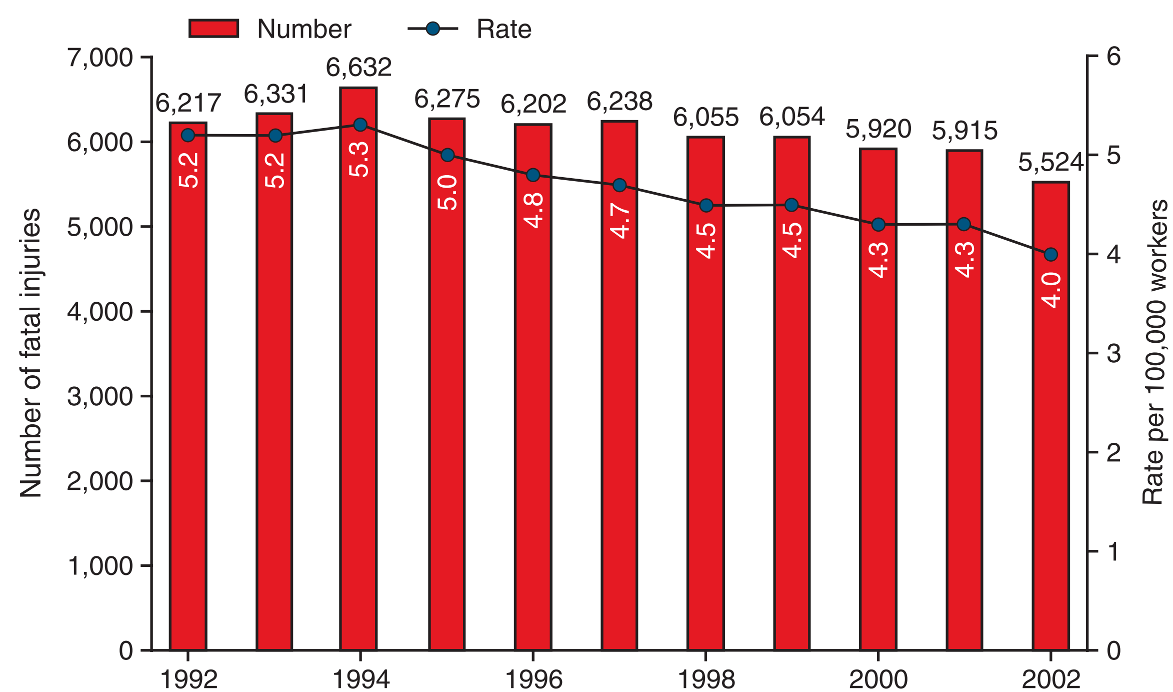


Figure 2–16. Numbers and rates of fatal occupational injuries, 1992–2002. A total of 5,524 fatal occupational injuries were recorded in 2002. During 1992–2002, fatality rates declined from 5.2 per 100,000 workers to 4.0. ***(Source: BLS [2003c].)***

Numbers and Rates among States

How did the rate of fatal occupational injuries differ by State during 1980–2000?

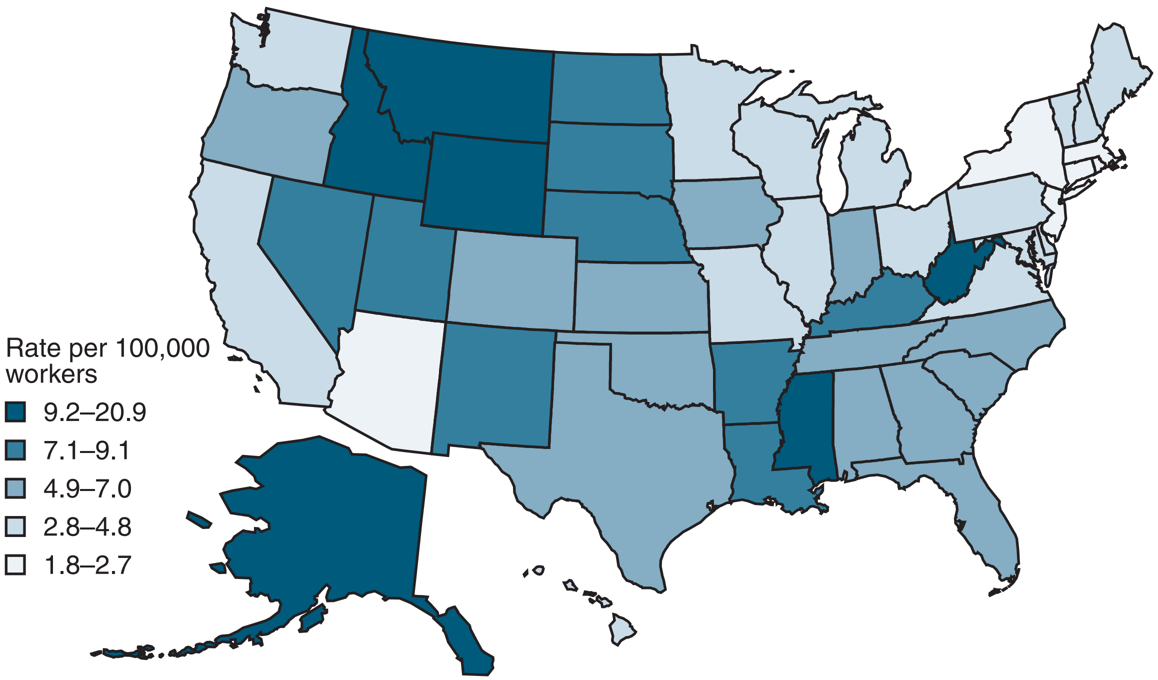


Figure 2–17. Average annual rate of fatal occupational injuries per 100,000 workers by State of death, 1980–2000. (All data for 1980–2000 exclude New York City.) The States with the highest fatality rates for occupational injury during 1980–2000 include Alaska (20.9 per 100,000 workers), Wyoming (14.9), Montana (11.1), Idaho (9.7), Mississippi (9.6), and West Virginia (9.6). The greatest numbers of fatal occupational injuries occurred in California (12,221), Texas (11,635), Florida (7,252), Illinois (5,145), and Pennsylvania (4,420). ***(Source: NIOSH [2003].)***

How did the number of fatal occupational injuries differ by State in 2002?

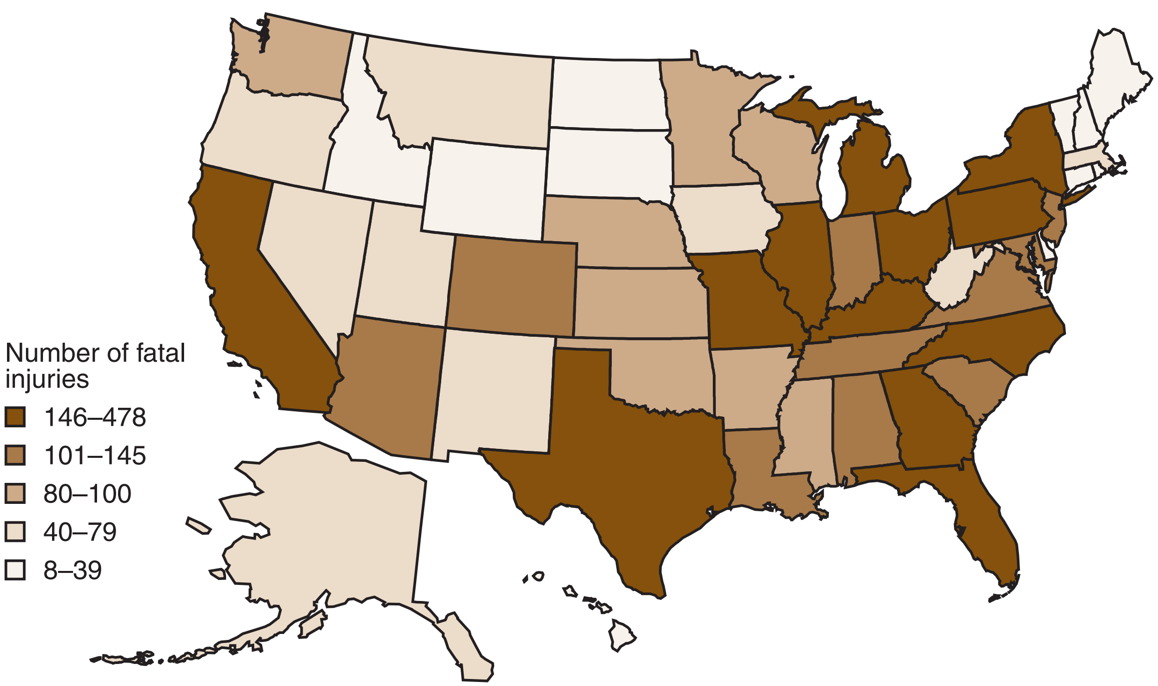
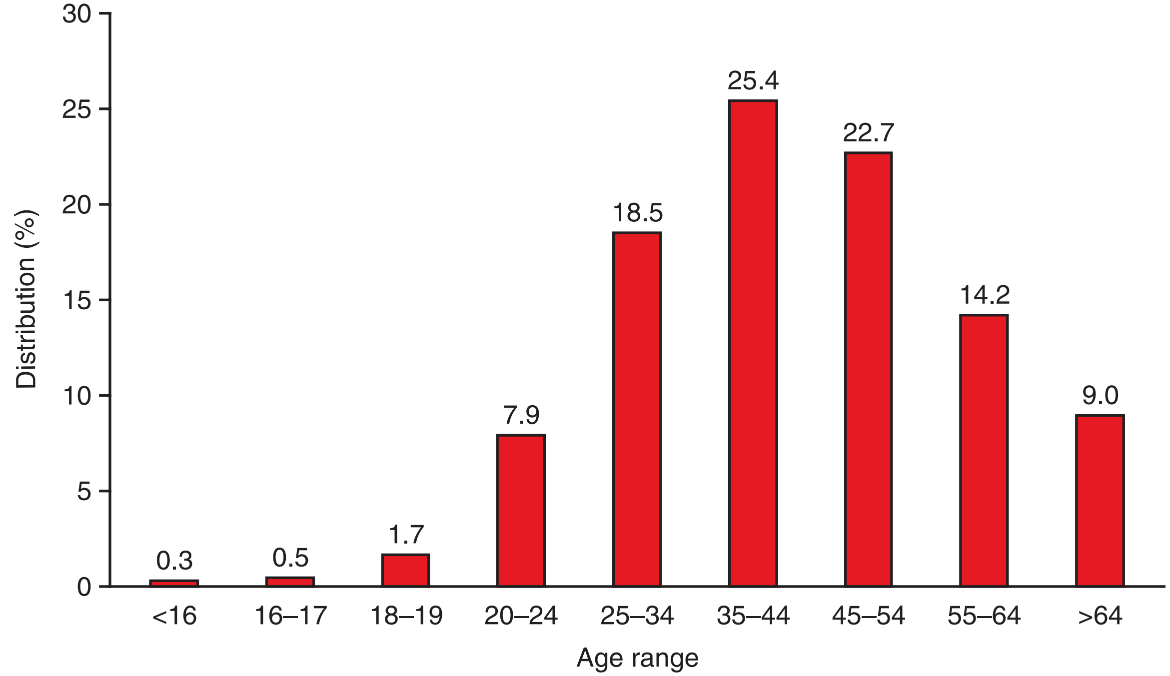


Figure 2–18. Number of fatal occupational injuries by State, 2002. BLS reported a low of 8 fatal occupational injuries in Rhode Island and a high of 478 in California for 2002. High fatality counts were also reported for Texas (417), Florida (354), New York (238), and Ohio (202). ***(Source: BLS [2003c].)***

Age

How did fatal occupational injuries differ by age of worker in 2002?

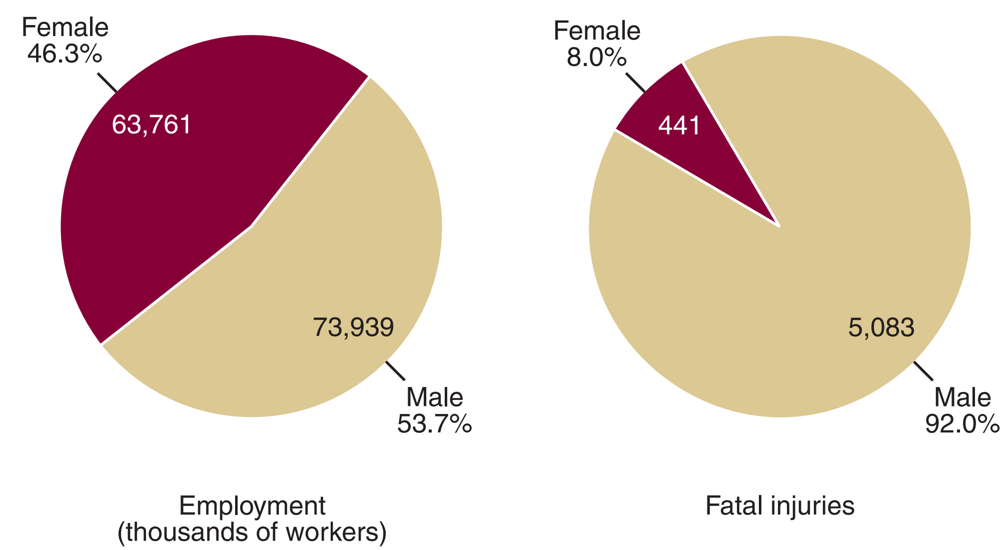
Figure 2–19. Distribution of fatal occupational injuries by age of worker, 2002. In 2002, two-thirds of all fatally injured workers were aged 25–54. The highest percentage and number of fatalities (25.4% or 1,402 cases) were reported for workers aged 35–44. ***(Source: BLS [2003c].)***

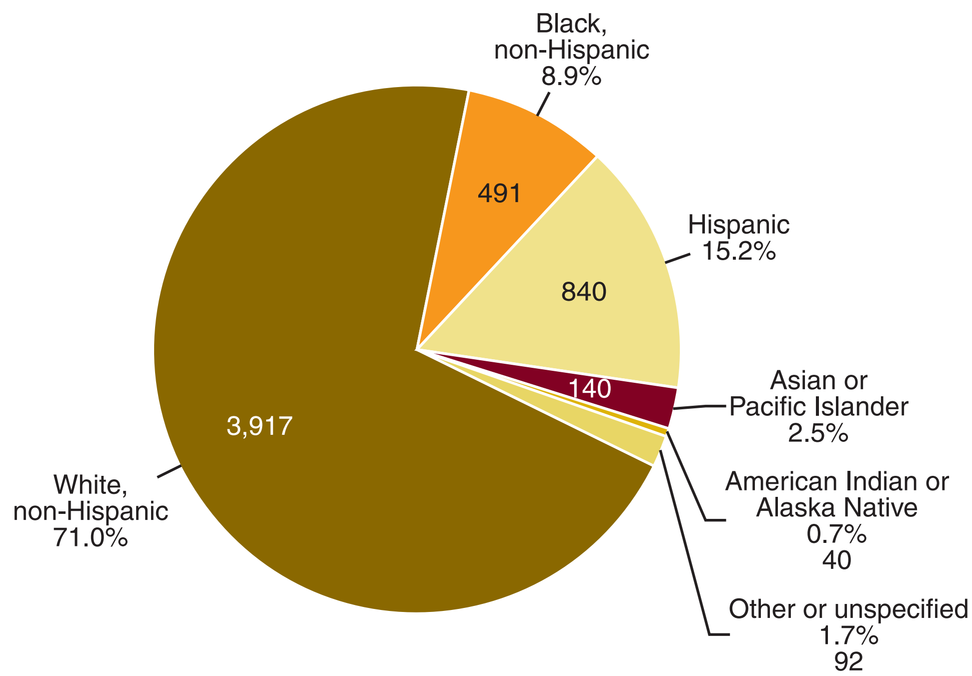


Sex

How did fatal occupational injuries differ by sex of worker in 2002?

Figure 2–20. Employment and fatality profiles by sex, 2002. Male workers held 53.7% of the estimated 137.7 million jobs for employed workers in 2002, and they incurred 92.0% of the 5,524 fatal occupational injuries. ***(Source: BLS [2003c].)***

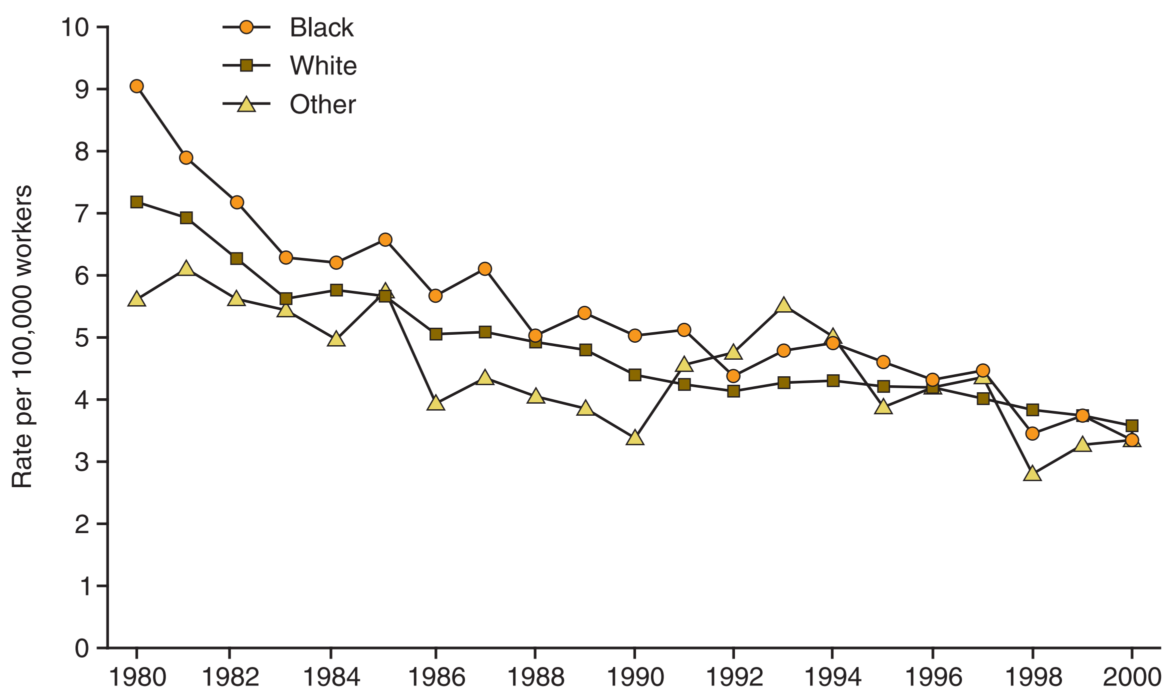




Race/Ethnicity

How did fatal occupational injuries differ by race/ethnicity in 2002?

Figure 2–21. Distribution and number of fatal occupational injuries by race/ethnicity, 2002. The 3,917 fatal injuries among white, non-Hispanic workers represented 71.0% of all fatal occupational injuries in 2002. Hispanic workers accounted for 840 cases or 15.2% of fatal occupational injuries in 2002. *(Source: BLS [2003c].)*



How did annual rates of fatal occupational injuries change by race during 1980–2000?

Figure 2–22. Annual rates of fatal occupational injuries by race/ethnicity, 1980–2000. (All data for 1980–2000 exclude New York City.) In general, fatal occupational injury rates decreased for all races during 1980–2000. From 1991 through 1994, the rates for other races increased because of changes in methods for coding race/ethnicity information. Before 1998, black workers had slightly higher fatal occupational injury rates than white workers. But after 1998, the rates for white workers were slightly higher than those for black workers and for workers of all other races. *(Source: NIOSH [2003].)*

Causes of Death

How did annual rates of fatal occupational injuries differ by cause of death during 1980–1998?

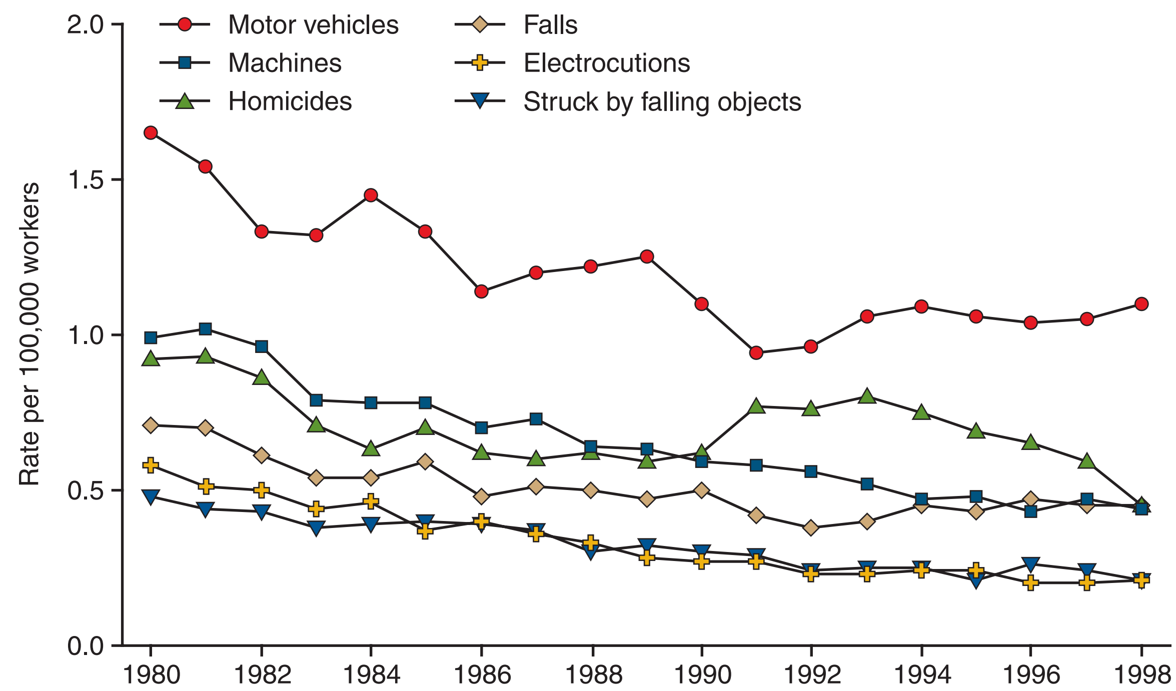


Figure 2–23. Annual rates of fatal occupational injuries by leading cause, 1980–1998. (All data for 1998 exclude New York State.) During 1980–1998, fatal occupational injury rates declined for the six leading causes of death, though not always consistently. During this period, deaths due to motor vehicle incidents had the highest rates. Deaths due to machines had the second highest rate until 1990, when they were surpassed by deaths due to homicides. For 1998, the rates of death for homicides and falls were second highest, followed closely by the rate for machine-related deaths. ***(Source: NIOSH [2001].)***

Occupation

How were fatal injuries distributed by occupation in 2002?

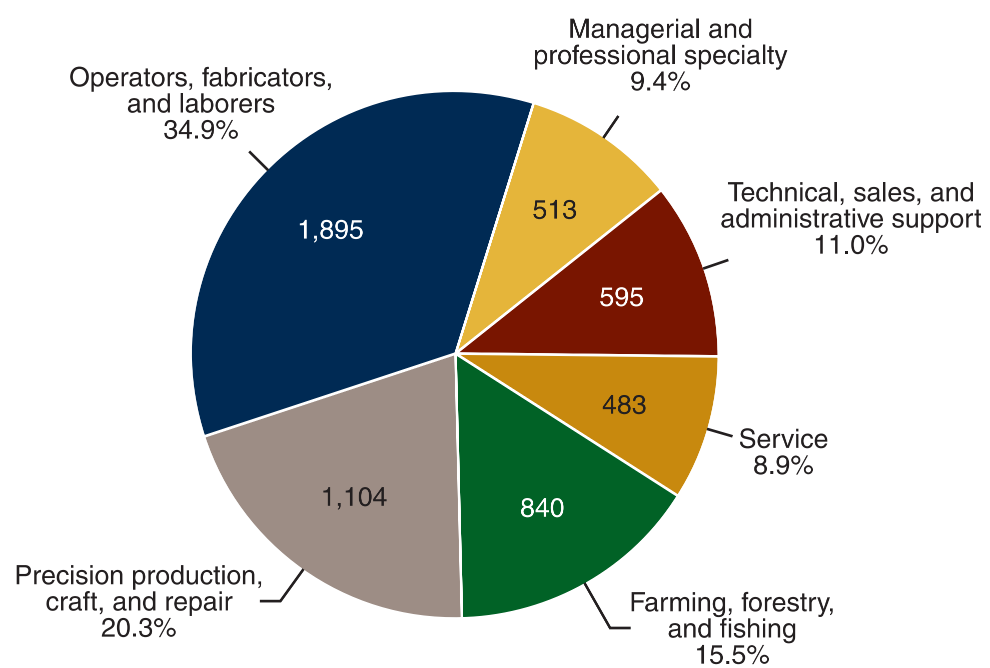
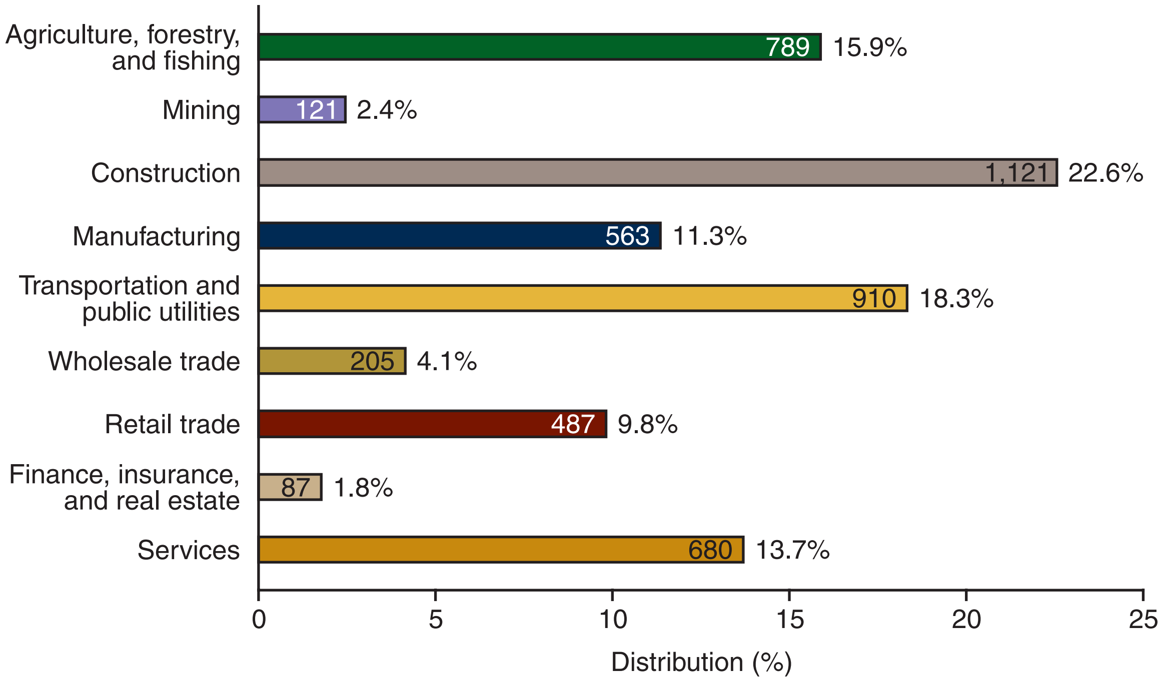


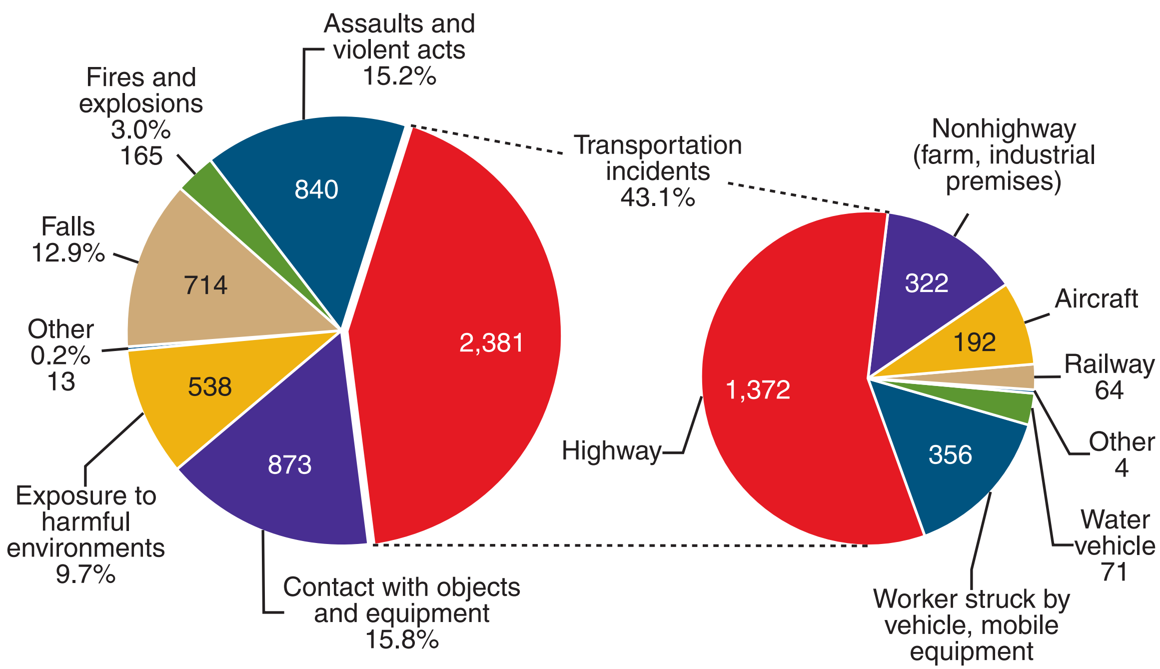
Figure 2–24. Distribution and number of fatal occupational injuries by occupation, 2002. In 2002, the majority of fatal injuries (55.2% or 2,999 cases) occurred among two occupational groups: operators, fabricators, and laborers (34.9% or 1,895 cases) and precision production, craft, and repair workers (20.3% or 1,104 cases). ***(Source: BLS [2003c].)***



Industry

How were fatal injuries distributed by private industry sector in 2002?

Figure 2–25. Distribution and number of fatal occupational injuries by private industry sector, 2002. In 2002, two industry sectors accounted for more than 40% of fatal occupational injuries: construction (22.6% or 1,121 cases) and transportation and public utilities (18.3% or 910 cases). ***(Source: BLS [2003c].)***



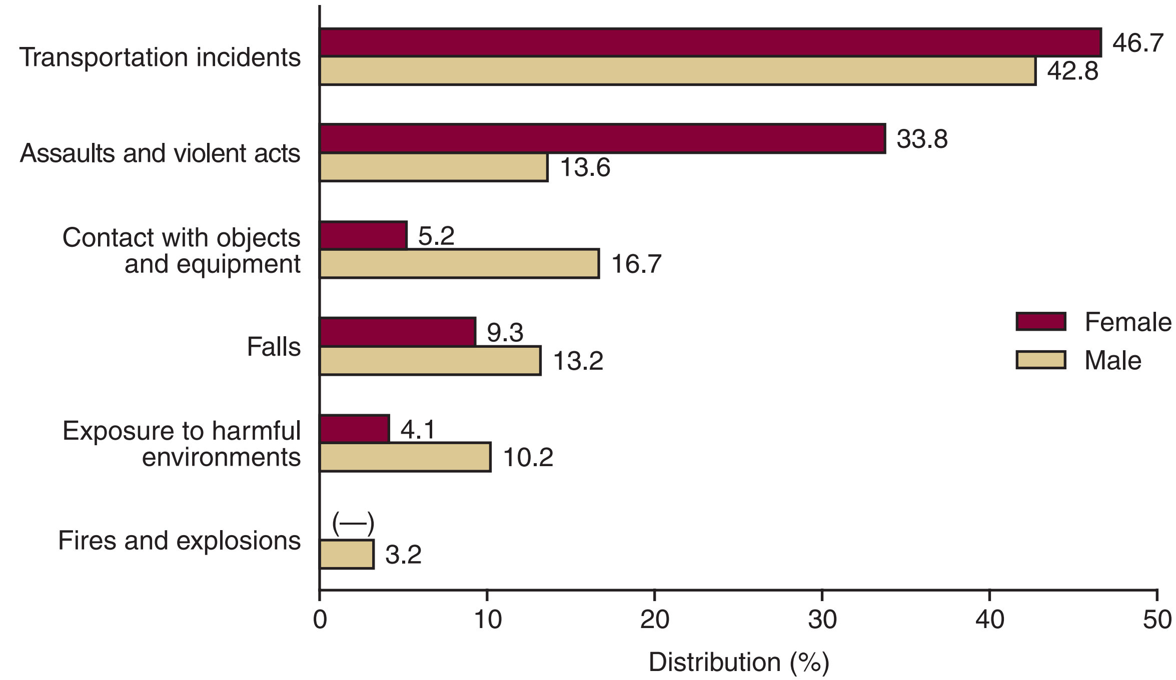
Event or Exposure

How did fatal occupational injuries differ by event or exposure in 2002?

Figure 2–26. Distribution and number of fatal occupational injuries by event or exposure, 2002. Transportation-related incidents caused 43.1% of the fatal occupational injuries in 2002, including 1,372 highway fatalities (which accounted for 24.9% of all occupational fatalities). ***(Source: BLS [2003c].)***

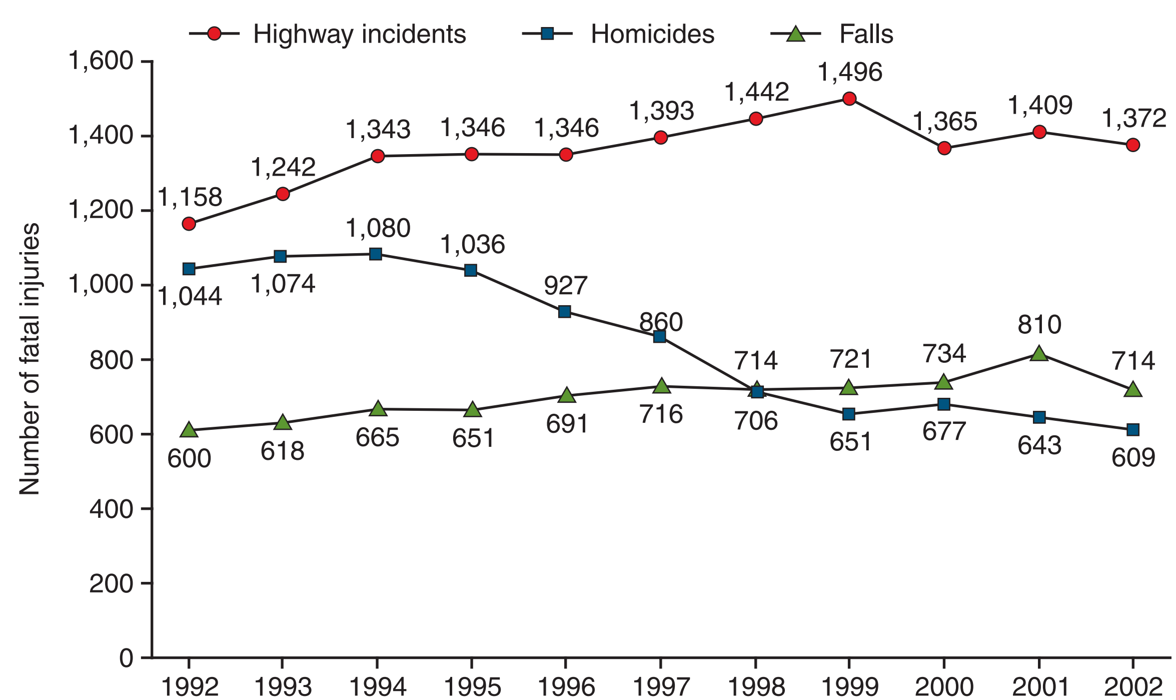
How did fatal occupational injuries differ by sex of worker and event or exposure in 2002?

Figure 2–27. Distribution of fatal occupational injuries by sex of worker and event or exposure, 2002. Fatal injuries to male and female workers were not distributed consistently by type of event or exposure in 2002 because of differences in the types of jobs held by men and women. Fatal injuries in female workers were most frequently associated with transportation incidents (46.7%) and assaults and violent acts (33.8%). Transportation incidents also accounted for the most fatalities in male workers (42.8%), and contact with objects and equipment accounted for an additional 16.7% of male fatalities. (*Note:* A dash in parentheses indicates that no data were reported or that data do not meet BLS publication criteria.) ***(Source:* BLS [2003c].)**



How did the numbers of fatal occupational injuries from highway incidents, homicides, and falls change during 1992–2002?

Figure 2–28. Numbers of fatal occupational injuries associated with the three most frequent fatal occupational events, 1992–2002. In 2002, fatal occupational highway injuries declined slightly from 2001 (2.6% or 37 cases), accounting for 1,372 fatal injuries. Falls showed the greatest decline from 2001 (11.9% or 96 cases). Fatal occupational highway injuries and fatal falls increased 19% during 1992–2002. Job-related homicides decreased 42% during the same period. ***(Source:* BLS [2003c].)**



Hearing Loss

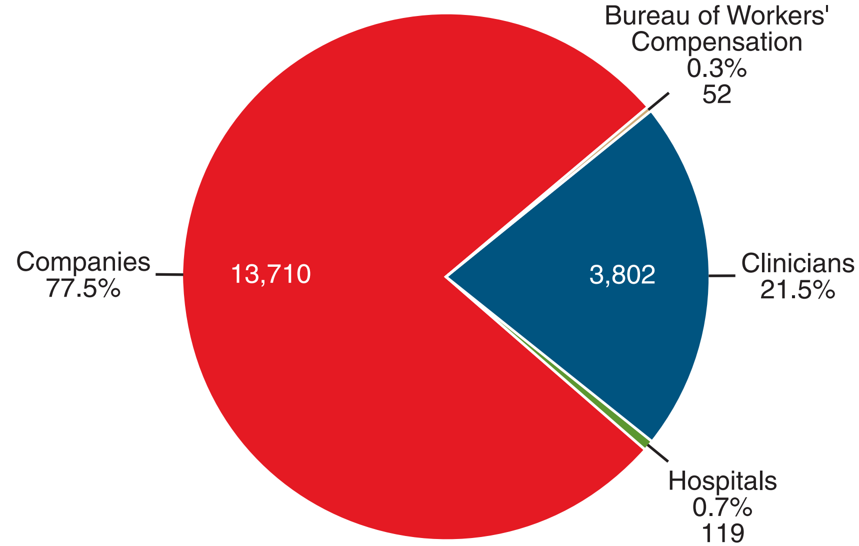
Repeated exposures to loud noise can lead to permanent, incurable hearing loss or tinnitus [NIOSH 2002a]. Approximately 30 million workers are exposed to hazardous noise on the job, and an additional 9 million are at risk for hearing loss from other agents such as solvents and metals [NIOSH 2002b]. From 1992 to 2000 (and beginning again in 2002), NIOSH provided technical and financial support through the SENSOR program to the State of Michigan for a noise-induced hearing loss surveillance and prevention program. The Michigan SENSOR program is a partnership between the Michigan Department of Labor and Economic Growth and the Michigan State University [Rosenman et al. 2002].

Data for the figures come from Michigan's surveillance reports, including reports from audiologists, otolaryngologists, and companies. A worker is considered to have occupational noise-induced hearing loss if a health professional determines the worker to have (a) audiometric findings consistent with noise-induced hearing loss, and (b) a history of exposures to sufficient noise at work to cause hearing loss. In 2000, Michigan reported more than 2,200 new hearing loss cases known or suspected to be caused by noise at work.

Reporting Sources

Who reported occupational noise-induced hearing loss during 1991–2000?

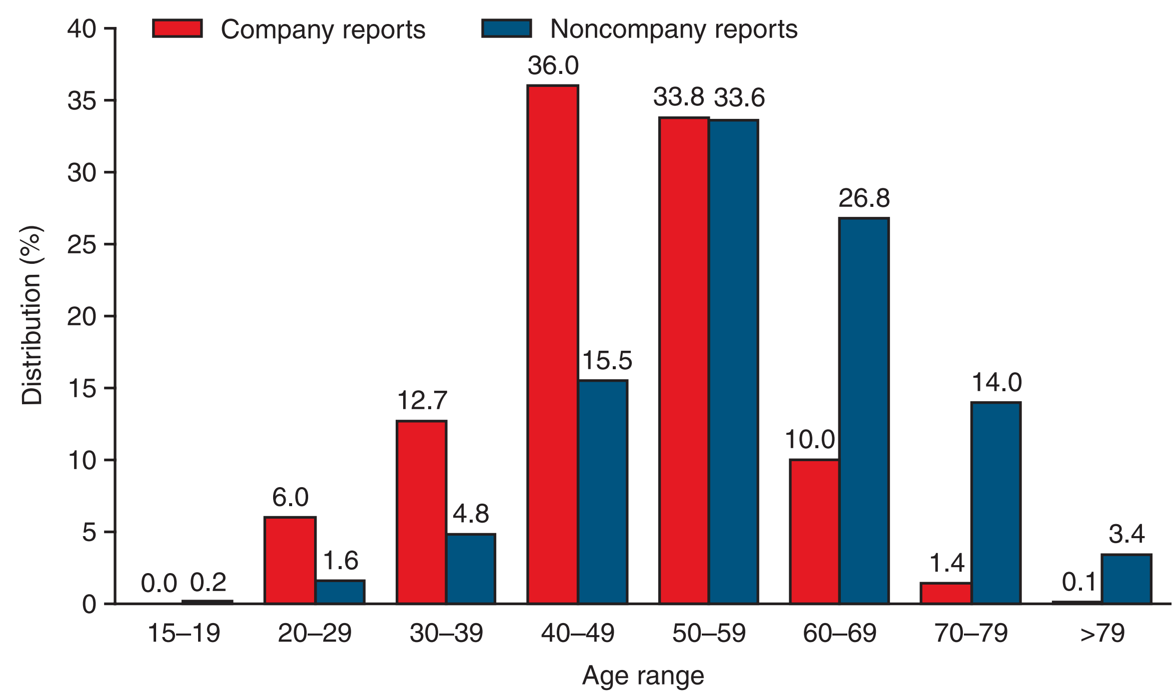
Figure 2–29. Distribution and number of noise-induced hearing loss cases in Michigan by source of reports, 1991–2000. During 1991–2000, 17,683 noise-induced hearing loss cases were reported in Michigan. Companies with hearing conservation programs reported the largest number of workers with occupational noise-induced hearing loss. Typically, companies reported standard threshold shifts, whereas the other three sources reported fixed losses of at least 25 dB. ***(Source: Rosenman and Reilly [2002].)***

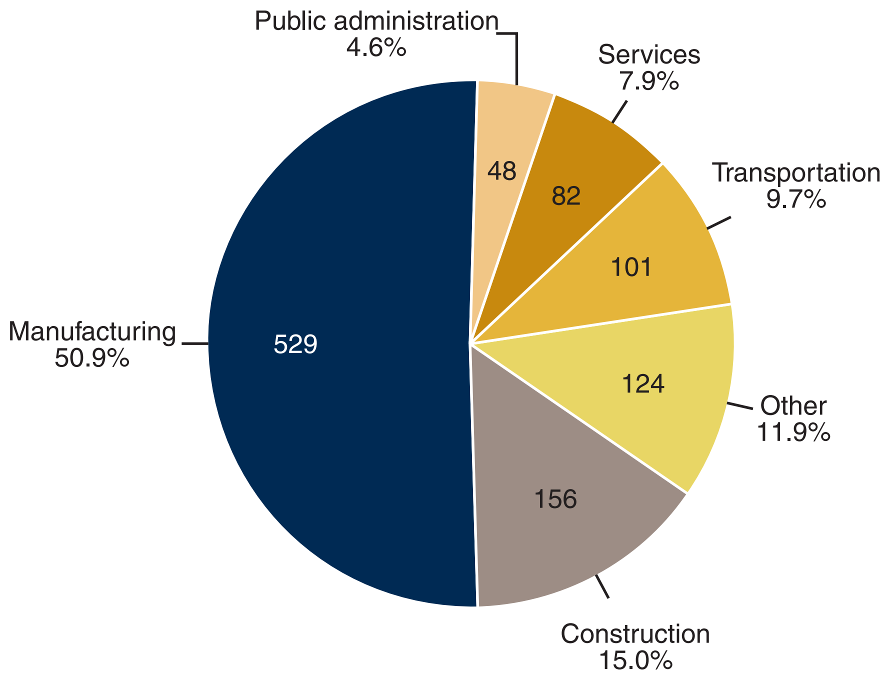


Age

How old were workers who developed occupational noise-induced hearing loss in 2000?

Figure 2–30. Distribution of noise-induced hearing loss cases in Michigan by age of patient and type of report (company or noncompany), 2000. Company reports indicated that workers aged 40–49 and 50–59 had the highest percentages of noise-induced hearing loss cases (36% and 33.8%, respectively) in 2000. Noncompany and company reports indicated nearly equal percentages of cases among workers aged 50–59. Age was unknown for 11 workers reported by company medical departments and for 40 workers reported by noncompany hearing health professionals. The hearing loss reports from companies involve a younger working age population enrolled in a hearing conservation program. ***(Source: Rosenman and Reilly [2002].)***

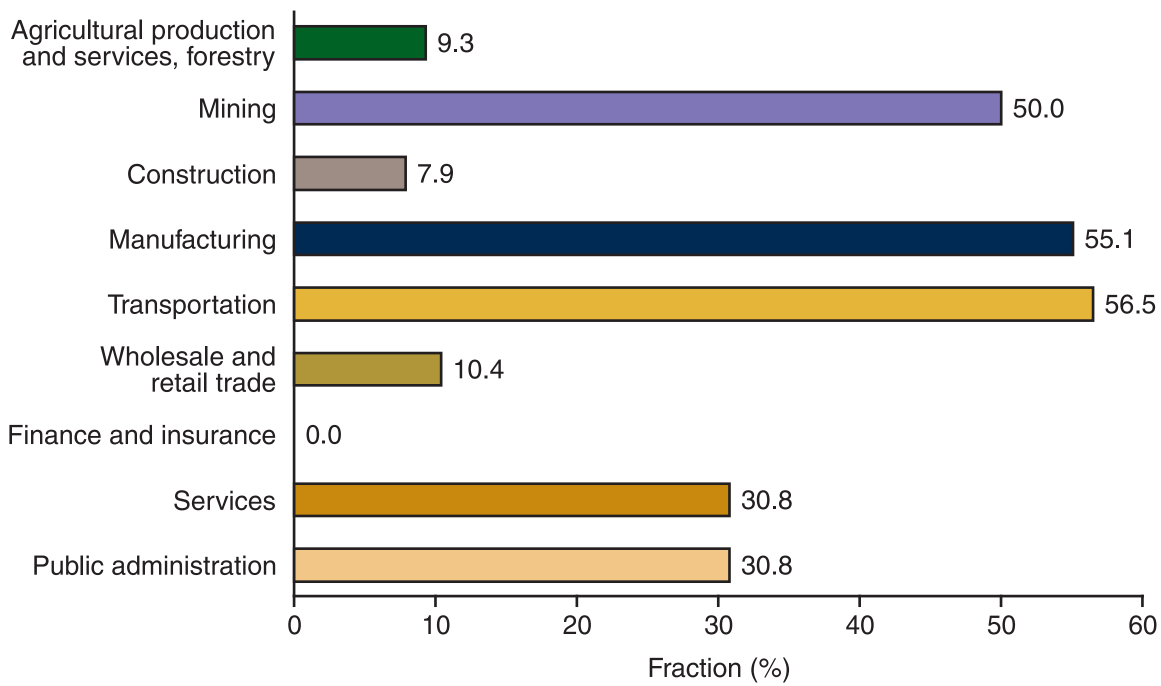




Industry

Where were workers with occupational noise-induced hearing loss exposed to the noise that caused their hearing loss?

Figure 2–31. Distribution and number of permanent hearing loss cases reported by clinicians in Michigan, by industry, 2000. Manufacturing accounted for 50.9% of permanent hearing loss cases reported in Michigan in 2000, and construction industry sectors accounted for 15.0%. ***(Source: Rosenman and Reilly [2002].)***



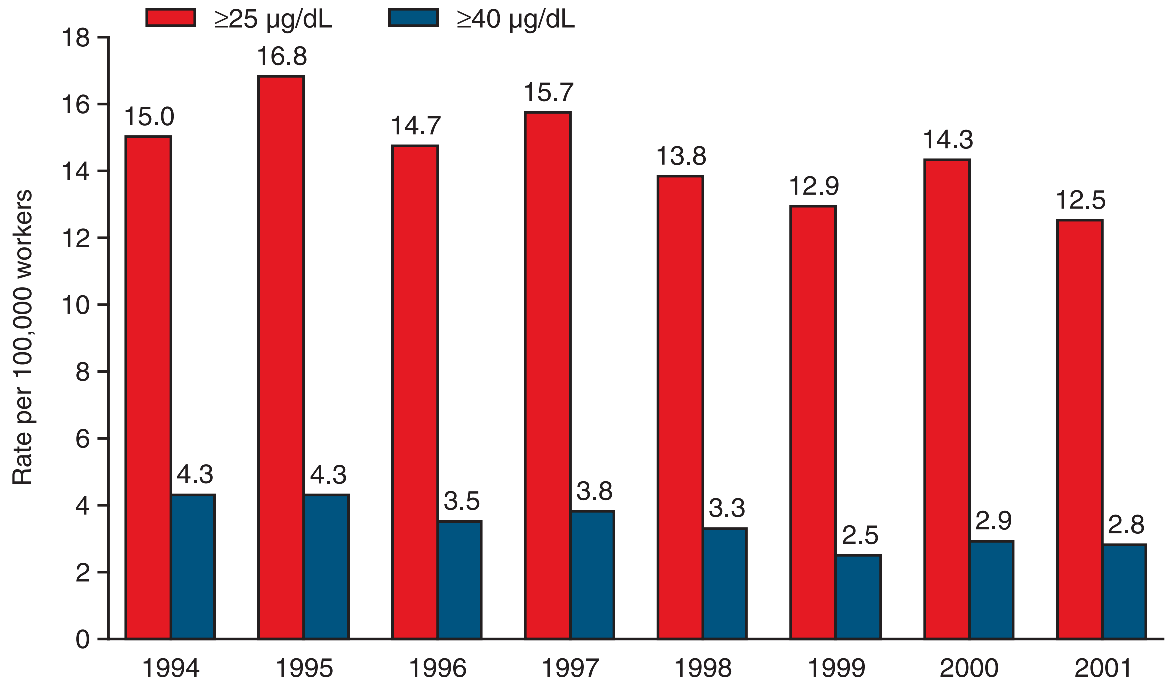
In which industries were companies most likely to test for hearing loss as part of a hearing conservation program?

Figure 2–32. Percentage of companies in Michigan in major industry divisions that tested for hearing loss as part of a hearing conservation program (when worker was most recently exposed to noise), as reported by patient interviews, 1992–2000. Companies were most likely to have tested for hearing loss as part of a hearing conservation program (when worker was most recently exposed to noise) in the transportation, manufacturing, and mining industries. ***(Source: Rosenman and Reilly [2002].)***

Lead Toxicity

The Adult Blood Lead Epidemiology and Surveillance (ABLES) program is a State-based surveillance program of laboratory-reported blood lead levels (BLLs) in adults. The public health objective of the ABLES program (objective 20.7 in *Healthy People 2010* [DHHS 2000]) is to reduce the number of adults with BLLs of 25 µg/dL or greater. Among the 25 States reporting to ABLES during 1998–2001, rates of elevated BLLs (25 µg/dL or greater) ranged from 2.6 to 40.9 per 100,000 employed workers (Figure 2–34).

Since 2001, ABLES program enhancements have (1) allowed for an increase to 37 States (adding Alaska, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Maine, Missouri, Montana, and New Mexico), and (2) increased data requirements to include individual data on industry, age, and sex. During 1994–2001, declines occurred in the mean annual State prevalence rates for adults with elevated BLLs (Figure 2–33). For the most current listing of ABLES data and ABLES States, visit [www.cdc.gov/niosh/ables.html].



Magnitude and Trend

What were the average State rates of elevated BLLs reported by ABLES States during 1994–2001?

Figure 2–33. Average State prevalence rates for adults aged 16 and older with elevated BLLs, ABLES States, 1994–2001. For 1994–2001, ABLES States reported declines in the mean annual State prevalence rates for adults with BLLs of 25 µg/dL or greater and 40 µg/dL or greater. For 1998–2001, the 4-year mean State prevalence rate for adults with BLLs of 25 µg/dL or greater was 13.4 per 100,000 employed workers—a decline from the rate of 15.2 per 100,000 employed workers reported for 1994–1997. For adults with BLLs of 40 µg/dL or greater, the 4-year mean State prevalence rate for 1998–2001 was 2.9 per 100,000 employed workers—a decline from 3.9 per 100,000 employed for 1994–1997. ***(Sources: NIOSH [2002c]; CDC [2002d].)***

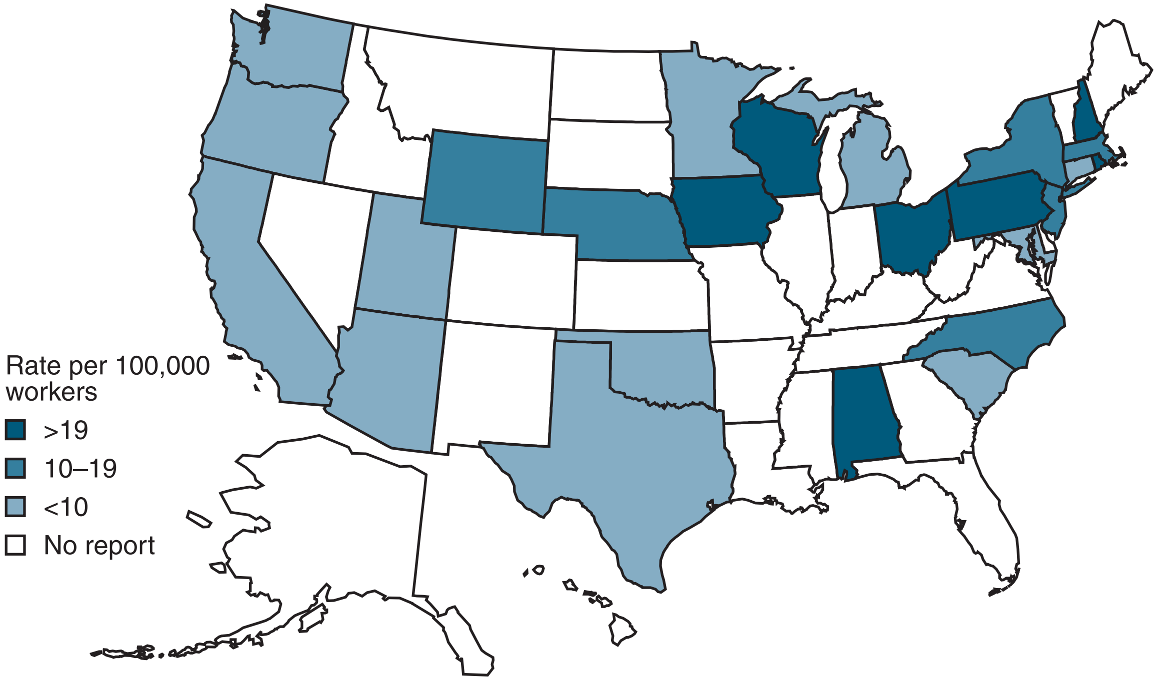
Rates among States

How did the rates of elevated BLLs differ by State?

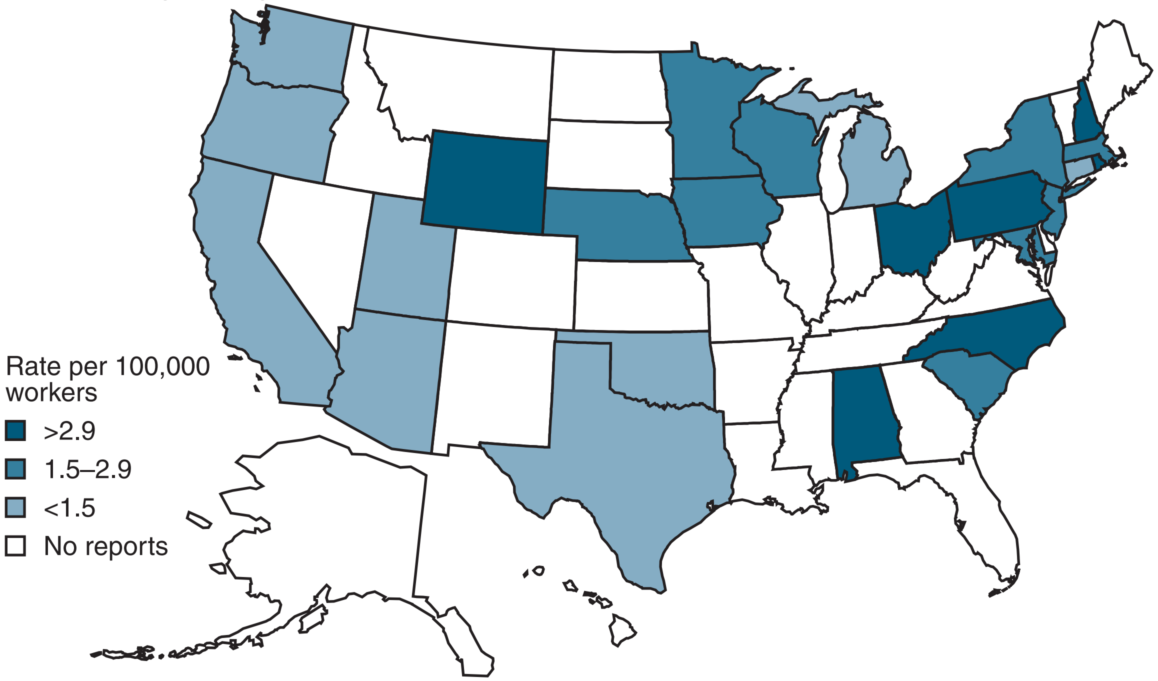
Figure 2–34. Average State rates of elevated BLLs per 100,000 employed workers, 1998–2001: (A) 25 µg/dL or greater, and (B) 40 µg/dL or greater. During 1998–2001, the mean State rates for adults with BLLs of 25 µg/dL or greater ranged from 2.6 to 40.9 per 100,000 employed workers. Among the reporting States, those with the highest rates included Pennsylvania (40.9), New Hampshire (28.4), and Alabama (27.5). The lowest rate was reported by Arizona (2.6). State rates may truly reflect the magnitude of the lead exposure problem, but they may be biased because of varying degrees of completeness of blood lead testing carried out by employers among the States. ***(Sources: NIOSH [2002c]; CDC [2002d].)***

During 1998–2001, the mean State rates for adults with BLLs of 40 µg/dL or greater ranged from 0.4 to 8.8 per 100,000 employed workers. Among the reporting States, those with the highest rates included Alabama (8.8), New Hampshire (7.5), and North Carolina (7.0). The lowest rate was reported by Arizona (0.4). (*Note:* Nebraska provided 2 years of data, and South Carolina provided 3 years. All other States provided 4 years of data for this figure.) ***(Sources: NIOSH [2002c]; CDC [2002d].)***

A. BLLs 25µg/dL or greater



B. BLLs 40µg/dL or greater



Musculoskeletal Disorders

Musculoskeletal disorders (MSDs) are injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and spinal discs. MSDs do not include disorders caused by slips, trips, falls, or motor or similar incidents. Through annual news releases and publications, the BLS defines MSDs to include sprains, strains, tears; back pain, hurt back; soreness, pain, hurt, except back; carpal tunnel syndrome (CTS); hernia; and musculoskeletal system and connective tissue diseases and disorders when the event or exposure leading to the case is bodily reaction (bending, climbing, crawling, reaching, twisting), overexertion, or repetitive motion.

MSD cases are more severe than the average nonfatal injury or illness case (Figure 2–42). In 2001, they involved a median of 8 days away from work compared with 6 days for all nonfatal injury and illness cases [BLS 2003a]. MSD cases declined from 784,145 cases in 1992 to 522,528 cases in 2001 (Figure 2–35). Three age groups (25–34, 35–44, and 45–54) accounted for 78.9% of cases (Figure 2–39). More male than female workers were affected (Figure 2–40), as were more white, non-Hispanic workers (Figure 2–41). Operators, fabricators, and laborers and persons in technical, sales, and administrative support occupations accounted for 58.1% of the MSD cases (Figure 2–43). The manufacturing and services industry sectors together accounted for about half of all MSD cases (Figure 2–44).

Magnitude and Trend

How did the number of MSD cases compare with all nonfatal injury and illness cases during 1992–2001?

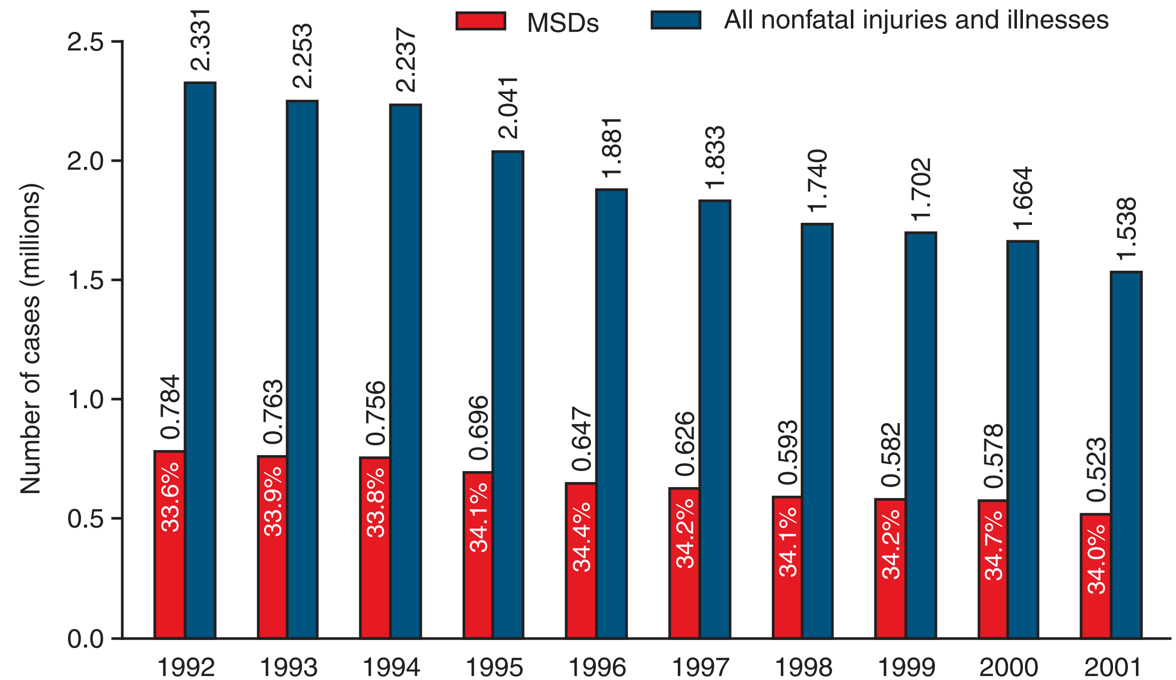


Figure 2–35. Number of MSD cases and all nonfatal injury and illness cases involving days away from work in private industry, 1992–2001. The number of MSD cases declined from 784,145 in 1992 to 522,528 in 2001. As a percentage of all nonfatal injury and illness cases, MSD cases remained relatively stable between 1992 and 2001, ranging from a low of 33.6% in 1992 to a high of 34.0% in 2001. ***(Source: BLS [2003c].)***

How were MSDs distributed by nature of injury or illness in 2001?

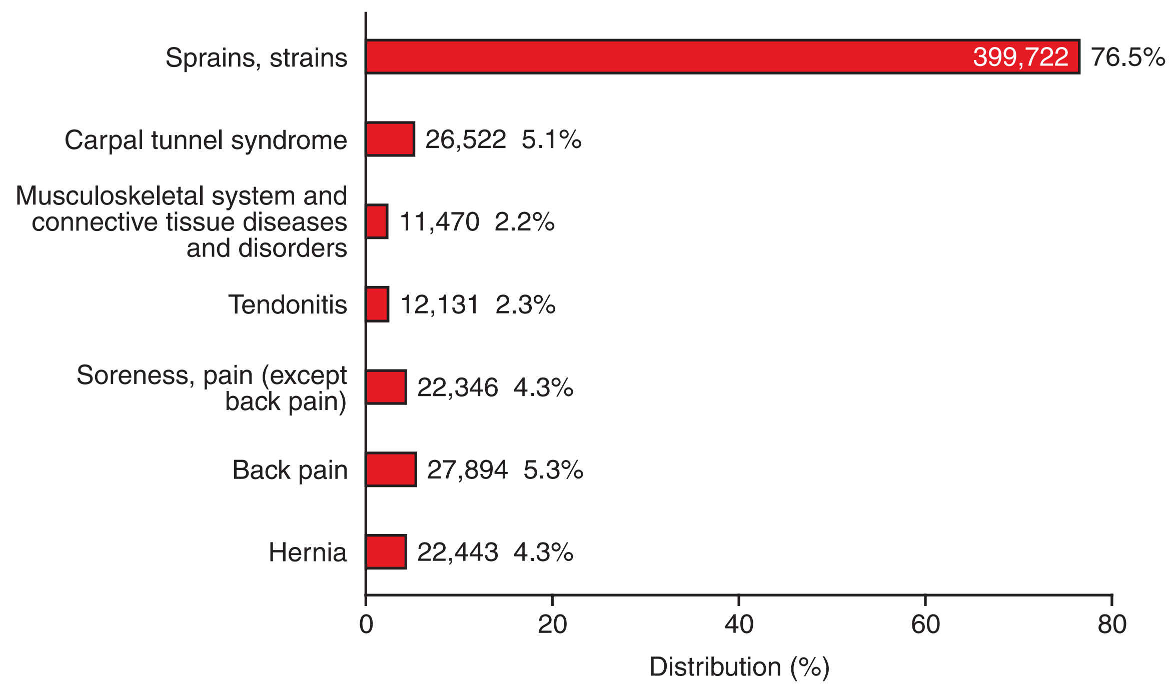
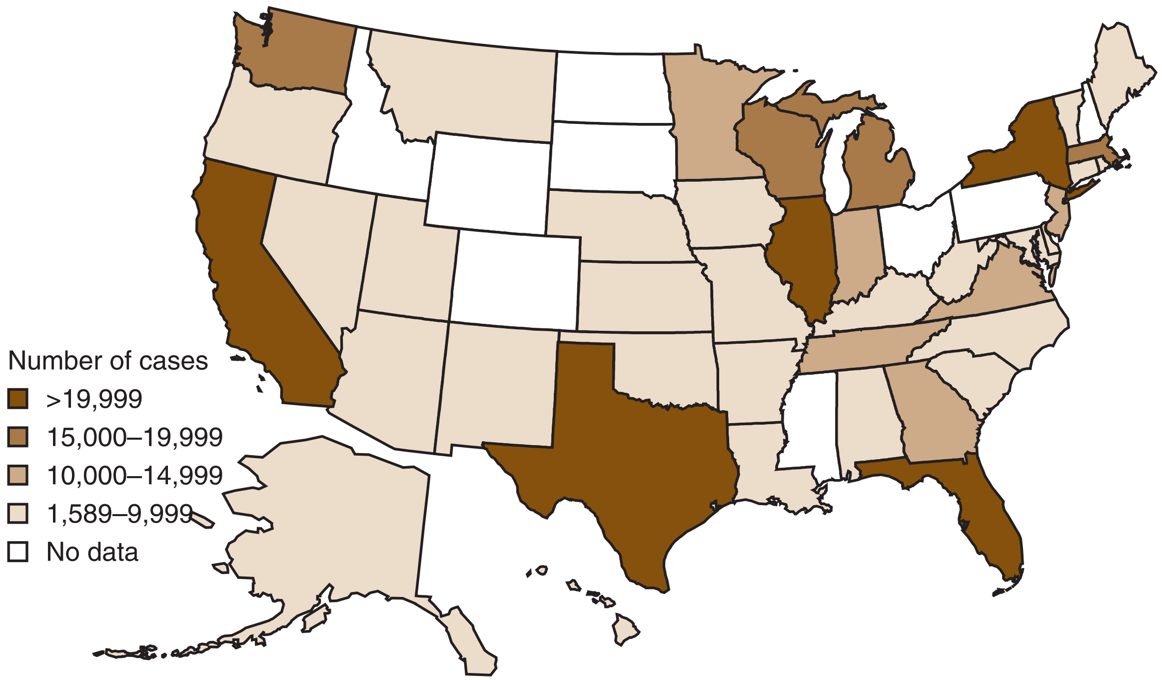


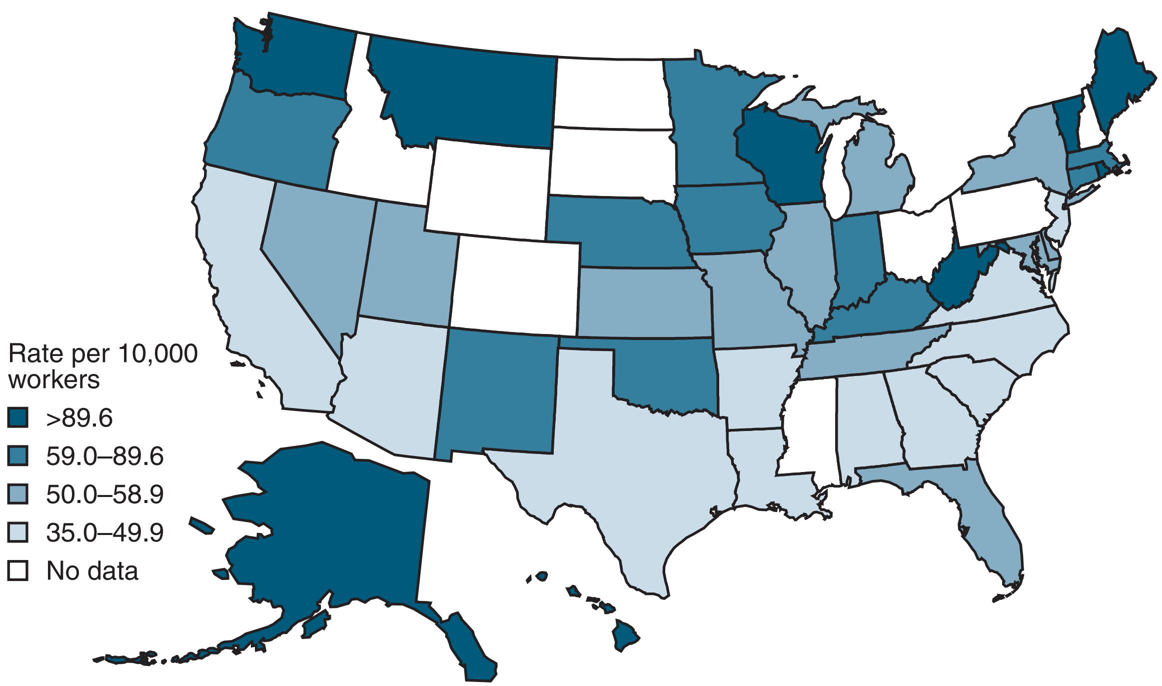
Figure 2–36. Distribution and number of MSD cases involving days away from work in private industry by nature of injury or illness, 2001. Sprains and strains accounted for 399,772 cases or 76.5% of the 522,528 musculoskeletal disorders involving days away from work in 2001. ***(Source: BLS [2003d].)***



Numbers by State

How did the number of MSD cases differ by State in 2001?

Figure 2–37. Number of MSD cases involving days away from work in private industry by State, 2001. The number of new MSD cases within reporting States ranged from 1,589 to 52,136 in 2001. The States with the highest numbers of cases included California (52,136), New York (33,773), and Texas (32,838). *(Source: BLS [2003d].)*



Rates among States

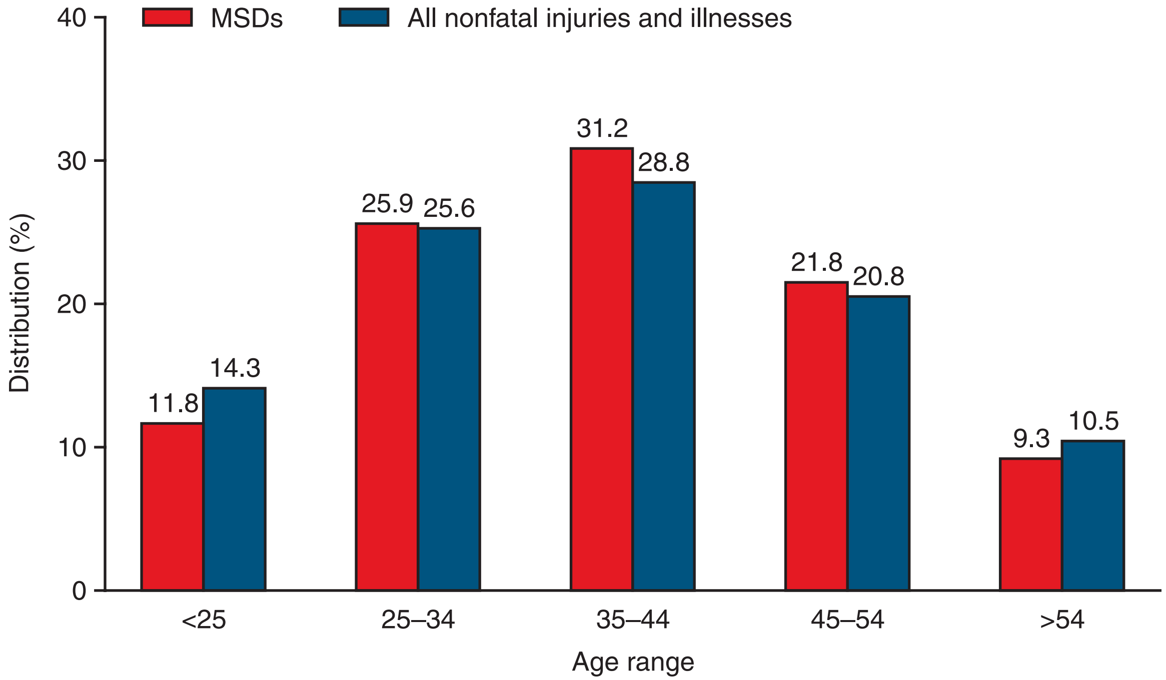
How did the rates of MSD cases differ by State in 2001?

Figure 2–38. Rates of MSD cases involving days away from work in private industry by State, 2001. The rate of new MSD cases within reporting States ranged from 35.0 to 141.5 per 10,000 full-time workers in 2001. The States with the highest rates include West Virginia (141.5), Alaska (123.5), and Washington (112.1). BLS reported an overall rate of 57.5 per 10,000 full-time workers for the United States in 2001. *(Source: BLS [2003d].)*

Age

How did MSD cases compare with all nonfatal injury and illness cases by age of worker in 2001?

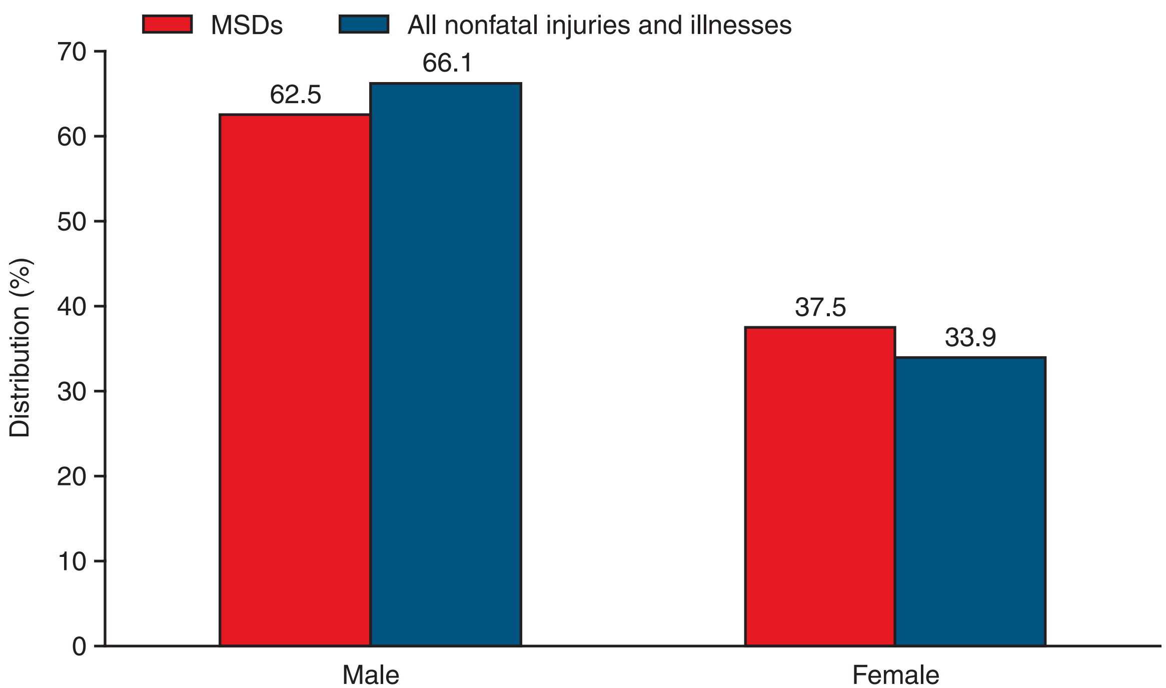
Figure 2–39. Distribution of MSD cases and all nonfatal injury and illness cases involving days away from work in private industry by age, 2001. Age data are available for 518,397 of the 522,528 BLS-estimated MSD cases involving days away from work in 2001. Overall, three age groups (25–34, 35–44, and 45–54) accounted for 78.9% of cases, slightly greater than the 75.2% reported for all nonfatal injury and illness cases. ***(Source: BLS [2003d].)***

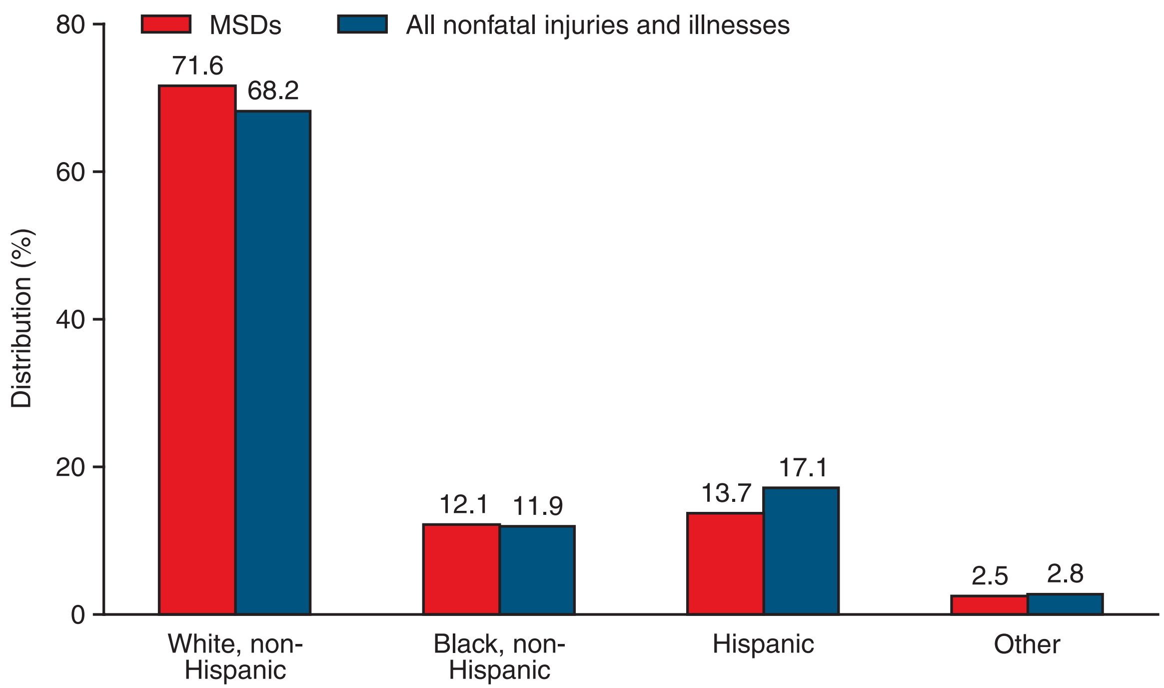


Sex

How did MSD cases compare with all nonfatal injury and illness cases by sex of worker in 2001?

Figure 2–40. Distribution of MSD cases and all nonfatal injury and illness cases involving days away from work in private industry by sex, 2001. Male workers accounted for a lower percentage of MSD cases in 2001 than nonfatal injury and illness cases (62.5% versus 66.1%). However, female workers accounted for a higher percentage of MSD cases (37.5% versus 33.9%). ***(Source: BLS [2003d].)***

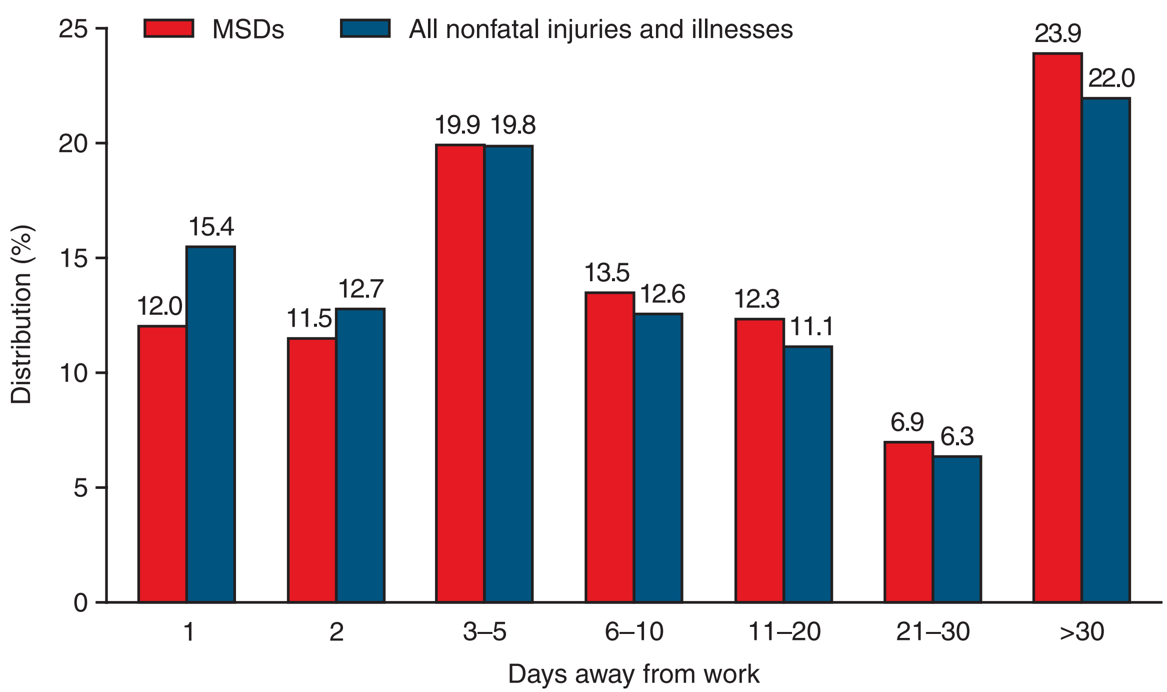




Race/Ethnicity

How did MSD cases compare with all nonfatal injury and illness cases by race/ethnicity in 2001?

Figure 2–41. Distribution of MSD cases and all nonfatal injury and illness cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 373,710 of the 522,528 BLS-estimated MSD cases involving days away from work in 2001. White, non-Hispanic workers accounted for 71.6% of MSD cases and 68.2% of all nonfatal injury and illness cases. Black, non-Hispanic workers and Hispanic workers accounted for 12.1% and 13.7% of MSD cases, respectively. ***(Source: BLS [2003d].)***



Severity

How did MSD cases compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–42. Distribution of MSD cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Compared with all nonfatal injuries and illnesses in 2001, MSD cases tended to involve higher percentages of long-term work loss (6–10, 11–20, 21–30, and 31 or more days away from work). Thirty-one or more days away from work were reported for 23.9% of MSD cases. A median of 8 days away from work was reported for MSD cases in 2001—slightly greater than the median of 6 days for all nonfatal injuries and illnesses. ***(Source: BLS [2003d].)***

Occupation

How did MSD cases compare with all nonfatal injury and illness cases by occupation in 2001?

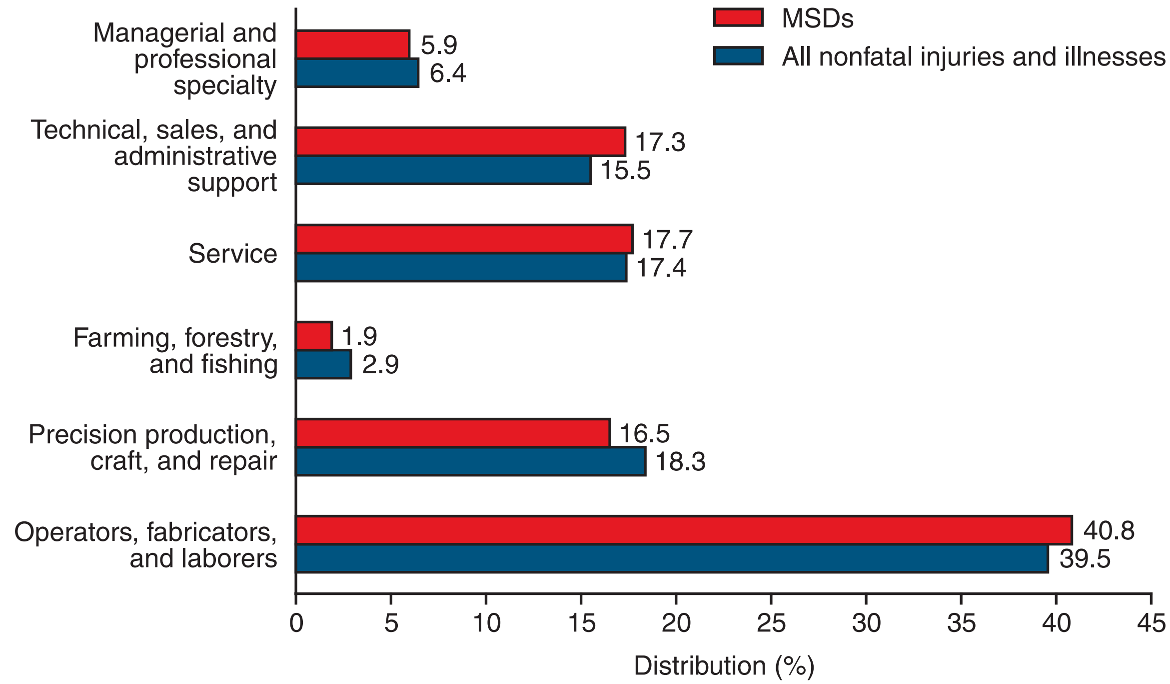


Figure 2–43. Distribution of MSD cases and all nonfatal injury and illness cases involving days away from work in private industry by occupation, 2001. Operators, fabricators, and laborers accounted for 40.8% of all MSD cases involving days away from work in 2001. Comparisons between MSD cases and nonfatal injuries and illnesses by occupational groups indicate only small differences. ***(Source: BLS [2003d].)***

Industry

How did MSD cases compare with all nonfatal injury and illnesses cases by private industry sector in 2001?

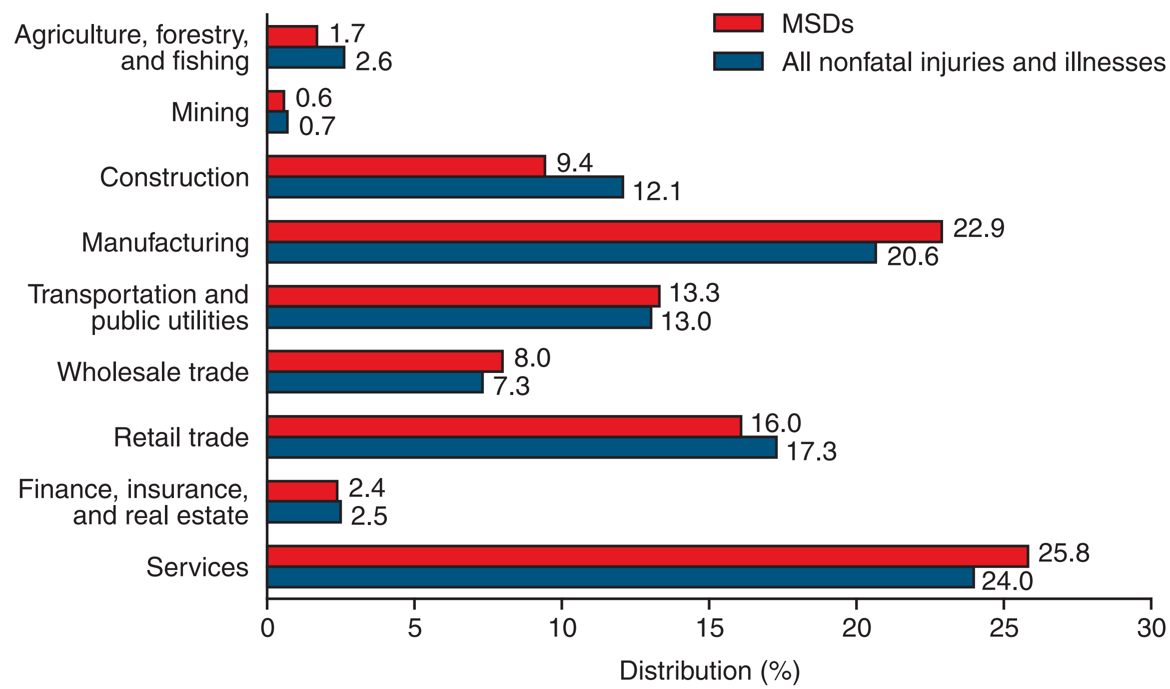


Figure 2–44. Distribution of MSD cases and all nonfatal injury and illness cases involving days away from work in private industry by industry, 2001. Manufacturing (22.9%) and services (25.8%) accounted for about half of all MSD cases in 2001. Distributions of MSD cases are notably different from distributions of all nonfatal injuries and illnesses by industry sector, with the greatest differences in services, construction, manufacturing, and retail trade. ***(Source: BLS [2003d].)***

Carpal Tunnel Syndrome (CTS)

The U.S. Department of Labor defines CTS as a disorder associated with the peripheral nervous system, which includes nerves and ganglia located outside the spinal cord and brain. Carpal tunnel syndrome is the compression of the median nerve at the wrist, which may result in numbness, tingling, weakness, or muscle atrophy in the hand and fingers. The carpal tunnel receives its name from the eight bones in the wrist (called carpals), which form a tunnel-like structure. The tunnel is filled with flexor tendons, which control finger movement. The carpal tunnel also provides a pathway for the median nerve to reach sensory cells in the hand. Repetitive flexing and extension of the wrist may cause a thickening of the protective sheaths that surround each of the tendons. The swollen tendon sheaths apply increased pressure on the median nerve and produce CTS.

Two sources of data describe the magnitude and distribution of these adverse health conditions: the SOII and the case-based SENSOR program.

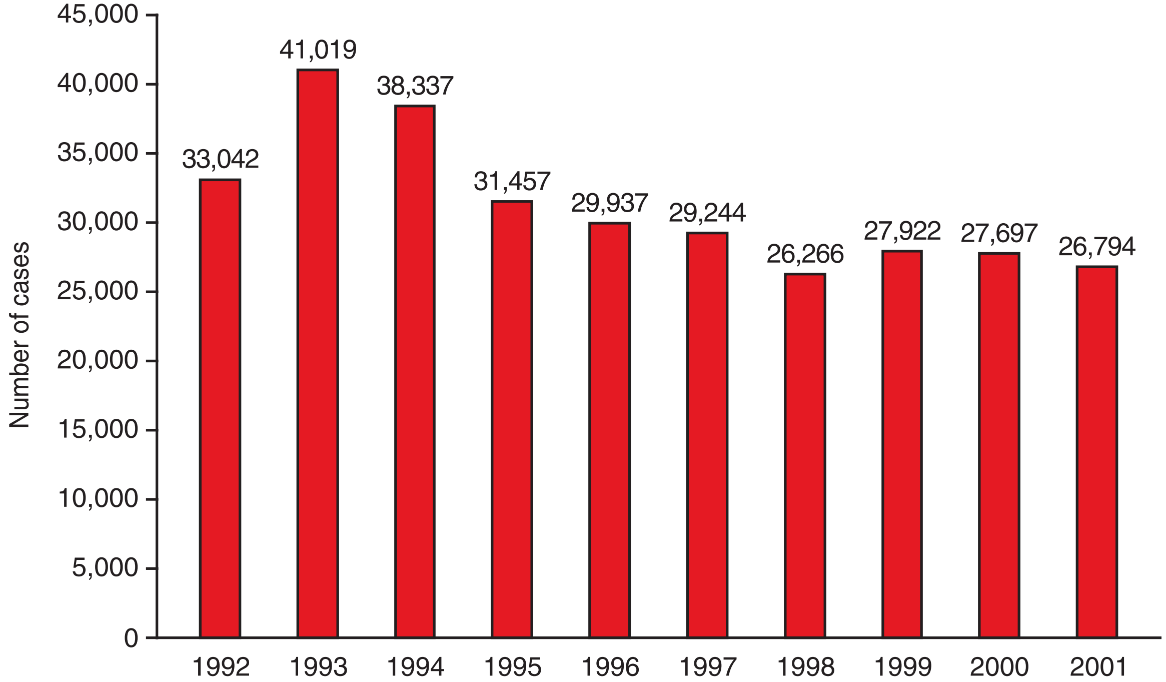
Annual Survey of Employers' Reports for CTS (BLS)

CTS is more severe than the average nonfatal injury or illness case (Figure 2–50). In 2001, CTS cases involved a median of 25 days away from work compared with 6 days for all nonfatal injury and illness cases [BLS 2003a]. BLS reported 26,794 CTS cases involving days away from work in 2001 (Figure 2–45). During 1992–2001, annual rates declined 30.2% to a rate of 3.0 per 10,000 full-time workers in 2001 (Figure 2–46). Most cases involved workers who were aged 25–54 (83.6%) (Figure 2–47), female (Figure 2–48), and white, non-Hispanic (75.4%) (Figure 2–49). Two occupational groups accounted for more than 70% of all CTS cases in 2001: operators, fabricators, and laborers (36.7% or 9,808 cases) and technical, sales, and administrative support (34.2% or 9,144 cases) (Figure 2–51). Incidence rates exceeding the private-sector rate were reported for manufacturing (6.5 per 10,000 full-time workers) and finance, insurance, and real estate (3.2) (Figure 2–52). Manufacturing had consistently higher rates than other industry sectors during 1992–2001 and experienced a 33% rate reduction (Figure 2–53).

Magnitude and Trend

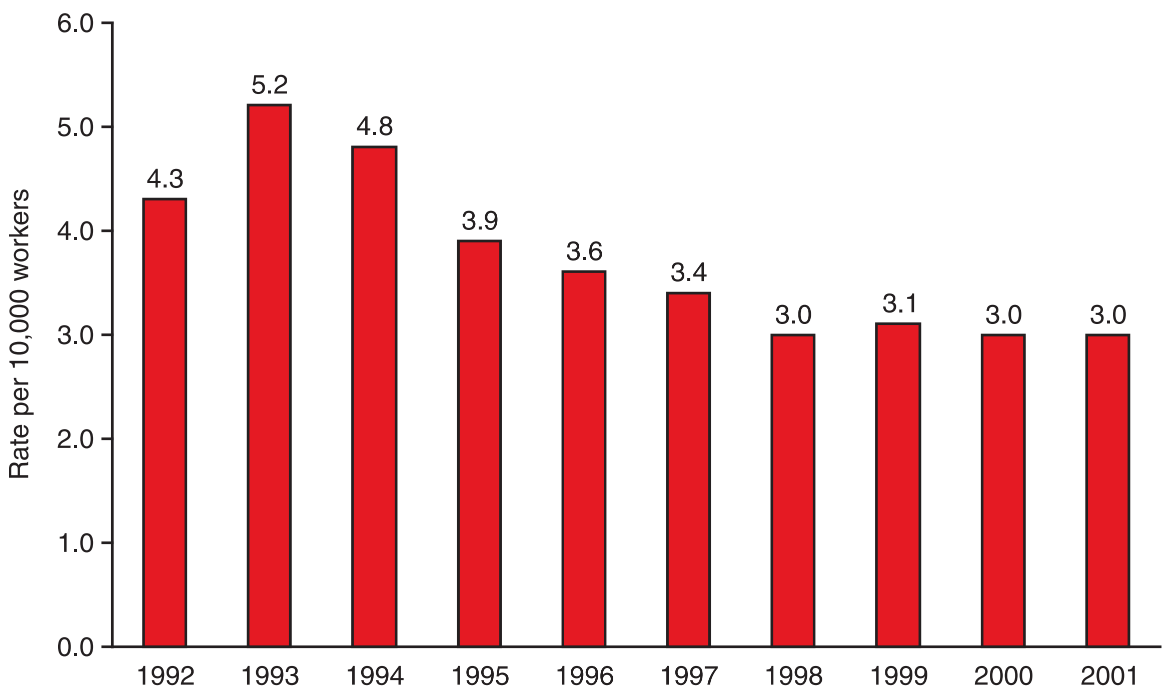
How did the number of CTS cases in private industry change during 1992–2001?

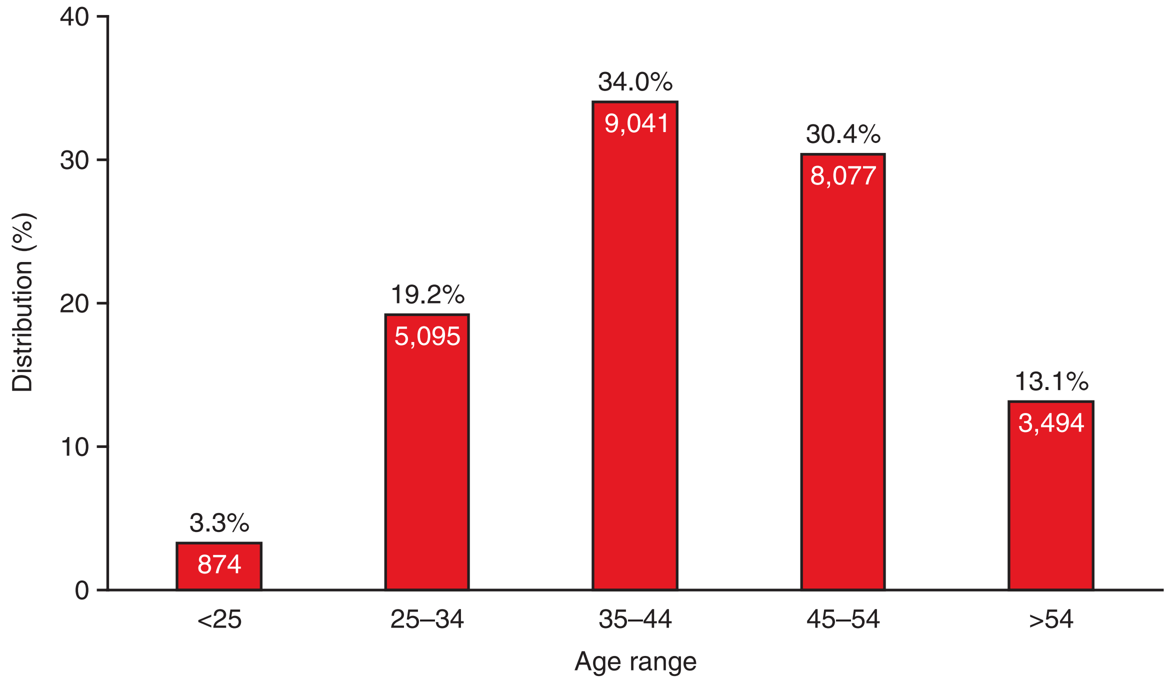
Figure 2–45. Number of CTS cases involving days away from work in private industry, 1992–2001. The annual number of CTS cases involving days away from work declined 18.9% during this period—from 33,042 cases in 1992 to 26,794 cases in 2001. CTS cases reached a high of 41,019 cases in 1993. ***(Sources: BLS [2003a,b].)***



How did the annual rate of CTS cases change during 1992–2001?

Figure 2–46. Annual rates of CTS cases involving days away from work in private industry, 1992–2001. The annual rate of CTS cases involving days away from work declined 30.2% during this period—from 4.3 per 10,000 full-time workers in 1992 to 3.0 in 2001. ***(Sources: BLS [2003a,b].)***

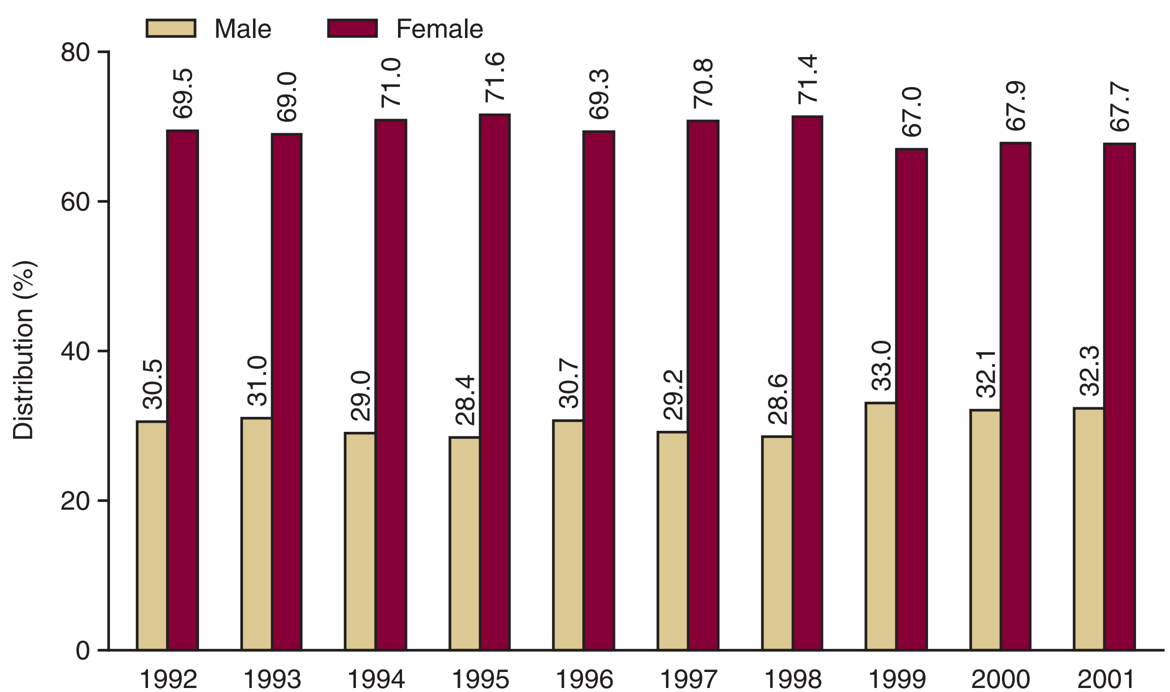




Age

How did the number of CTS cases differ by age of worker in 2001?

Figure 2–47. Distribution and number of CTS cases involving days away from work in private industry by age, 2001. Age data are available for 26,581 of the 26,794 BLS-estimated CTS cases involving days away from work in 2001. Workers aged 25–54 accounted for 22,213 cases or 83.6%. Workers aged 35–44 accounted for 34.0% and those aged 45–54 accounted for 30.4%. ***(Sources:** **BLS [2003a,b]; Booth-Jones et al. [2003b].)***



Sex

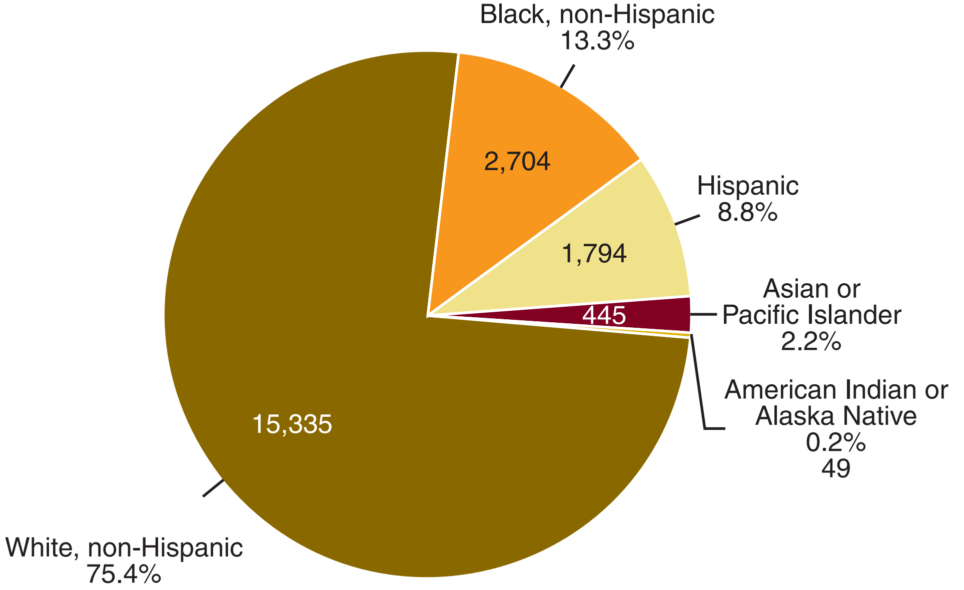
How did the distribution of CTS cases differ by sex of worker during 1992–2001?

Figure 2–48. Distribution of CTS cases involving days away from work in private industry by sex, 1992–2001. Female workers accounted for nearly 70% of CTS cases during 1992–2001, ranging from 67.0% to 71.6%, with a slightly decreasing trend. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003b].)***

Race/Ethnicity

How did CTS cases differ by race/ethnicity in 2001?

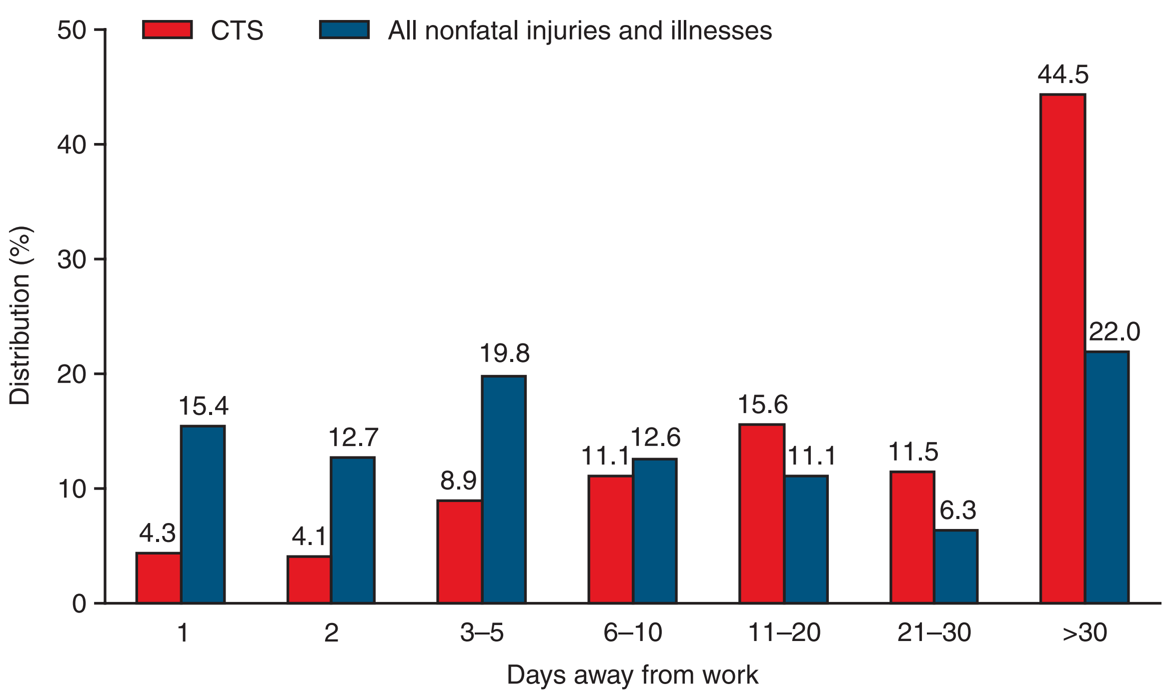
Figure 2–49. Distribution and number of CTS cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 20,327 of the 26,794 BLS-estimated CTS cases involving days away from work in 2001. White, non-Hispanic workers accounted for the majority of cases (15,335 or 75.4%). Black, non-Hispanic workers accounted for 2,704 cases or 13.3%, and Hispanic workers accounted for 1,794 cases or 8.8%. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003b].)***

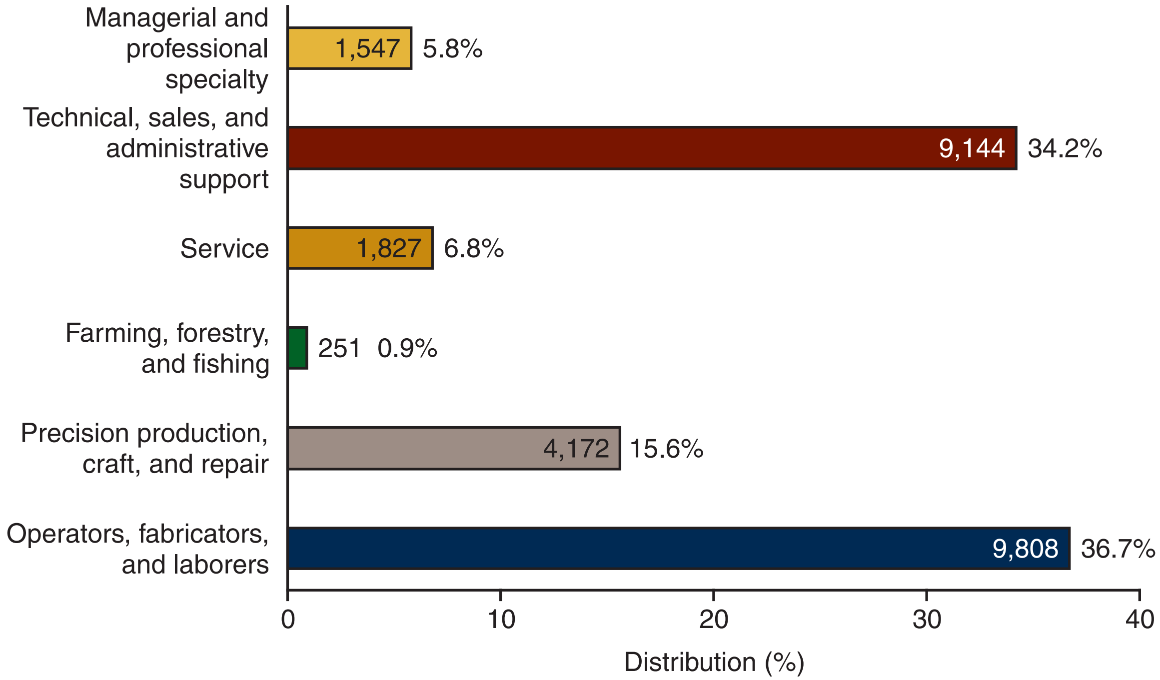


Severity

How did CTS cases compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–50. Distribution of CTS cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Compared with all nonfatal injury and illness cases, CTS cases tended to involve higher percentages of long-term work loss (11–20, 21–30, and 31 or more days away from work) in 2001. Cases involving 31 or more days away from work accounted for 44.5% of CTS cases and 22% of all fatal injuries and illnesses. CTS cases involved a median of 25 days away from work in 2001—substantially greater than the median of 6 days for all nonfatal injuries and illnesses. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003b].***

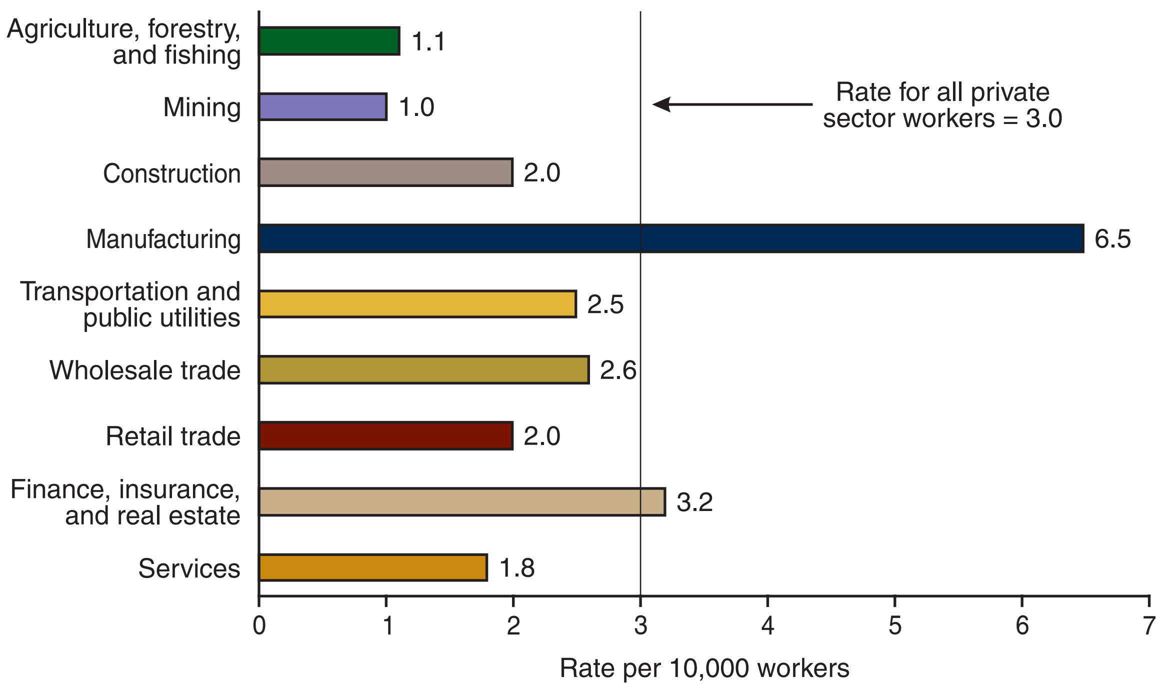




Occupation

How did CTS cases differ by occupation in 2001?

Figure 2–51. Distribution and number of CTS cases involving days away from work in private industry by occupation, 2001. In 2001, the majority of CTS cases requiring days away from work (18,952 cases or 70.9%) occurred among two occupational groups: operators, fabricators, and laborers and technical, sales, and administrative support workers. Precision production, craft, and repair workers constituted 15.6% (4,172) of the overall CTS cases. ***(Sources:** **BLS [2003a,b]; Booth-Jones et al. [2003b].)***



Industry

How did CTS rates differ by private industry sector in 2001?

Figure 2–52. Incidence rate of CTS cases by private industry sector, 2001. Private industry reported a CTS incidence rate of 3.0 per 10,000 full-time workers in 2001. The rates for manufacturing (6.5 or 11,240 cases) and for finance, insurance, and real estate (3.2 or 2,204 cases) both exceeded the private-sector rate. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003b].)***

How did the annual rates of CTS change by private industry sector during 1992–2001?

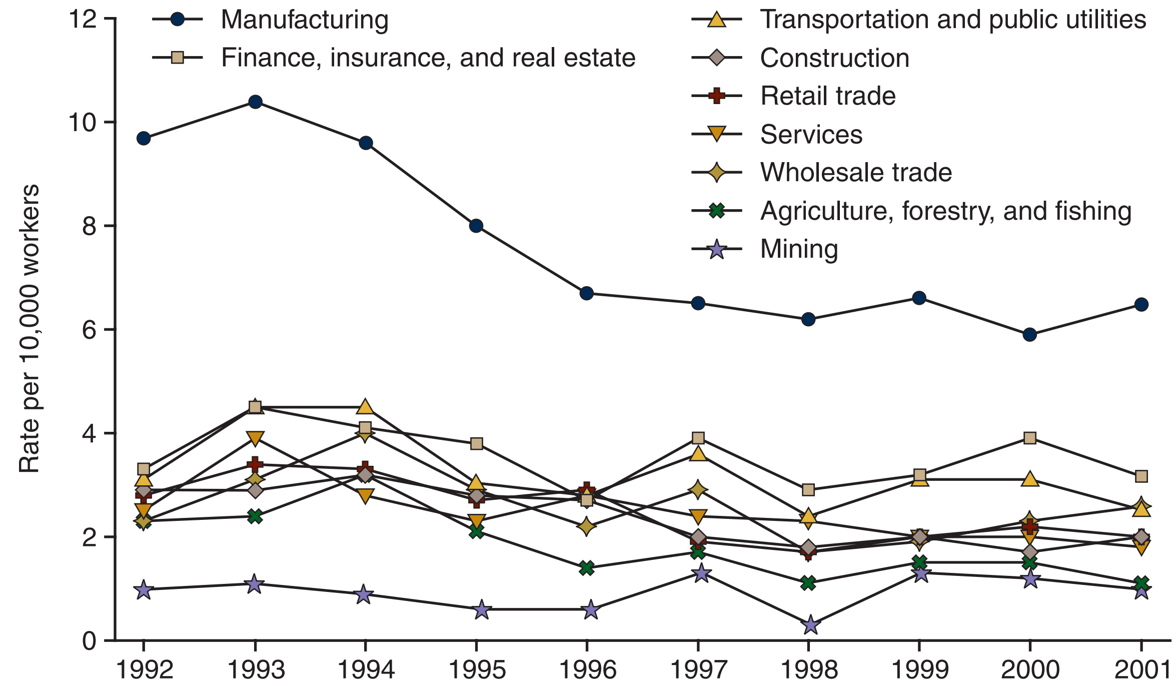


Figure 2–53. Annual rates of CTS cases involving days away from work by private industry sector, 1992–2001. The private-sector annual rate declined 30.2% during 1992–2001. Rates declined for each industry sector except wholesale trade. During this 10-year period, manufacturing had consistently higher rates than other industry sectors and experienced a 33% rate reduction. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003b].)***

Case-Based Reporting of CTS (California SENSOR)

Through the SENSOR program, NIOSH provides technical and financial support to the California Department of Health Services for case-based surveillance of CTS. The California SENSOR program evaluated 3,358 CTS cases during 1998–2000. Technical, sales, and administrative support occupations consistently accounted for a disproportionate number of CTS cases in California for each of the 3 years—nearly three times the number of cases in other occupational categories (Figure 2–54). Computing (data entry) activities consistently accounted for nearly half of CTS cases in California for each of the 3 years (Figure 2–55).

Occupation

How did the number of CTS cases change in California by occupation during 1998–2000?

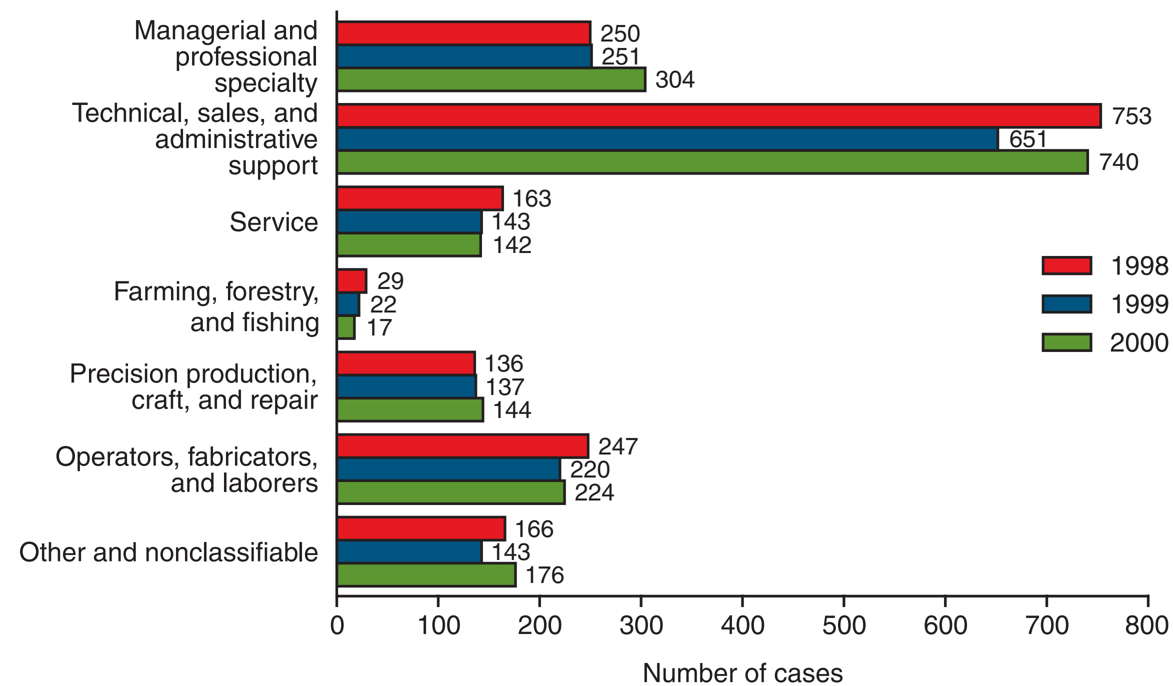


Figure 2–54. Number of CTS cases in California by occupation, 1998–2000. For each year during this period, technical, sales, and administrative support occupations consistently accounted for a disproportionately large number of CTS cases in California—nearly three times the number accounted for by other occupations. The number of CTS cases decreased during this period for four of the seven occupational groups. *(Source: Harrison and Flattery [2002a].)*

Job Activity

How did the prevalence of CTS change in California by type of job activity?

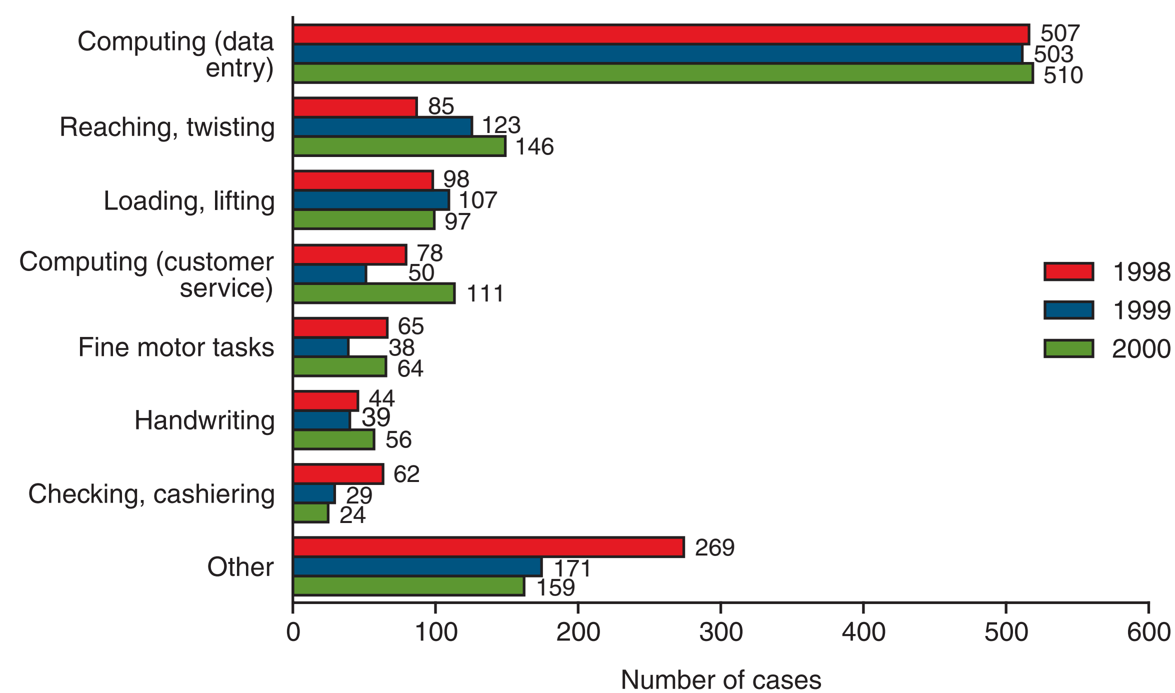


Figure 2–55. Number of CTS cases in California by type of job activity, 1998–2000. Among the cases sampled, computing (data entry) activities consistently accounted for nearly half of all CTS cases in California for each of the 3 years during 1998–2000. Cases involved with reaching and twisting, computing (customer service), and handwriting increased from 1998 to 2000. *(Source: Harrison and Flattery [2002a].)*

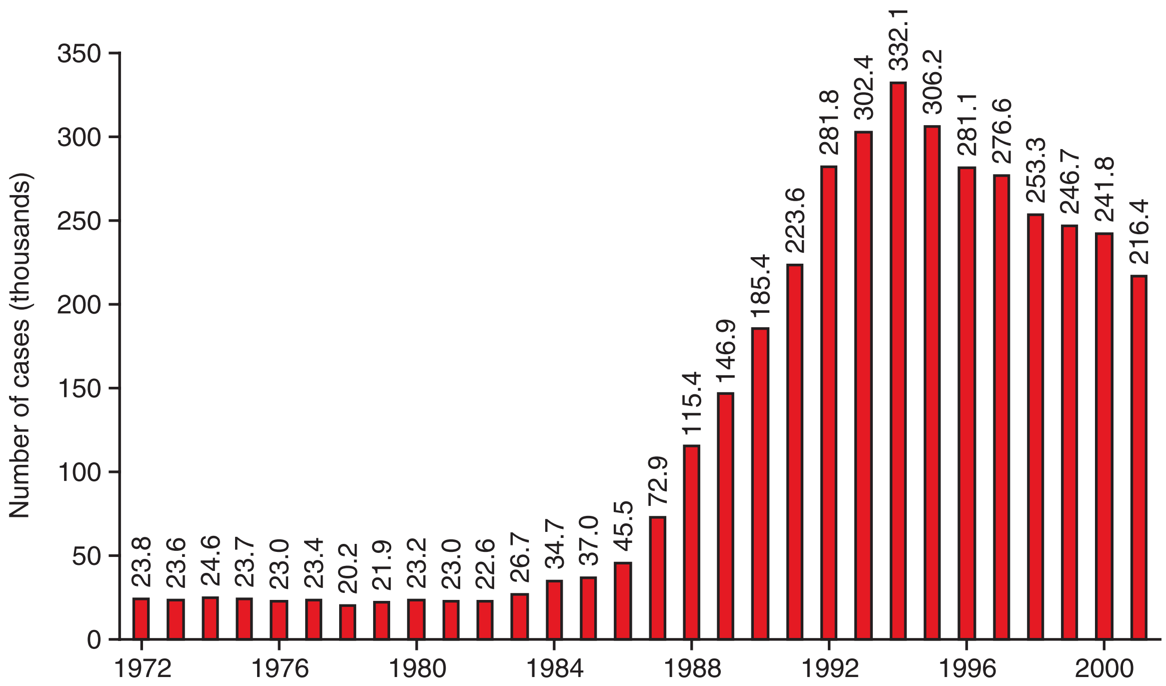
Disorders Associated with Repeated Trauma

Occupational disorders associated with repeated trauma include conditions resulting from repeated motion, vibration, or pressure. These disorders are one class of illness tracked by BLS. Examples of repeated trauma disorders include CTS, noise-induced hearing loss, Raynaud's phenomenon, synovitis, tenosynovitis, and bursitis. During 1972–2001, repeated trauma disorders ranged from a low of 20,200 cases in 1978 to a high of approximately 332,100 cases in 1994 (Figure 2–56). In 2001, BLS reported 216,400 cases of repeated trauma disorder—nearly 65% of all nonfatal occupational illness cases in 2001, and a decrease of 42% from the 1994 rate (Figure 2–56). Rates varied during 1984–2001 from a low of 5.1 per 10,000 full-time workers in 1984 to a high of 41.1 in 1994. BLS reported a rate of 23.8 per 10,000 full-time workers in 2001 (Figure 2–57). Within reporting States, the number of repeated trauma disorders ranged from 100 to 26,700 cases in 2001 (Figure 2–58). In 2001, incidence rates varied by State from a low of 2.9 per 10,000 full-time workers in New Mexico to a high of 120.1 in Maine. The U.S. rate was 23.8 per 10,000 full-time workers (Figure 2–59).

Magnitude and Trend

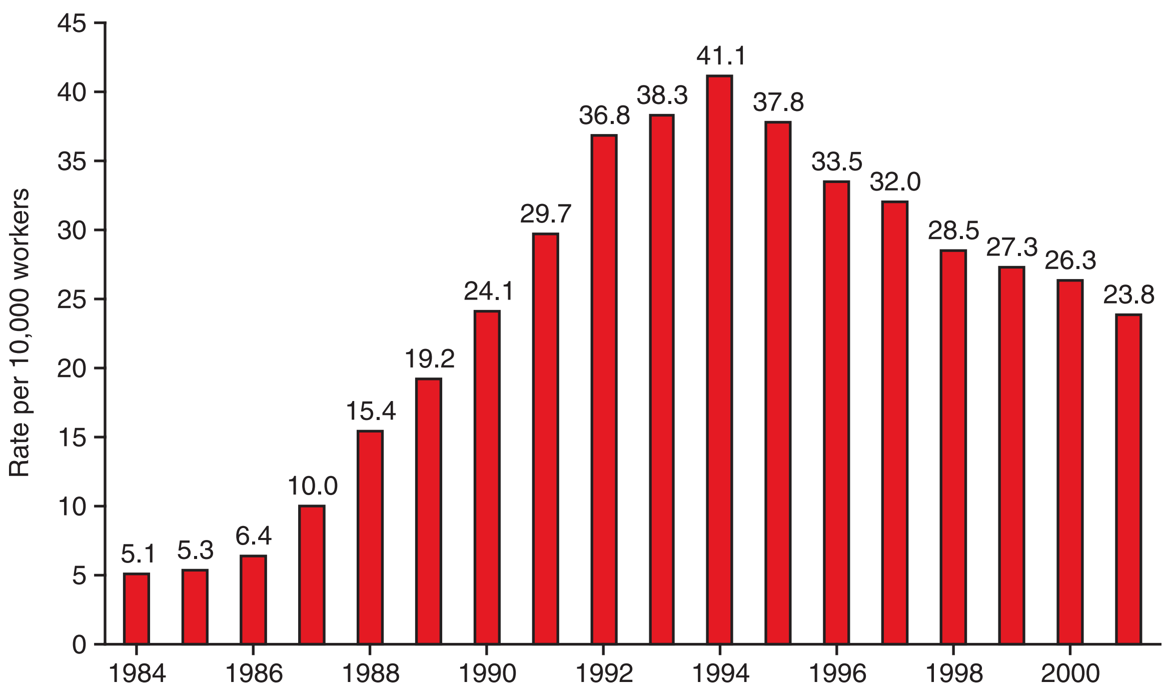
How did the number of repeated trauma disorders change during 1972–2001?

Figure 2–56. Number of disorders associated with repeated trauma in private industry, 1972–2001. Repeated trauma disorders ranged from a low of 20,200 cases in 1978 to a high of approximately 332,100 cases in 1994. In 2001, BLS reported 216,400 repeated trauma disorder cases—nearly 65% of all nonfatal occupational illness cases in 2001, and a decrease of 42% from the 1994 rate. ***(Source: BLS [2002].)***



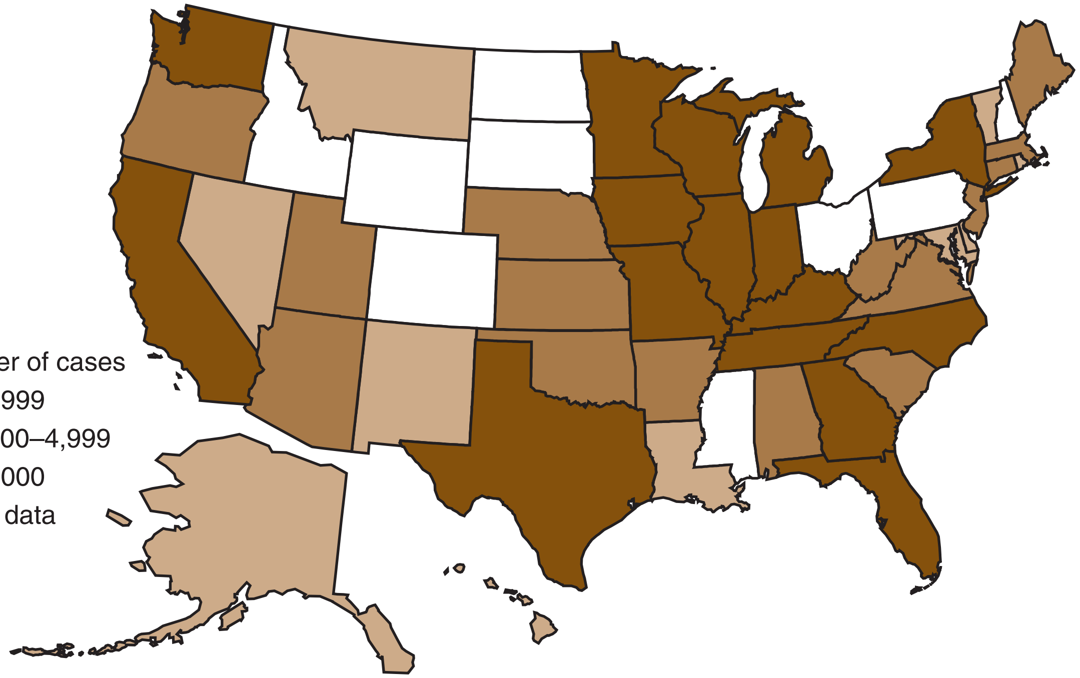
How did the rate of repeated trauma disorders change during 1984–2001?

Figure 2–57. Incidence rates of disorders associated with repeated trauma in private industry, 1984–2001. BLS reported increasing rates for repeated trauma disorders—from 5.1 per 10,000 full-time workers in 1984 to 41.1 in 1994. BLS reported a rate of 23.8 per 10,000 full-time workers in 2001. ***(Source: BLS [2002].)***



Numbers and Rates among States

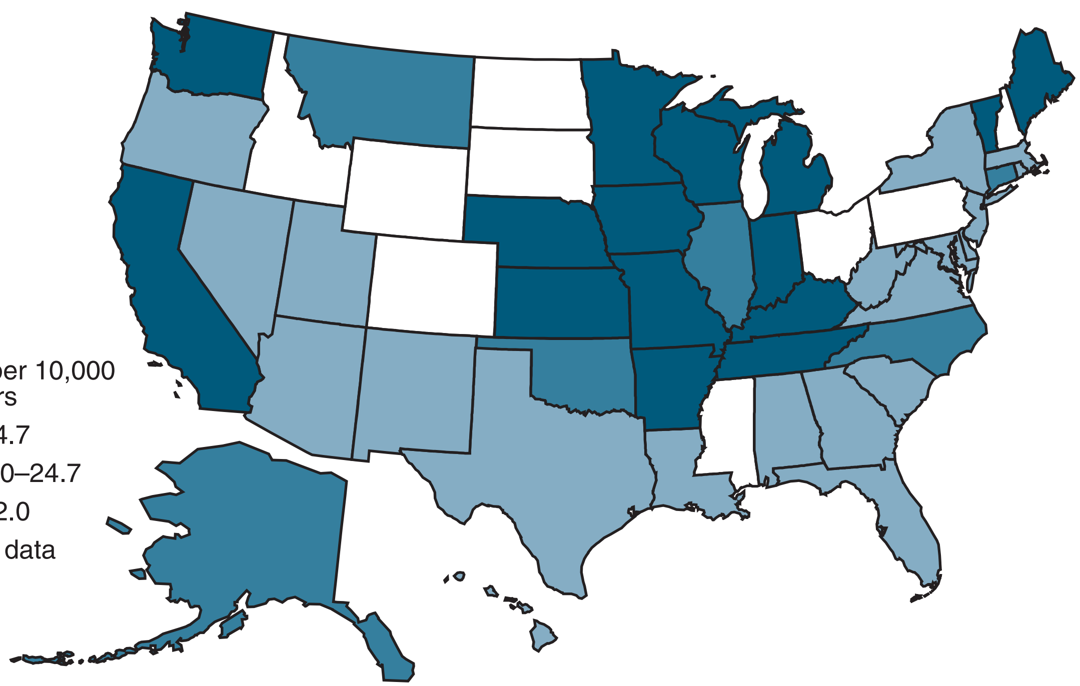
How did the number of repeated trauma disorders differ by State in 2001?



Number of cases
- >4,999
- 1,000–4,999
- <1,000
- No data

Figure 2–58. Number of disorders associated with repeated trauma in private industry by State, 2001. Within reporting States, the number of repeated trauma disorders ranged from 100 to 26,700 cases in 2001. States with the highest numbers included California (26,700), Michigan (22,700), Texas (11,600), and Illinois (9,500). ***(Source: BLS [2002].)***

How did the rates of repeated trauma disorders differ by State in 2001?



Rate per 10,000 workers
- >24.7
- 22.0–24.7
- <22.0
- No data

Figure 2–59. Incidence rates for disorders associated with repeated trauma in private industry by State, 2001. Incidence rates for disorders associated with repeated trauma varied by State in 2001, from a low of 2.9 per 10,000 full-time workers in New Mexico to a high of 120.1 in Maine. The U.S. rate was 23.8 per 10,000 full-time workers. Lower rates were reported for States in the West, the Southwest, and the South. ***(Source: BLS [2002].)***

Tendonitis

Tendonitis is an inflammation or irritation of a tendon, the thick fibrous cord that attaches muscle tissue to bone. Tendonitis cases are more severe than the average nonfatal injury or illness case (Figure 2–65). In 2001, these cases involved a median of 10 days away from work compared with 6 days for all nonfatal injury and illness cases [BLS 2003a].

BLS reported 14,124 tendonitis cases involving days away from work in 2001 (Figure 2–60). Rates declined 51.5% during 1992–2001, from 3.3 per 10,000 full-time workers in 1992 to 1.6 in 2001 (Figure 2–61). Most cases involved workers who were aged 25–54 (82.1%) (Figure 2–62), female (Figure 2–63), and white, non-Hispanic (71.3%) (Figure 2–64). Two occupational groups accounted for more than 67% of all tendonitis cases in 2001: operators, fabricators, and laborers (47.1% or 6,627 cases) and technical, sales, and administrative support workers (20.8% or 2,925 cases) (Figure 2–66). Incidence rates exceeding the private-sector rate were reported for manufacturing (3.2 per 10,000 full-time workers), construction (2.0), and transportation and public utilities (1.7) (Figure 2–67). Manufacturing had consistently higher rates than other industry sectors during 1992–2001 and experienced a 59% rate reduction (Figure 2–68).

Magnitude and Trend

How did the number of tendonitis cases change during 1992–2001?

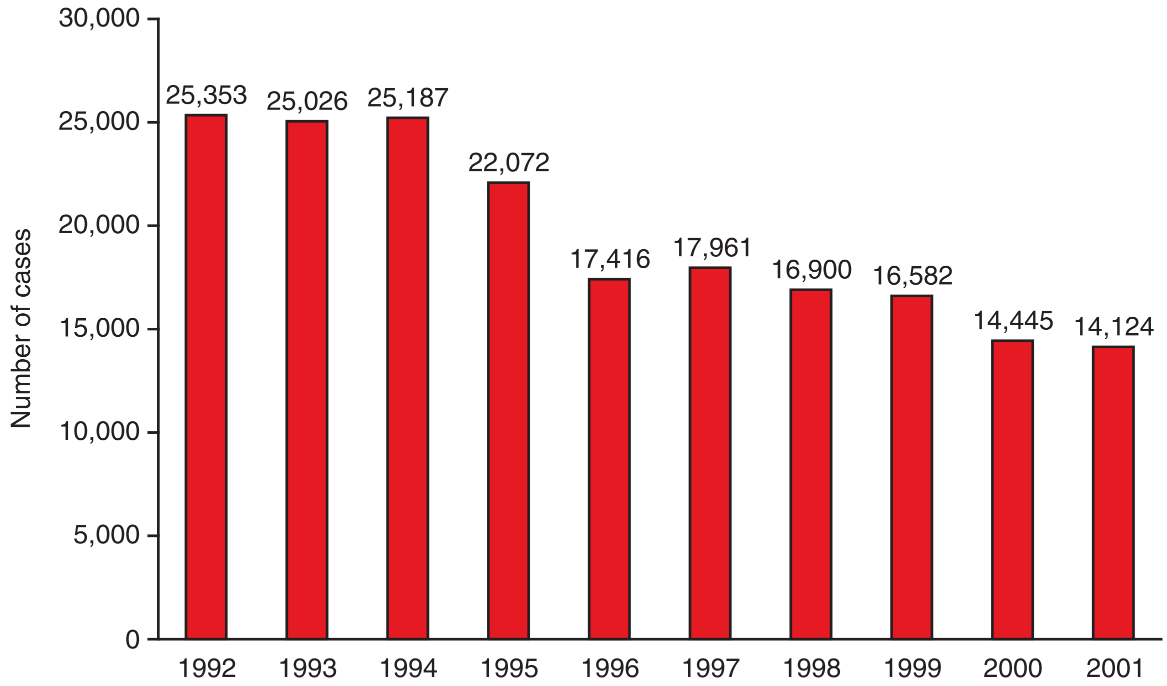


Figure 2–60. Number of tendonitis cases involving days away from work in private industry, 1992–2001. The annual number of tendonitis cases involving days away from work declined 44.3% during this period, from 25,353 cases in 1992 to 14,124 cases in 2001. ***(Sources: BLS [2003a,b].)***

How did the annual rate of tendonitis cases change during 1992–2001?

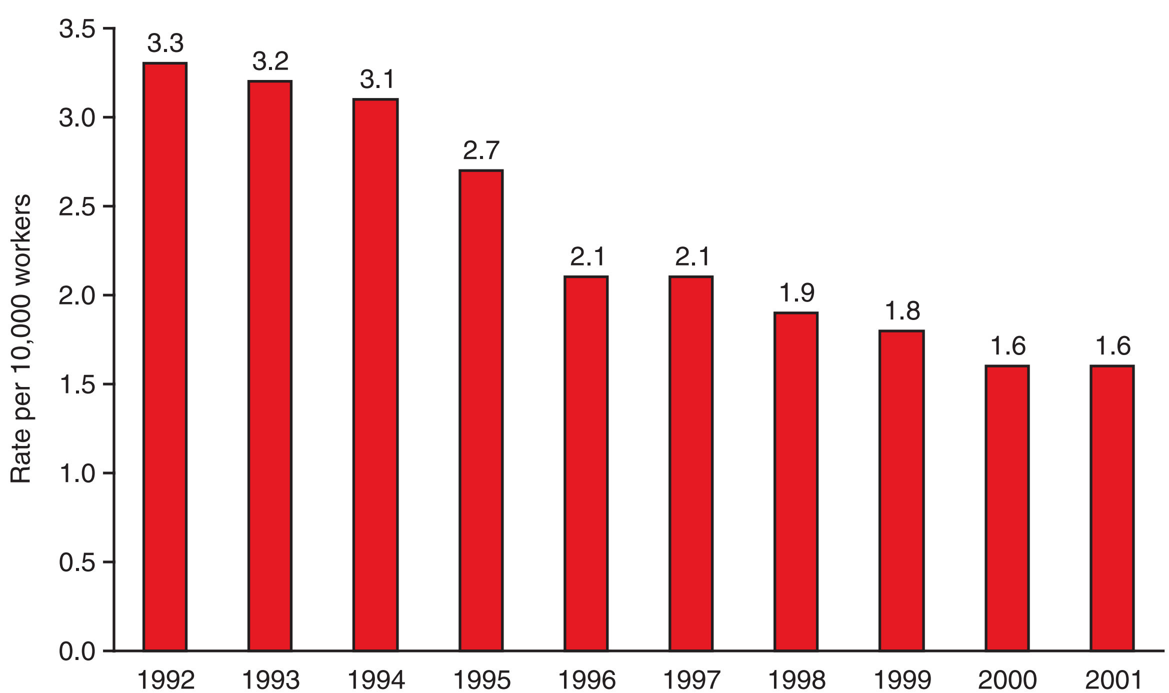
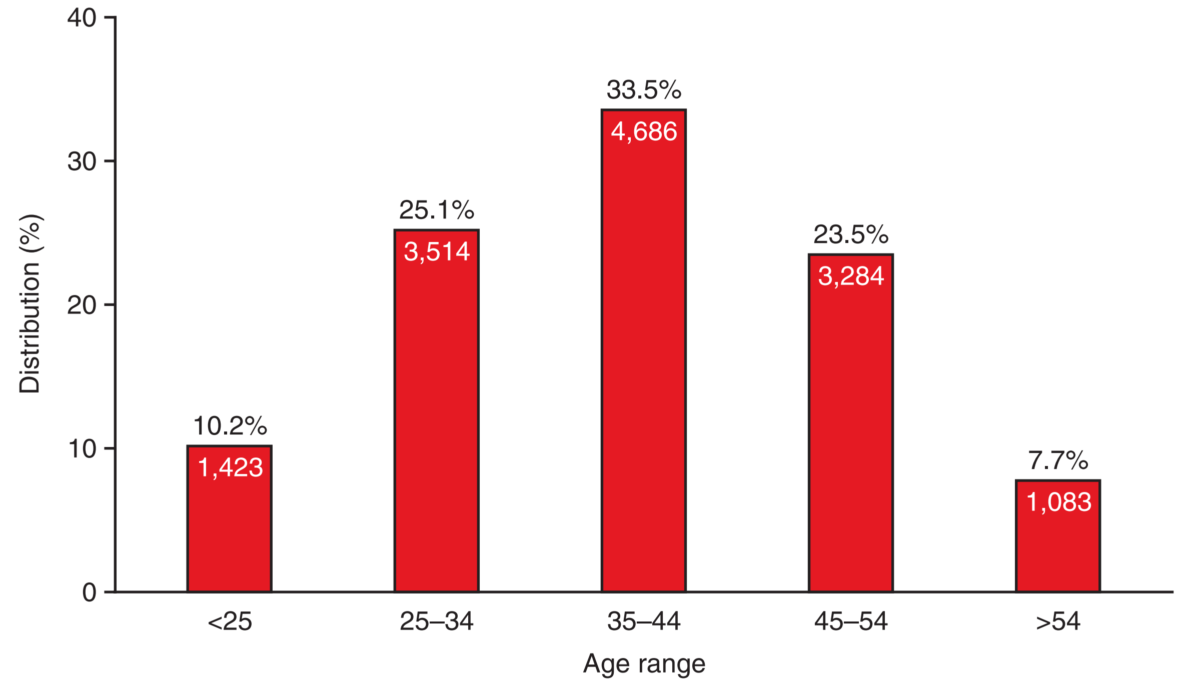


Figure 2–61. Annual rate of tendonitis cases involving days away from work in private industry, 1992–2001. The annual rate of private-sector tendonitis cases involving days away from work declined 51.5% during this period—from 3.3 per 10,000 full-time workers in 1992 to 1.6 in 2001. ***(Sources: BLS [2003a,b].)***

Age

How did the number of tendonitis cases differ by age of worker in 2001?

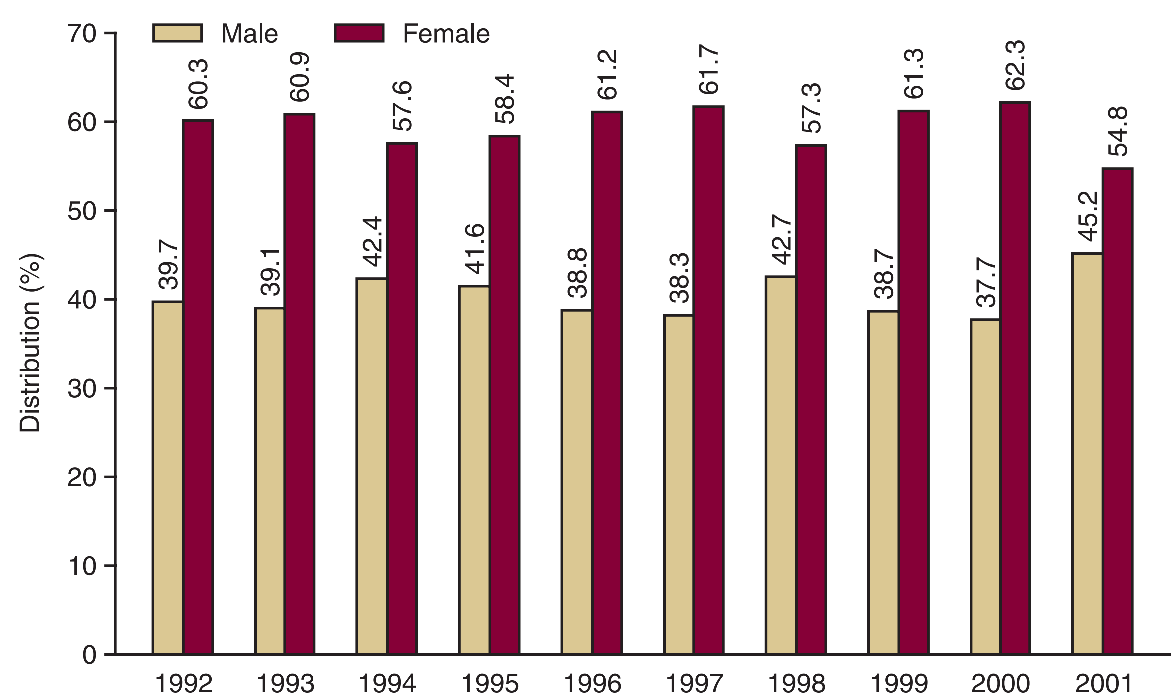
Figure 2–62. Distribution and number of tendonitis cases involving days away from work in private industry by age, 2001. Age data are available for 13,990 of the 14,124 BLS-estimated tendonitis cases involving days away from work in 2001. Workers aged 35–44 accounted for 4,686 or 33.5% of cases. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003c].)***

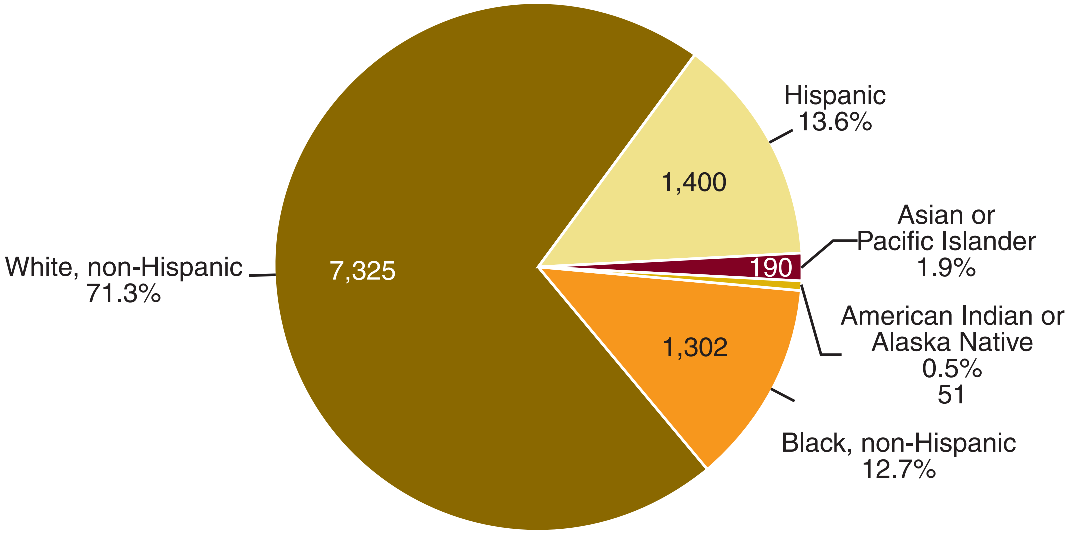


Sex

How did the distribution of tendonitis cases differ by sex of worker?

Figure 2–63. Distribution of tendonitis cases involving days away from work in private industry by sex, 1992–2001. Female workers accounted for the majority of tendonitis cases during 1992–2001. Over the decade, women represented 54.8% to 62.3% of the cases. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003c].)***

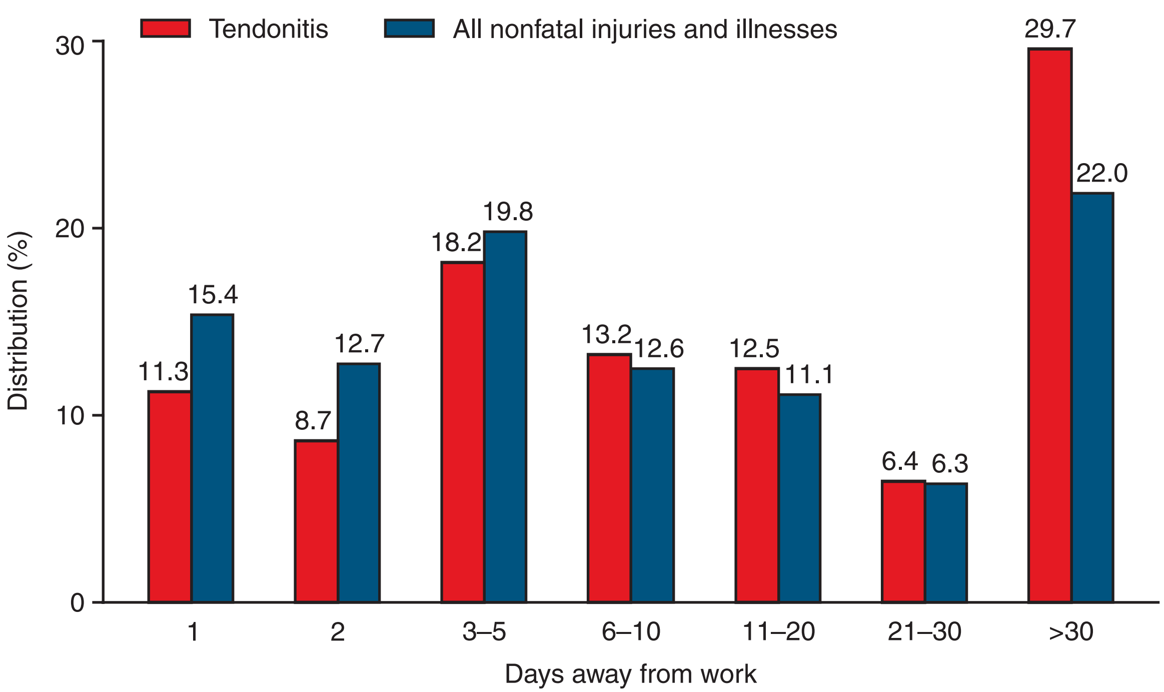




Race/Ethnicity

How did tendonitis cases differ by race/ethnicity in 2001?

Figure 2–64. Distribution and number of tendonitis cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 10,268 of the 14,124 BLS-estimated tendonitis cases involving days away from work in 2001. White, non-Hispanic workers accounted for the majority of cases (71.3% or 7,325 cases) in 2001. Hispanic workers accounted for 13.6% or 1,400 cases of tendonitis, and black, non-Hispanic workers accounted for 12.7% or 1,302 cases. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003c].)***



Severity

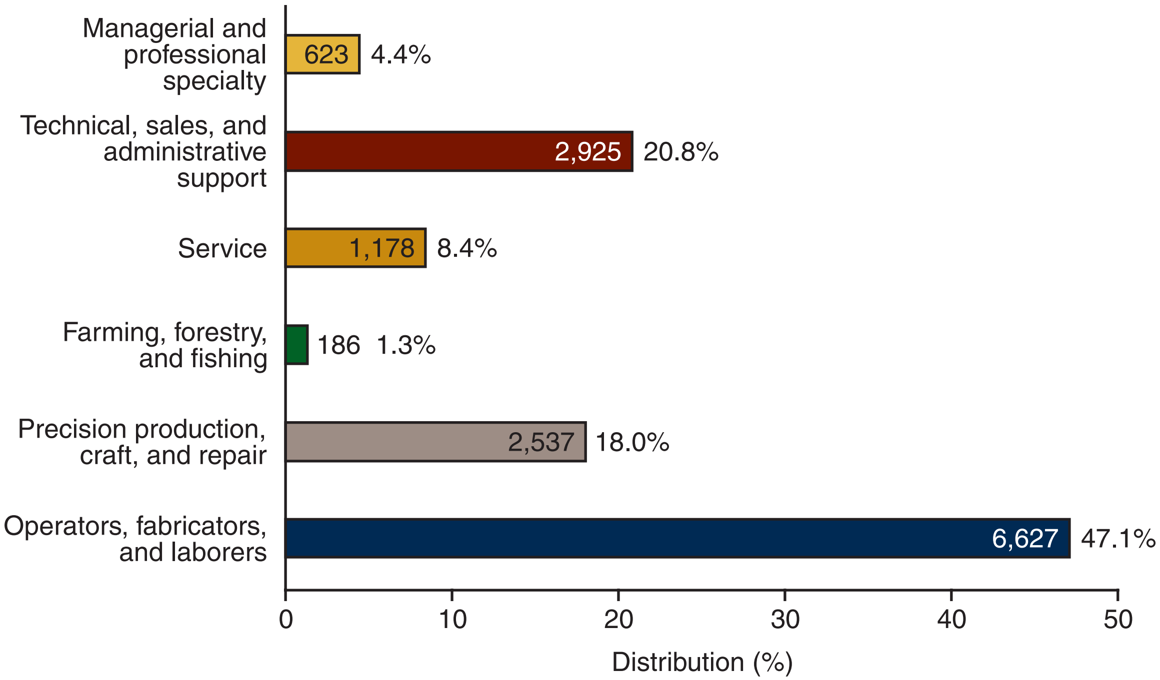
How did tendonitis cases compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–65. Distribution of tendonitis cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Tendonitis cases in 2001 tended to involve higher percentages of long-term work loss (6–10, 11–20, 21–30, and 31 or more days away from work). For example, 29.7% of tendonitis cases involved 31 or more days away from work compared with only 22.0% of all nonfatal injuries and illnesses. Tendonitis cases required a median of 10 days away from work in 2001, whereas all nonfatal injuries and illnesses required 6. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003c].)***

Occupation

How did tendonitis cases differ by occupation in 2001?

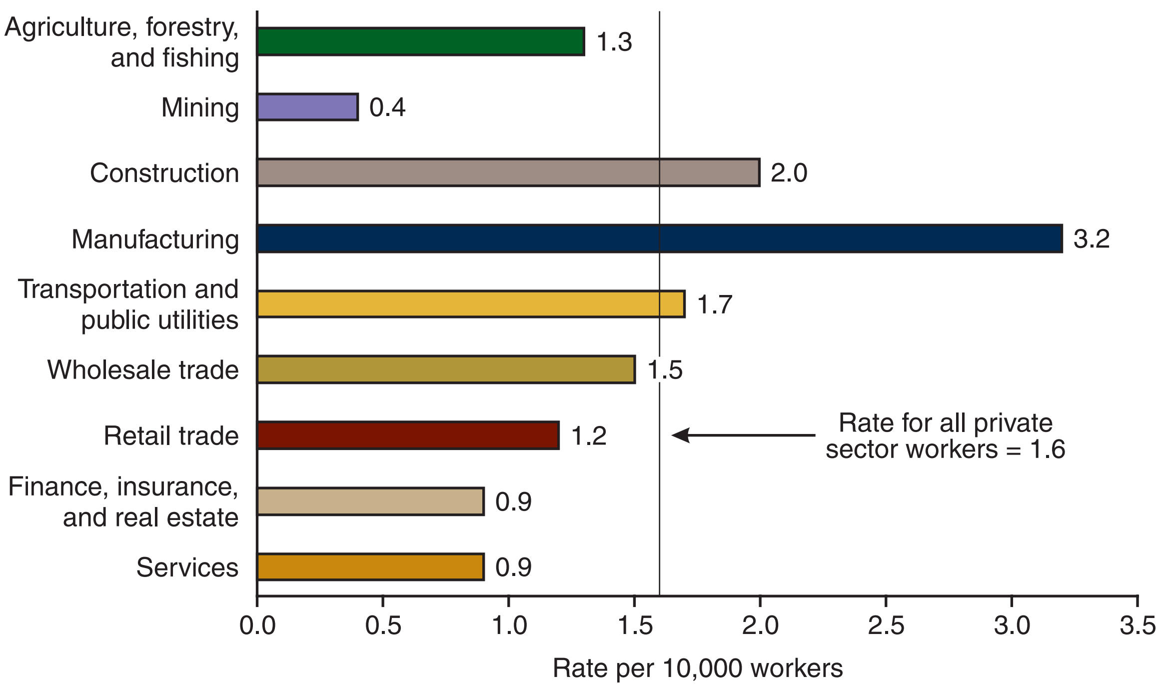
Figure 2–66. Distribution and number of tendonitis cases involving days away from work in private industry by occupation, 2001. Operators, fabricators, and laborers represented 47.1% of tendonitis cases in 2001. Two other occupations accounted for nearly 39% of the cases: technical, sales, and administrative support (20.8%); and precision production, craft, and repair (18.0%). ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003c].)***

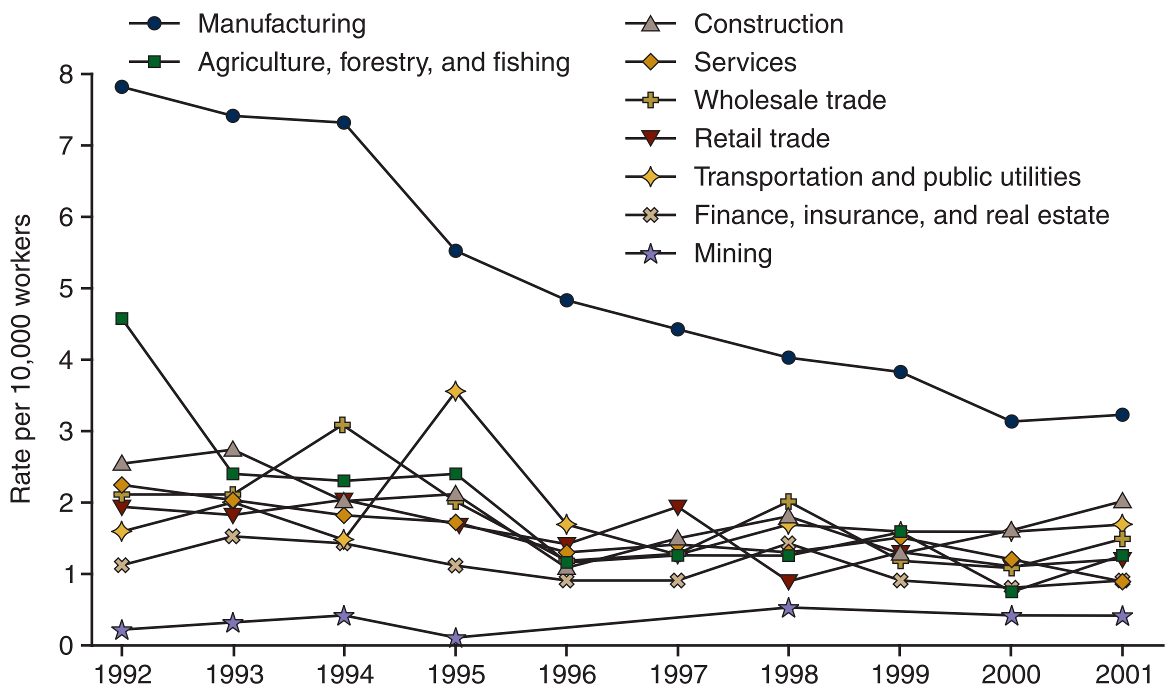


Industry

How did the rate of tendonitis cases differ by private industry sector in 2001?

Figure 2–67. Incidence rate of tendonitis cases involving days away from work by private industry sector, 2001. Private industry reported a tendonitis incidence rate of 1.6 per 10,000 full-time workers in 2001. Three sectors reported rates exceeding the private-sector rate: manufacturing (3.2 per 10,000 full-time workers or 5,567 cases), construction (2.0 per 10,000 full-time workers or 1,230 cases), and transportation and public utilities (1.7 per 10,000 full-time workers or 1,128 cases). ***(Source: BLS [2003a].)***





How did the rates of tendonitis change by private industry sector during 1992–2001?

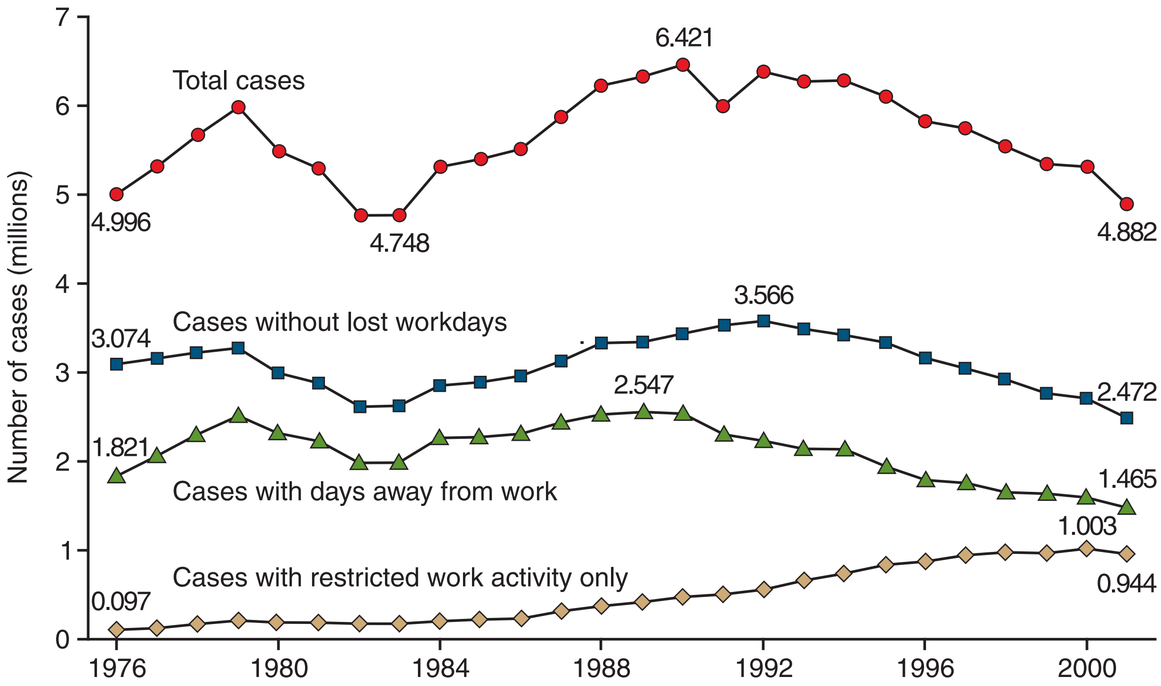
Figure 2–68. Annual rates of tendonitis cases involving days away from work by private industry sector, 1992–2001. The annual rate of tendonitis cases declined 51.5% in the private sector during 1992–2001. Rates declined among most industry sectors except for mining and transportation and public utilities. Manufacturing had consistently higher rates of tendonitis than other industry sectors and experienced a 59% rate reduction during this 10-year period. ***(Source: BLS [2003a].)***

Nonfatal Injuries

BLS estimates that total recordable occupational injuries (which include fatalities before 1992) reached a high of 6.4 million cases in 1990 then declined to a low of 4.9 million injuries in 2001 (Figure 2–69). Nonfatal injuries represented 93.6% of the 5.2 million nonfatal injuries and illnesses reported in 2001. Injury incidence rates (which include fatalities before 1992) declined 39% during 1976–2001, from 8.9 cases per 100 full-time workers in 1976 to 5.4 cases in 2001 (Figure 2–70). This decline is reflected in cases without lost workdays (19.6% reduction) and in cases involving days away from work (19.5% reduction). The increasing number and rate of injury cases with restricted work activity continued: the number of cases increased 8.7-fold and the rates increased 4-fold.

NIOSH, in collaboration with the U.S. Consumer Product Safety Commission, collects information about nonfatal occupational injuries and illnesses treated in hospital emergency departments. In 1999, an estimated 3.9 million occupational injuries and illnesses were treated in hospital emergency departments among all industry and occupation groups for workers aged 15 and older. The highest rates of these occupational injuries and illnesses occurred among workers aged 15–24 (Figure 2–71). Male workers aged 15 and older accounted for two-thirds or 2.7 million of all occupational injuries and illnesses treated in U.S. hospital emergency departments (Figure 2–72). Among the treated workers for whom race/ethnicity was known, 2.46 million or 78.3% were white, non-Hispanic; 459,000 or 14.6% were black, non-Hispanic; and 225,000 or 7.1% were Hispanic. Race/ethnicity was unknown for a large portion of the workers treated in hospital emergency departments (Figure 2–73).

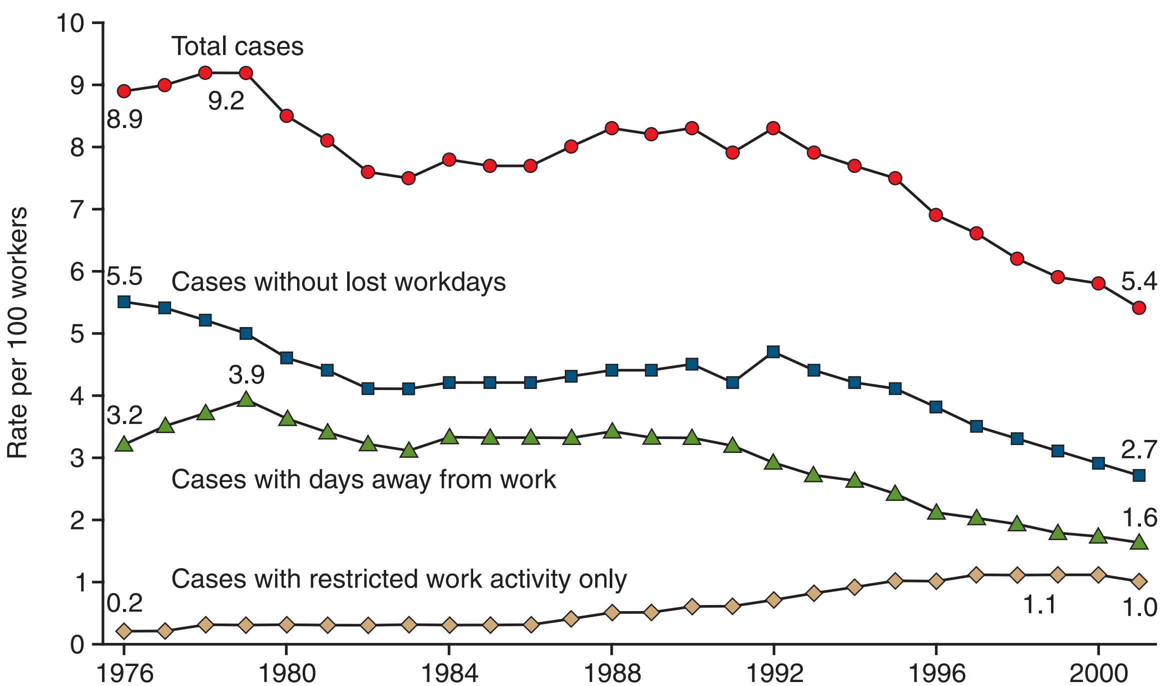
By private industry sector in 2001, incidence rates for nonfatal occupational injuries ranged from a low of 1.5 per 100 full-time workers in finance, insurance, and real estate to a high of 7.8 in construction (Figure 2–74). Other industry sectors exceeding the private-sector rate included manufacturing (7.0, or 1.2 million cases), agriculture, forestry, and fishing (7.0, or 104,400 cases), transportation and public utilities (6.6, or 436,900 cases), and retail trade (5.5, or 964,200 cases). During 1976–2001, construction and manufacturing reported higher rates of total cases than other private industry sectors (Figure 2–75), and construction had higher rates for lost-workday cases (Figure 2–76); manufacturing reported more cases of restricted work activity only (Figure 2–77).



Magnitude and Trend

How many workers suffered injuries during 1976–2001?

Figure 2–69. Number of occupational injury cases by type of case in private industry, 1976–2001. The number of total recordable occupational injuries reached a high of 6.4 million cases in 1990 then declined to a low of 4.9 million in 2001. Injury cases with restricted work activity only increased steadily after 1976, reaching a high of 944,100 cases in 2001. (*Note:* Data before 1992 include fatalities.) ***(Source: BLS [2002].)***



How did the rates of occupational injuries change during 1976–2001?

Figure 2–70. Incidence rates of injury cases by type of case in private industry, 1976–2001. The incidence rate for total recordable occupational injuries reached a high of 9.2 cases per 100 full-time workers in 1979 then declined to a low of 5.4 per 100 full-time workers in 2001. Injury rates for cases with restricted work activity only increased steadily from a rate of 0.2 per 100 full-time workers in 1976 to 1.0 in 2001. (*Note:* Data before 1992 include fatalities.) ***(Source: BLS [2002].)***

Age

How did nonfatal occupational injuries and illnesses treated in hospital emergency departments differ by age of worker in 1999?

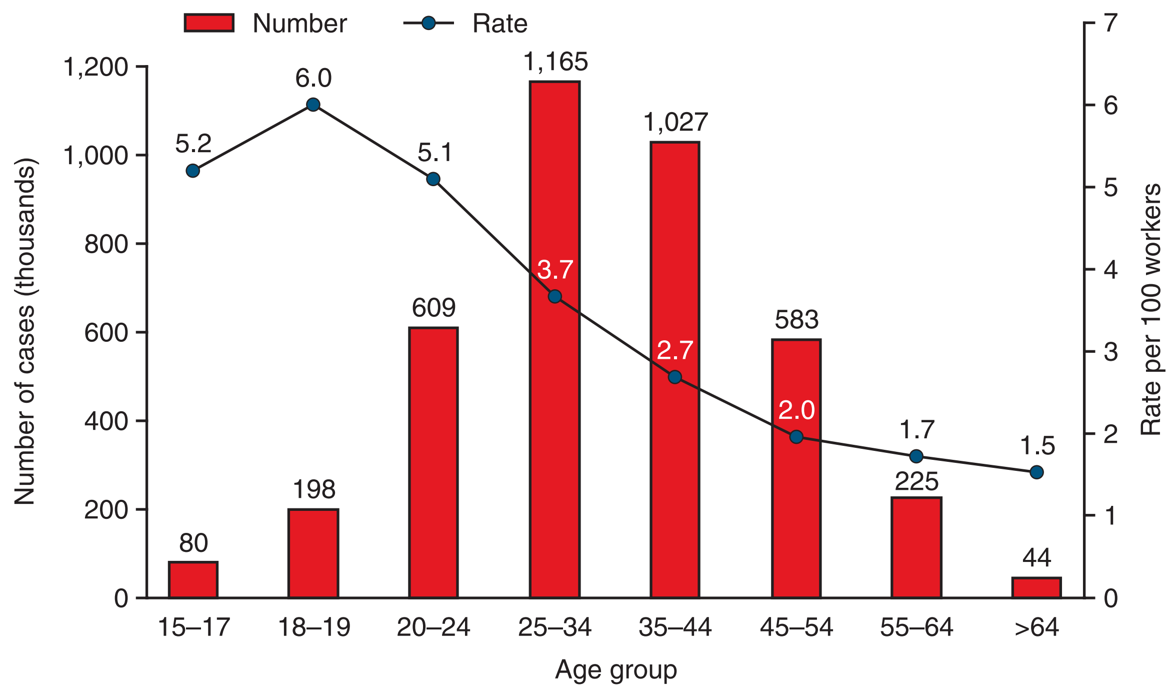


Figure 2–71. Number and rate of nonfatal occupational injuries and illnesses treated in hospital emergency departments, by age of worker, 1999. An estimated 3.9 million occupational injuries and illnesses were treated in hospital emergency departments among all industry and occupation groups for workers aged 15 and older. The highest numbers of these injuries and illnesses occurred among workers aged 25–44, and the highest rates were among workers aged 15–24. The overall rate was 3.0 per 100 full-time workers. *(Sources: NEISS [2003]; Jackson [2003].)*

Sex

How did nonfatal occupational injuries and illnesses treated in hospital emergency departments differ by sex of worker in 1999?

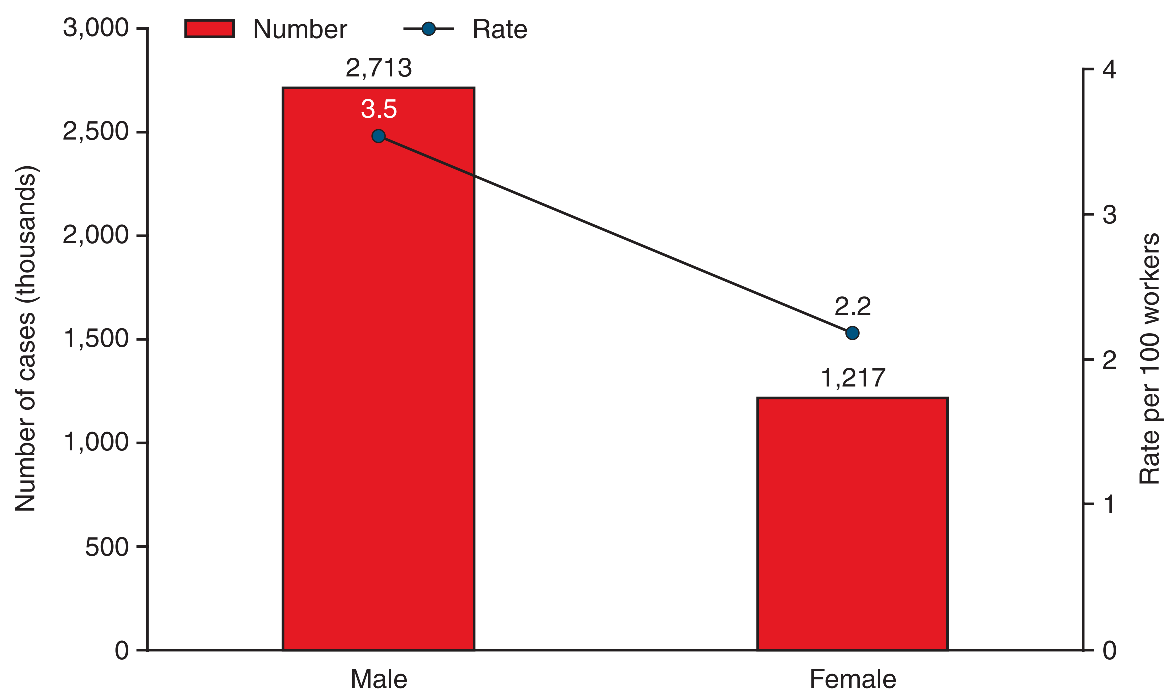


Figure 2–72. Number and rate of nonfatal occupational injuries and illnesses treated in U.S. hospital emergency departments, by sex of worker, 1999. Two-thirds (or 2.7 million) of all occupational injuries and illnesses treated in hospital emergency departments occurred among male workers aged 15 and older. However, the disparity between male and female workers was not as great when comparing incidence rates (2.2 versus 3.5 per 100 full-time workers). *(Sources: NEISS [2003]; Jackson [2003].)*

Race/Ethnicity

How did nonfatal occupational injuries and illnesses treated in hospital emergency departments differ by race/ ethnicity in 1999?

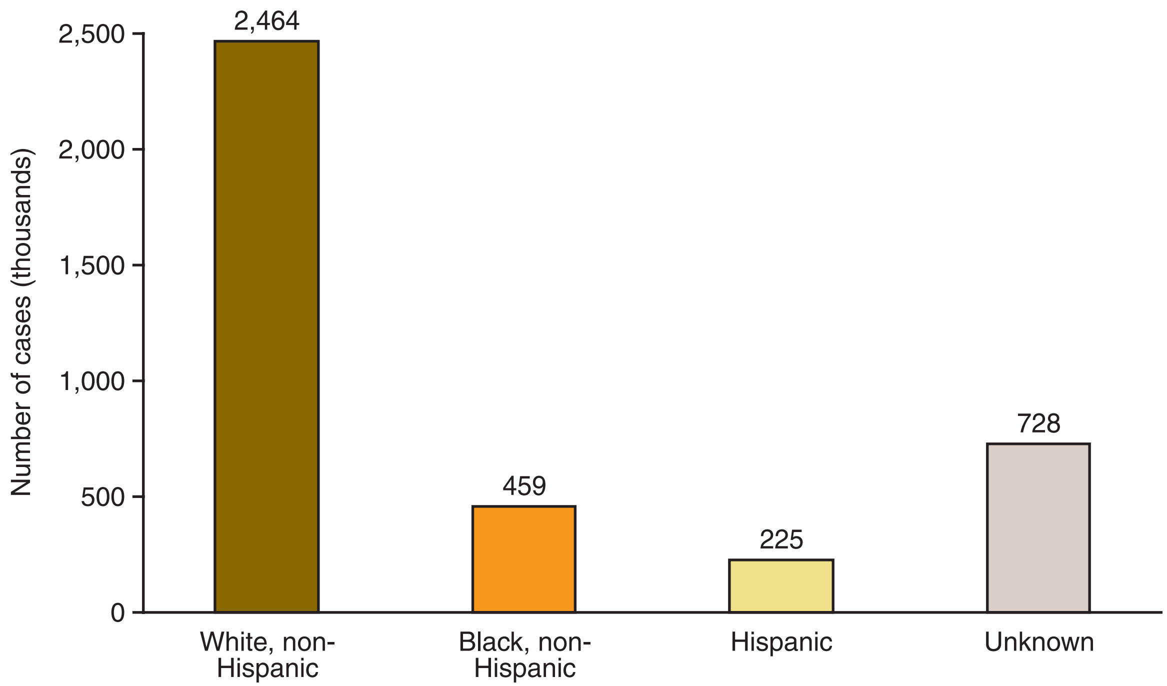


Figure 2–73. Number of nonfatal occupational injuries and illnesses treated in hospital emergency departments, by race/ ethnicity, 1999. Among workers of known race/ethnicity treated in hospital emergency departments, 2,464,000 or 78.3% were white, non-Hispanic; 459,000 or 14.6% were black, non-Hispanic; and 225,000 or 7.1% were Hispanic. Race/ethnicity was unknown for a large portion of the workers treated in U.S. hospital emergency departments. *(Sources: NEISS [2003]; Jackson [2003].)*

How did the rate of nonfatal occupational injuries differ by private industry sector in 2001?

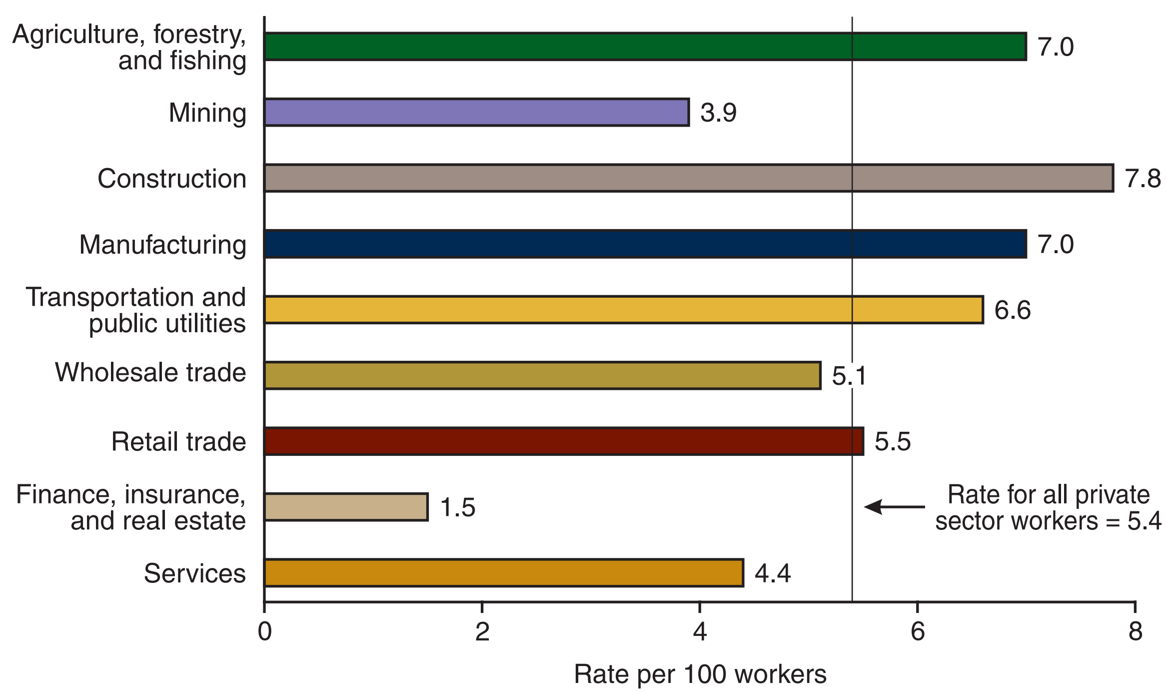


Figure 2–74. Incidence rate of total nonfatal occupational injury cases by private industry sector, 2001. The private sector reported a total injury incidence rate of 5.4 per 100 full-time workers in 2001. Rates exceeding the private-sector rate were reported for construction (7.8 per 100 full-time workers or 474,500 cases), manufacturing (7.0 per 100 full-time workers or 1.2 million cases), agriculture, forestry, and fishing (7.0 per 100 full-time workers or 104,400 cases), transportation and public utilities (6.6 per 100 full-time workers or 436,900 cases), and retail trade (5.5 per 100 full-time workers or 964,200 cases). *(Source: BLS [2002].)*

Industry

How did the rates of occupational injuries change by private industry sector during 1976–2001?

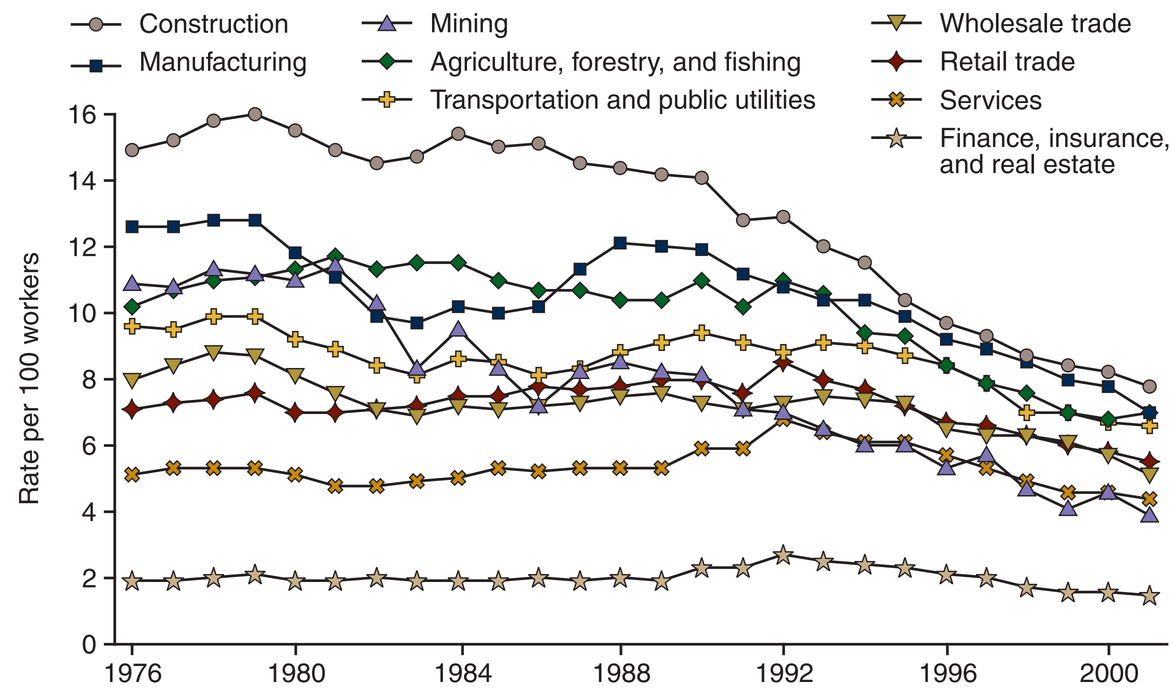


Figure 2–75. Incidence rates of total occupational injury cases by private industry sector, 1976–2001. Incidence rates of total occupational injury cases declined for each major industry sector during 1976–2001. With the general decline in rates, the high-to-low rate ratio narrowed from 7.9 in 1976 to 5.2 in 2001. Two industry sectors (construction and manufacturing) had consistently higher rates than most other sectors during the 25-year period. (*Note:* Data before 1992 include fatalities.) ***(Source:* BLS [2002].)**

How did the rates of lost-workday cases change by private industry sector during 1976–2001?

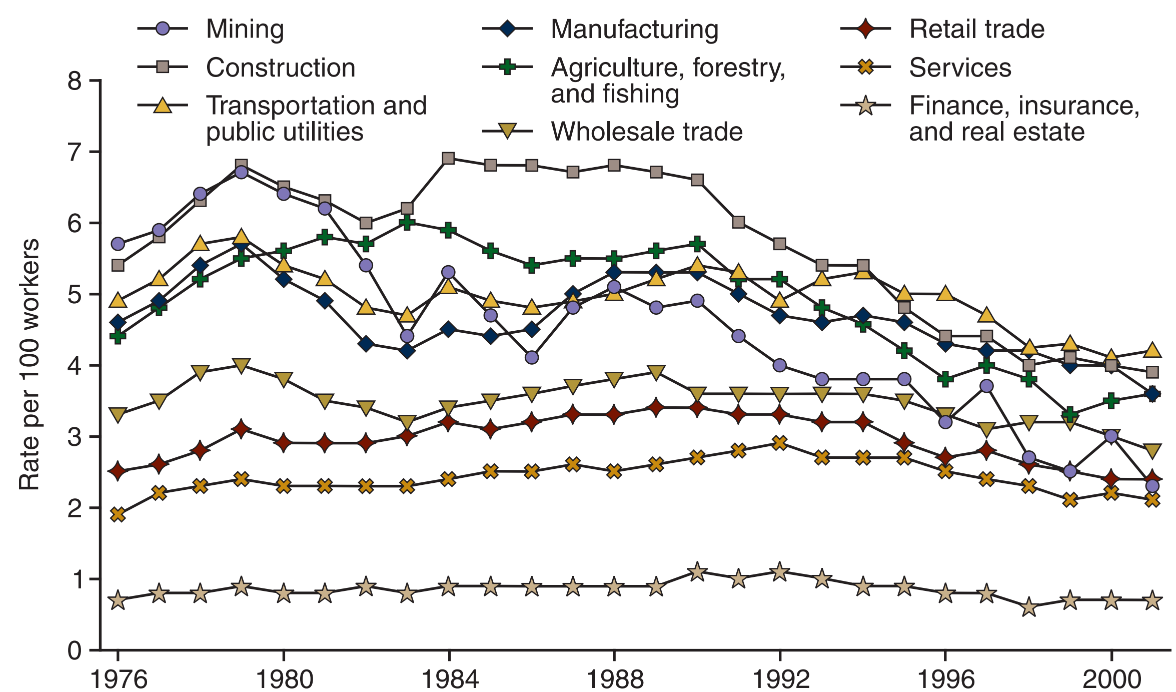
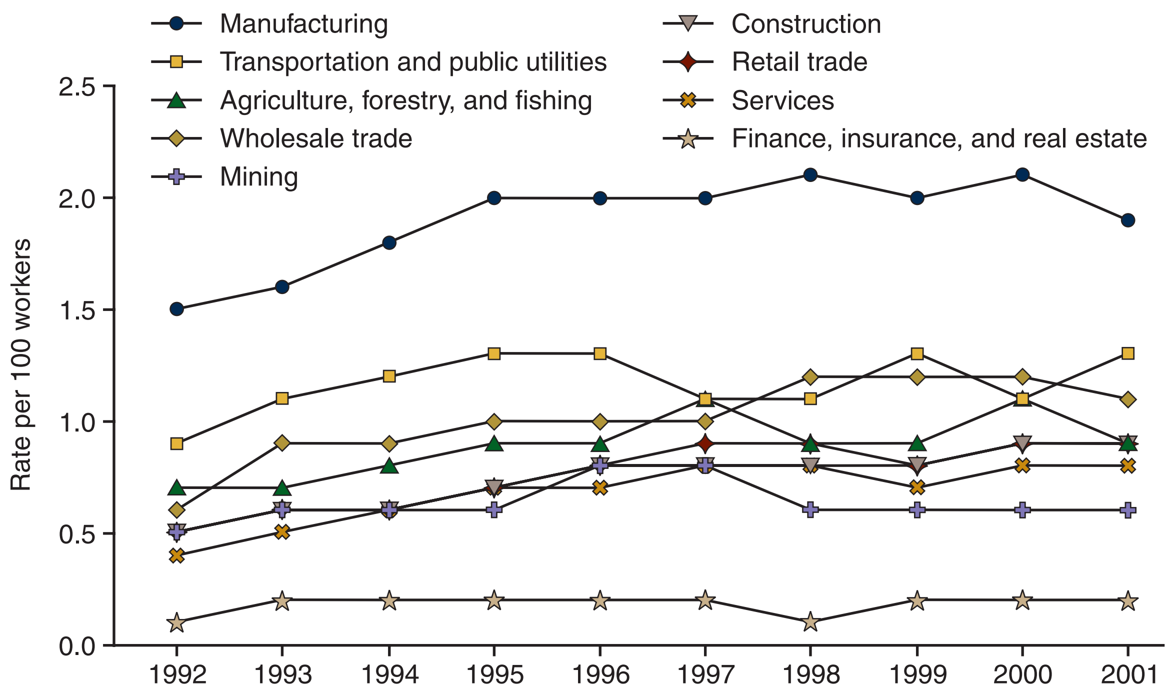


Figure 2–76. Incidence rates of lost-workday injury cases by private industry sector, 1976–2001. The incidence rates for recordable lost-workday injuries varied among industry sectors, with the high-to-low rate ratio narrowing from 8.1 in 1976 to 6.0 in 2001. Three industry sectors (construction, manufacturing, and transportation and public utilities) had consistently higher rates than other sectors during 1976–2001. ***(Source:* BLS [2002].)**



How did the rates of injuries with restricted work activity only change by private industry sector during 1992–2001?

Figure 2–77. Incidence rates of injury cases with restricted work activity only by private industry sector, 1992–2001. During this 10-year period, the incidence rate for cases of restricted work activity only increased for each major industry sector. The highest rates were reported for manufacturing, ranging from a low of 1.5 per 100 full-time workers in 1992 to a high of 2.1 in 1998 and 2000. The lowest rates (0.1 to 0.2 per 100 full-time workers) were reported for finance, insurance, and real estate. *(Source: BLS [2002].)*

Nonfatal Injuries Involving Days Away from Work

The BLS reported 1.5 million nonfatal occupational injury and illness cases involving days away from work in 2001. Traumatic injuries and disorders accounted for 1.4 million or 92.1% of these cases. Traumatic injuries and disorders required a median of 6 days away from work in 2001 [BLS 2003a]. This section of the *Chartbook* provides magnitude, trend, and demographic data for cases from the following seven categories of injuries:

- Amputations
- Back, including spine and spinal cord
- Bruises and contusions
- Heat burns and scalds
- Cuts and lacerations
- Fractures
- Sprains, strains, and tears

Amputations

Amputations are open-wound injuries that involve loss of a limb or other external body part. For BLS to classify an injury in this group, bone must be lost. Amputations are severe injuries. They involved a median of 18 days away from work in 2001 (Figure 2–85) compared with 6 days for all nonfatal injuries and illnesses [BLS 2003a].

In 1999, an estimated 19,700 occupational amputation cases were treated in a hospital emergency department—about 0.5% of all injuries and illnesses treated in hospital emergency departments among workers aged 15 and older (Figure 2–80). The number of cases corresponded to a rate of 1.5 amputations per 10,000 full-time workers. The highest rate of occupational amputations treated in hospital emergency departments occurred among workers under age 25; however, the greatest number occurred among workers aged 35–44. The age disparities for amputations were smaller than those observed for all types of injuries and illnesses treated in hospital emergency departments (Figure 2–80). Male workers suffered an estimated 17,200 amputations—6 to 7 times more occupational amputations than women. (Figure 2–82).

BLS reported 8,612 amputation cases involving days away from work in 2001 (Figure 2–78). Annual rates of amputation cases declined 37.5%, from 1.6 per 10,000 full-time workers in 1992 to 1.0 in 2001 (Figure 2–79). Most cases involved workers who were aged 25–54 (73.7%) (Figure 2–81), male (80.6%) (Figure 2–83), and white, non-Hispanic (64.8%) (Figure 2–84). Two occupational groups accounted for more than 75% of all amputations: operators, fabricators, and laborers (55.1%) and precision production, craft, and repair (23%) (Figure 2–86). Rates exceeding the private-sector rate were reported for agriculture, forestry, and fishing (2.7 per 10,000 full-time workers), manufacturing (2.5), construction (1.6), and mining (1.1) (Figure 2–87). Manufacturing had consistently higher rates than other industry sectors during 1992–2001 and experienced a 26.5% rate reduction (Figure 2–88).

Magnitude and Trend

How did the number of amputation cases change during 1992–2001?

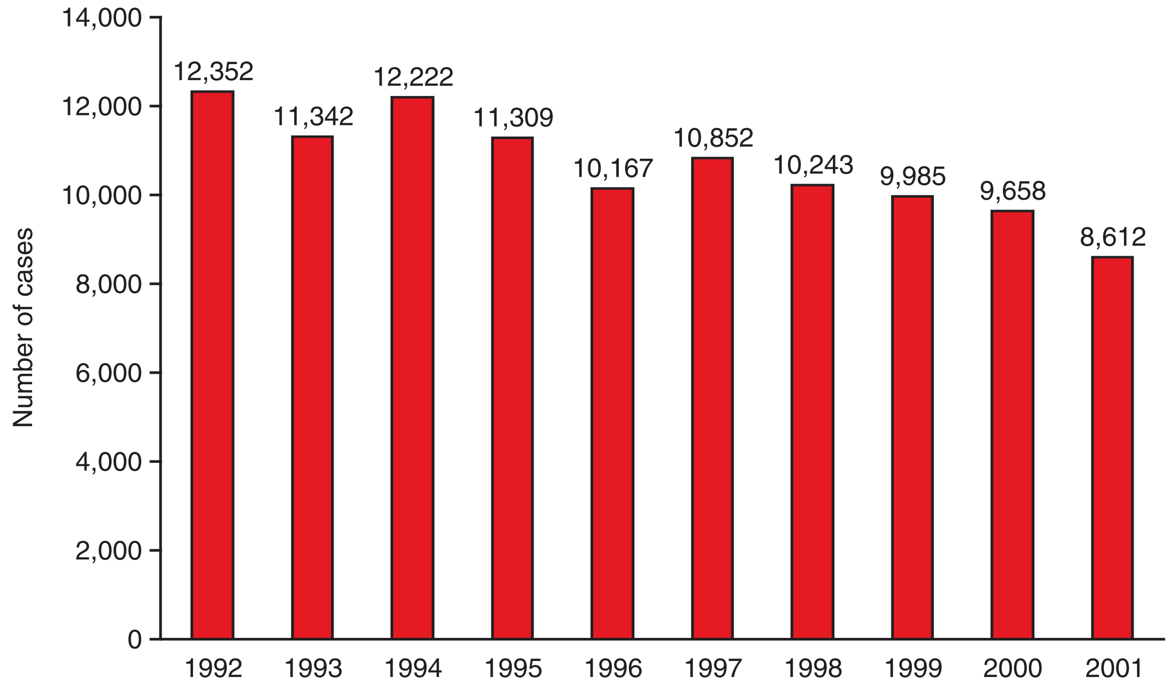


Figure 2–78. Number of amputation cases involving days away from work in private industry, 1992–2001. The annual number of amputation cases involving days away from work declined 30.3% during this period, from a high of 12,352 cases in 1992 to 8,612 cases in 2001. ***(Sources: BLS [2003a,b].)***

How did the annual rate of amputation cases change during 1992–2001?

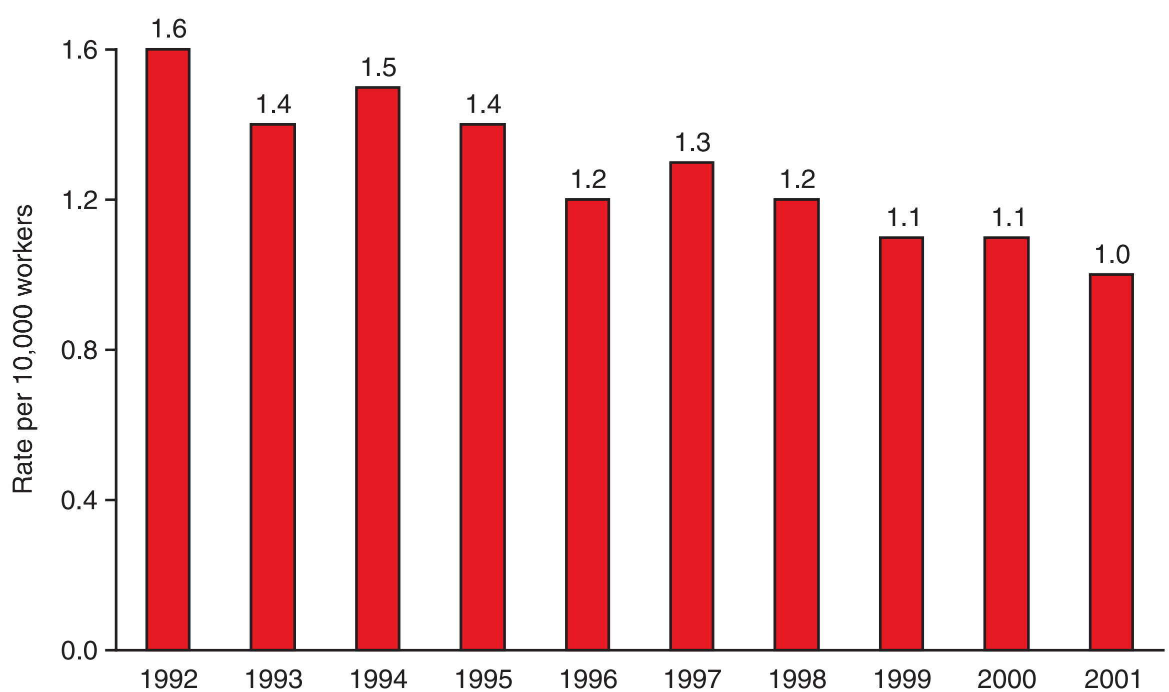


Figure 2–79. Annual rates of amputation cases involving days away from work in private industry, 1992–2001. The annual rate of amputation cases involving days away from work declined 37.5% in the private sector—from a high of 1.6 per 10,000 full-time workers in 1992 to 1.0 in 2001. ***(Sources: BLS [2003a,b].)***

Age

How did numbers and rates of amputations treated in hospital emergency departments differ by age of worker in 1999?

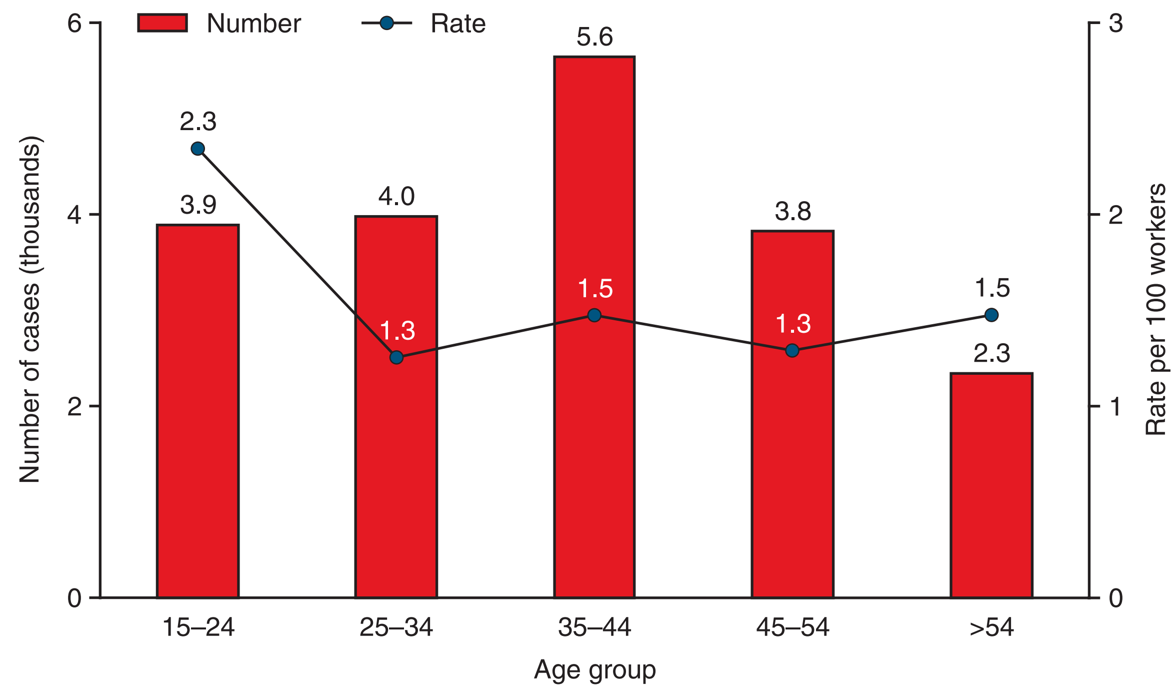


Figure 2–80. Numbers and rates of nonfatal occupational amputations treated in hospital emergency departments, by age of worker, 1999. An estimated 19,700 occupational amputations were treated in hospital emergency departments—about 0.5% of all injuries and illnesses treated in hospital emergency departments among workers aged 15 and older. The number of cases corresponded to a rate of 1.5 amputations per 10,000 full-time workers. The highest rate of occupational amputations treated in hospital emergency departments occurred among workers under age 25; however, the greatest number occurred among workers aged 35–44. ***(Sources: NEISS [2003]; Jackson [2003].)***

How did amputations compare with all nonfatal injuries and illnesses by age of worker in 2001?

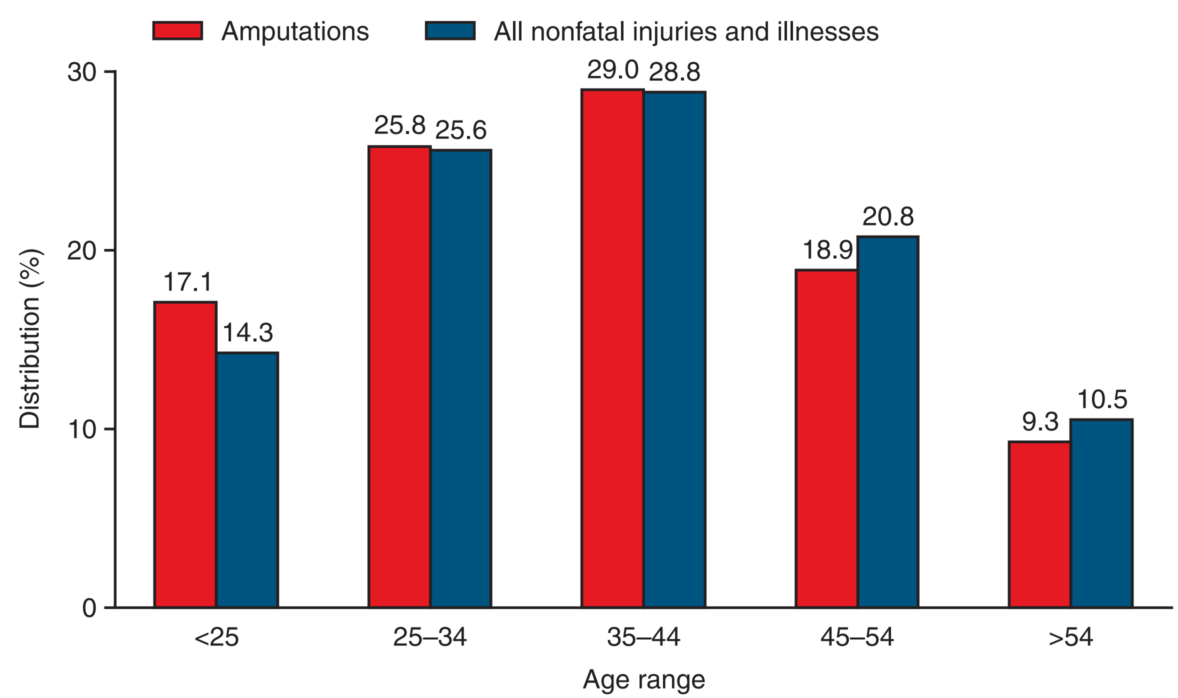


Figure 2–81. Distribution of amputation cases and all nonfatal injury and illness cases involving days away from work in private industry by age, 2001. Age data are available for 8,475 of the 8,612 BLS-estimated amputation cases involving days away from work in 2001. Three age groups (25–34, 35–44, and 45–54) accounted for 73.7% of cases, slightly less than the 75.2% reported for all nonfatal injury and illness cases. The largest difference is noted for workers under age 25, who accounted for 17.1% of amputation cases compared with 14.3% of all nonfatal injury and illness cases. ***(Source: BLS [2003a].)***

Sex

How did amputation cases compare with all nonfatal injury and illness cases by sex of worker in 2001?

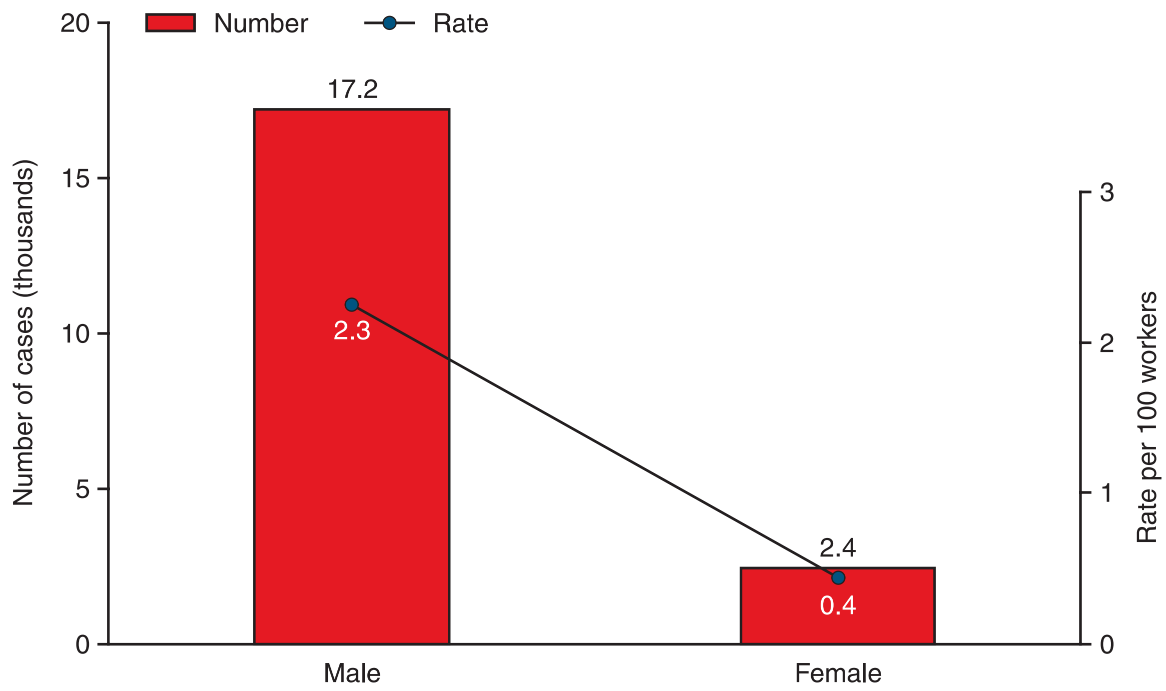


Figure 2–82. Number and rate of nonfatal occupational amputations treated in hospital emergency departments, by sex of worker, 1999. Men suffered an estimated 17,200 amputations, 6 to 7 times more amputations at work than women. ***(Sources: NEISS [2003]; Jackson [2003].)***

How did amputation cases compare with all nonfatal injury and illness cases by sex of worker in 2001?

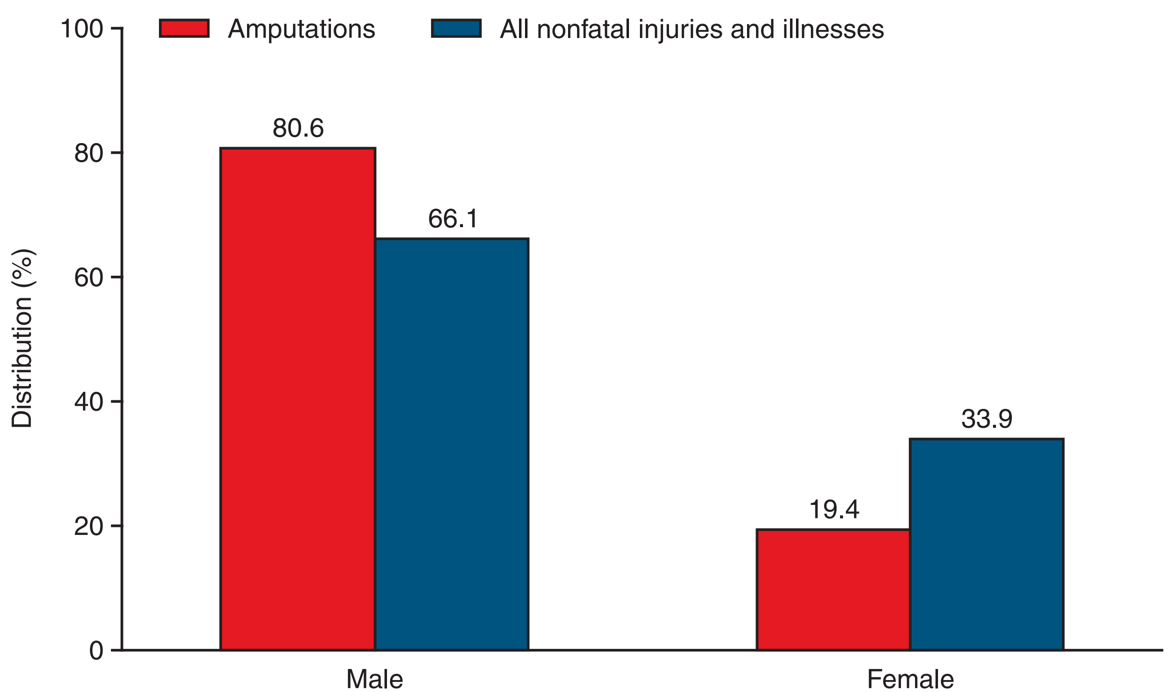


Figure 2–83. Distribution of amputation cases and all nonfatal injury and illness cases involving days away from work in private industry by sex, 2001. Male workers accounted for many more amputation cases (80.6%) than all nonfatal injury and illness cases (66.1%) in 2001. However, female workers accounted for fewer amputation cases (19.4%) than all nonfatal injury and illness cases (33.9%). ***(Source: BLS [2003a].)***

Race/Ethnicity

How did amputations compare with all nonfatal injuries and illnesses by race/ethnicity in 2001?

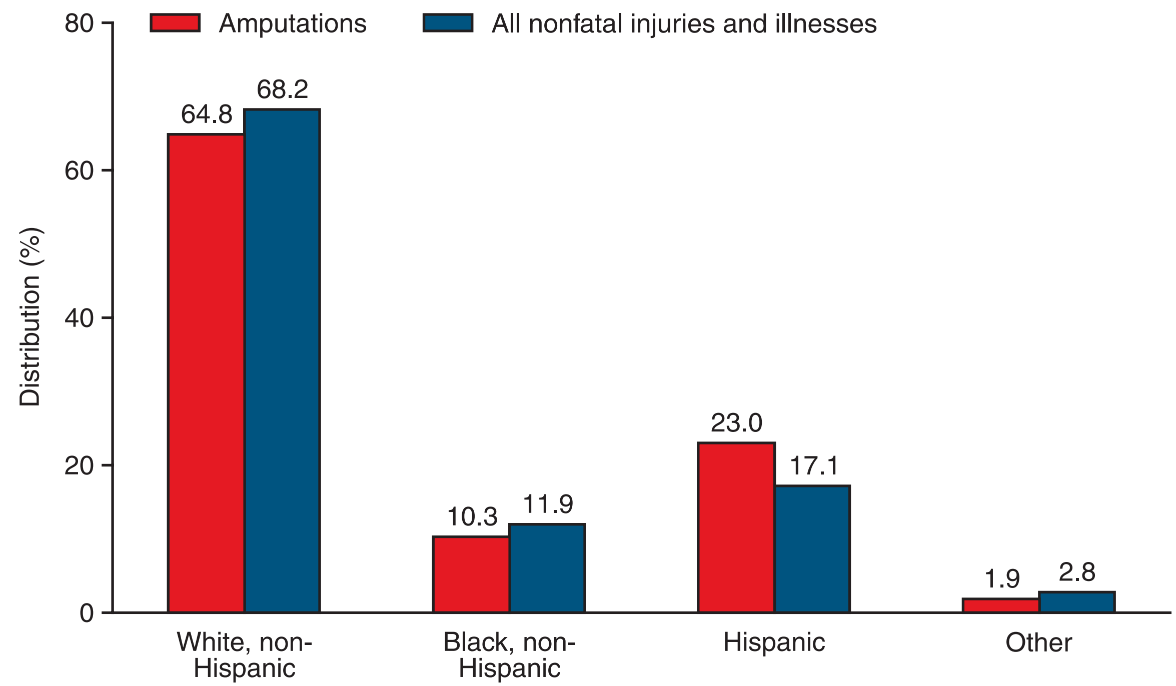


Figure 2–84. Distribution of amputation cases and all nonfatal injury and illness cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 7,208 of the 8,612 BLS-estimated amputation cases involving days away from work in 2001. White, non-Hispanic workers accounted for slightly fewer amputation cases (64.8%) than all nonfatal injury and illness cases (68.2%), as did black, non-Hispanic workers (10.3% versus 11.9%). But Hispanic workers accounted for more amputation cases (23%) than all nonfatal injury and illness cases (17.1%). ***(Source: BLS [2003a].)***

Severity

How did amputations compare with all nonfatal injuries and illnesses when measured by days away from work in 2001?

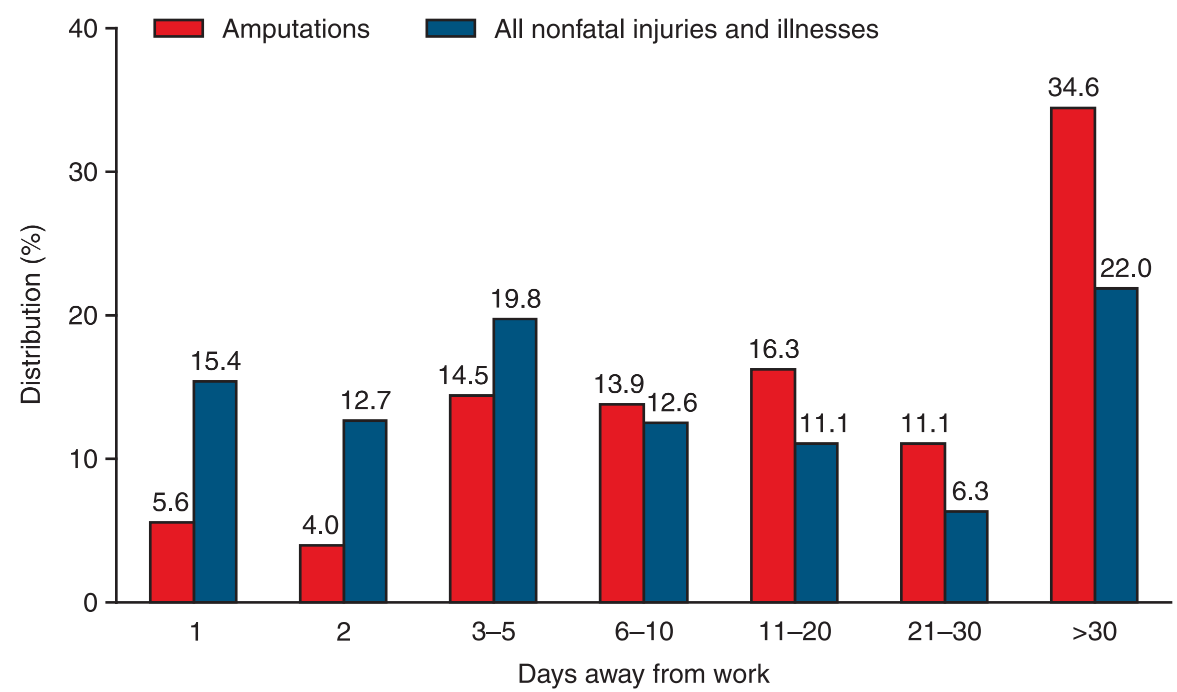
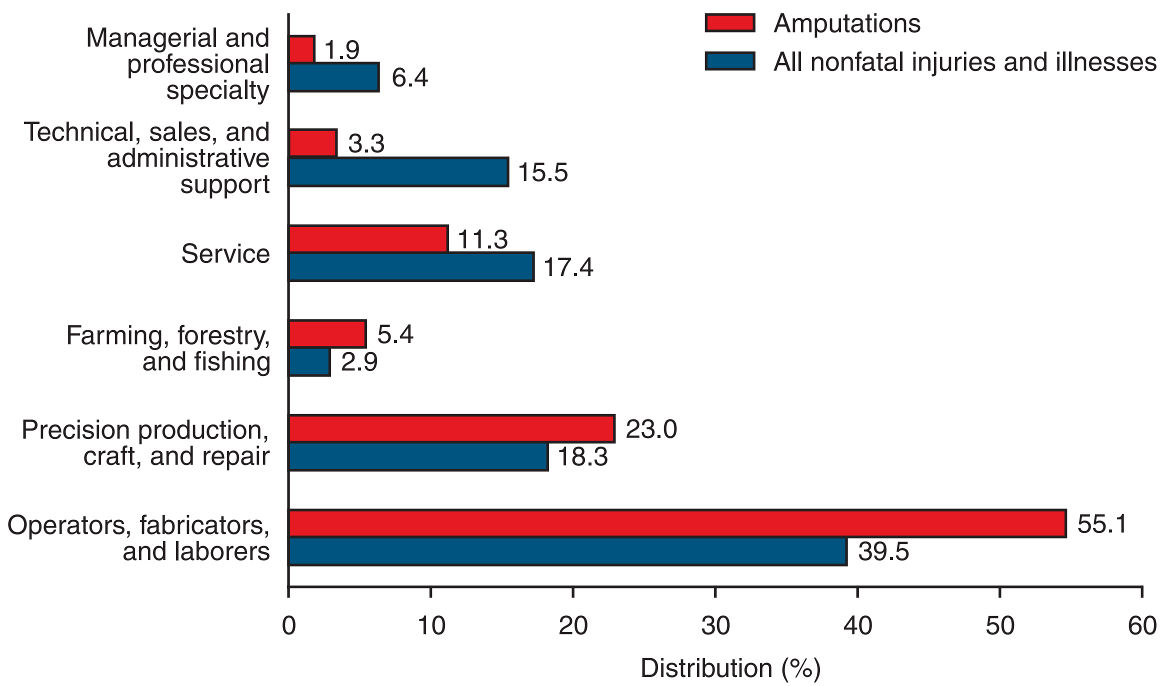


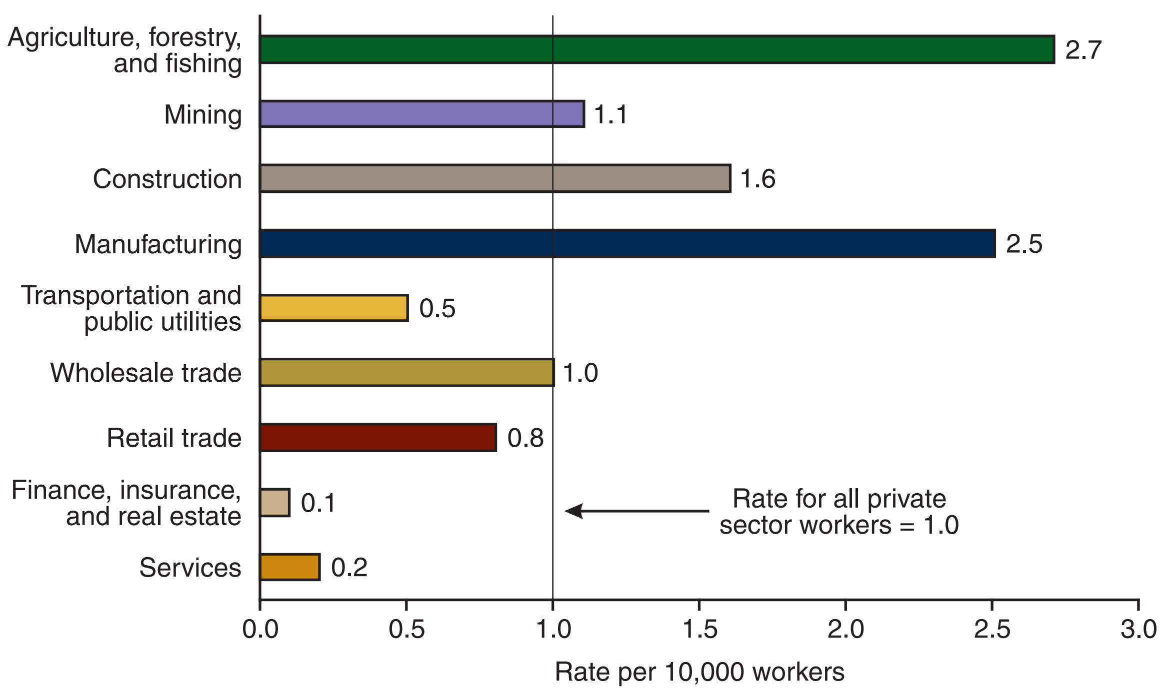
Figure 2–85. Distribution of amputation cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Higher percentages of long-term work loss (6–10, 11–20, 21–30, and 31 or more days away from work) were reported for amputation cases in 2001. Thirty-one or more days away from work were reported for 34.6% of amputation cases compared with 22.0% of all nonfatal injury and illness cases. For amputation cases, workers experienced a median of 18 days away from work in 2001—much higher than the median of 6 days for all nonfatal injuries and illnesses. ***(Source: BLS [2003a].)***



Occupation

How did amputations compare with all nonfatal injuries and illnesses by occupation in 2001?

Figure 2–86. Distribution of amputation cases and all nonfatal injury and illness cases involving days away from work in private industry by occupation, 2001. Two occupational groups accounted for more than 75% of all amputations in 2001: operators, fabricators, and laborers (55.1%) and precision production, craft, and repair (23%). The same two occupational groups accounted for more than half (57.8%) of all nonfatal injuries and illnesses. ***(Source: BLS [2003a].)***



Industry

How did the rate of amputations differ by private industry sector in 2001?

Figure 2–87. Incidence rate of amputation cases involving days away from work in private industry by industry sector, 2001. Private industry reported an amputation incidence rate of 1.0 per 10,000 full-time workers in 2001. Higher rates were reported for agriculture, forestry, and fishing (2.7 per 10,000 full-time workers or 401 cases), manufacturing (2.5 per 10,000 full-time workers or 4,239 cases), construction (1.6 per 10,000 full-time workers or 949 cases), and mining (1.1 per 10,000 full-time workers or 64 cases). ***(Source: BLS [2003a].)***

How did the rates of amputations change by private industry sector during 1992–2001?

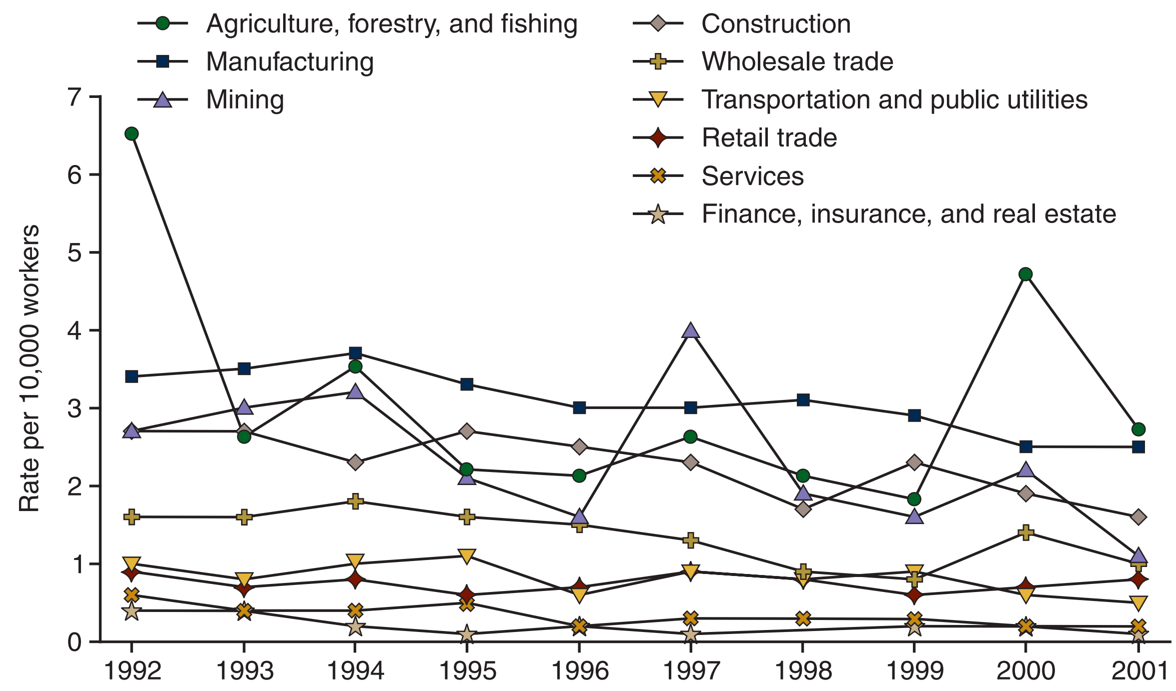


Figure 2–88. Annual rates of amputation cases involving days away from work by private industry sector, 1992–2001. The annual rate of amputations declined 37.5% in the private sector during 1992–2001. During this period, rates declined for each of the major industry sectors. Manufacturing had consistently higher rates than other industry sectors during the 10-year period and experienced a 26.5% reduction. ***(Sources: BLS [2003a,b].)***

Back, Including Spine and Spinal Cord

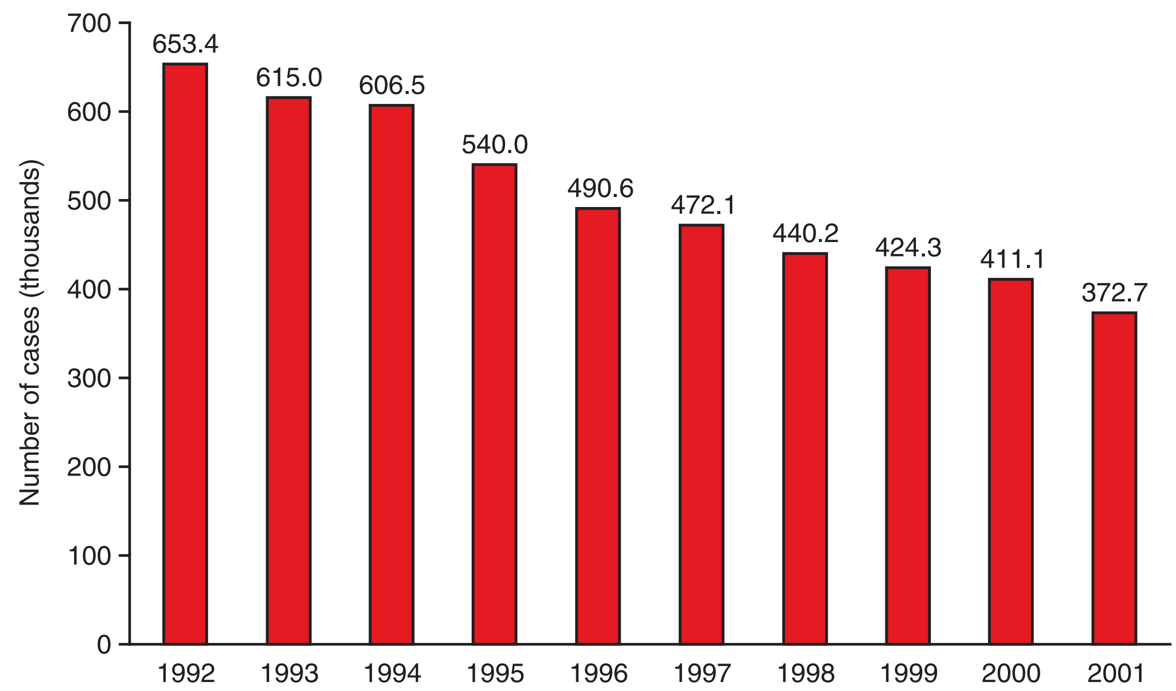
BLS uses four code structures to classify the characteristics of injury and illness cases involving days away from work. One code structure classifies cases by body part. The body part category *back, including spine and spinal cord* (hereafter called *back injury*), includes cases with injuries to the posterior part of the trunk that is bounded by the neck and pelvis. Back injuries may include injuries to cartilage, muscles, nerves, spine, spinal cord, tendons, veins and arteries, and vertebra. Back injuries are of moderate severity, and injured workers experience a median of 6 days away from work (Figure 2–94).

In 2001, BLS reported 372,683 back injury cases involving days away from work (Figure 2–89). Back injury rates declined 52% during 1992–2001, from a rate of 85.4 per 10,000 workers in 1992 to 41.0 in 2001 (Figure 2–90). Most cases involved workers who were aged 25–54 (78.5%) (Figure 2–91), male (64.3%) (Figure 2–92), and white, non-Hispanic (69.5%) (Figure 2–93). Two occupational groups accounted for more than 54% of back injury cases: operators, fabricators, and laborers (38.3%) and precision production, craft, and repair (16.5%) (Figure 2–95). Back injury rates exceeding the private-sector rate were reported for transportation and public utilities (77.1 per 10,000 full-time workers), construction (63.9), agriculture, forestry, and fishing (58.8), and wholesale trade (47.3) (Figure 2–96). Two industry sectors (transportation and public utilities and construction) had consistently higher back injury rates than other industry sectors during 1992–2001, and both experienced reductions in these rates (36.1% and 52.7%) (Figure 2–97).

Magnitude and Trend

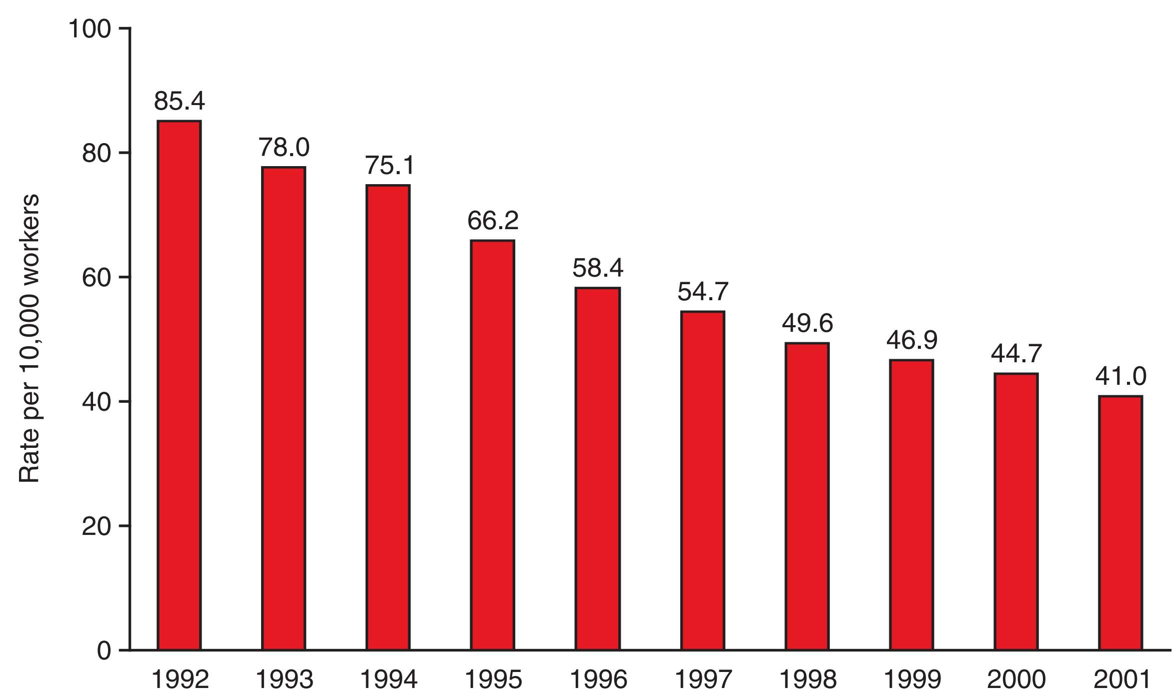
How did the number of back injuries change during 1992–2001?

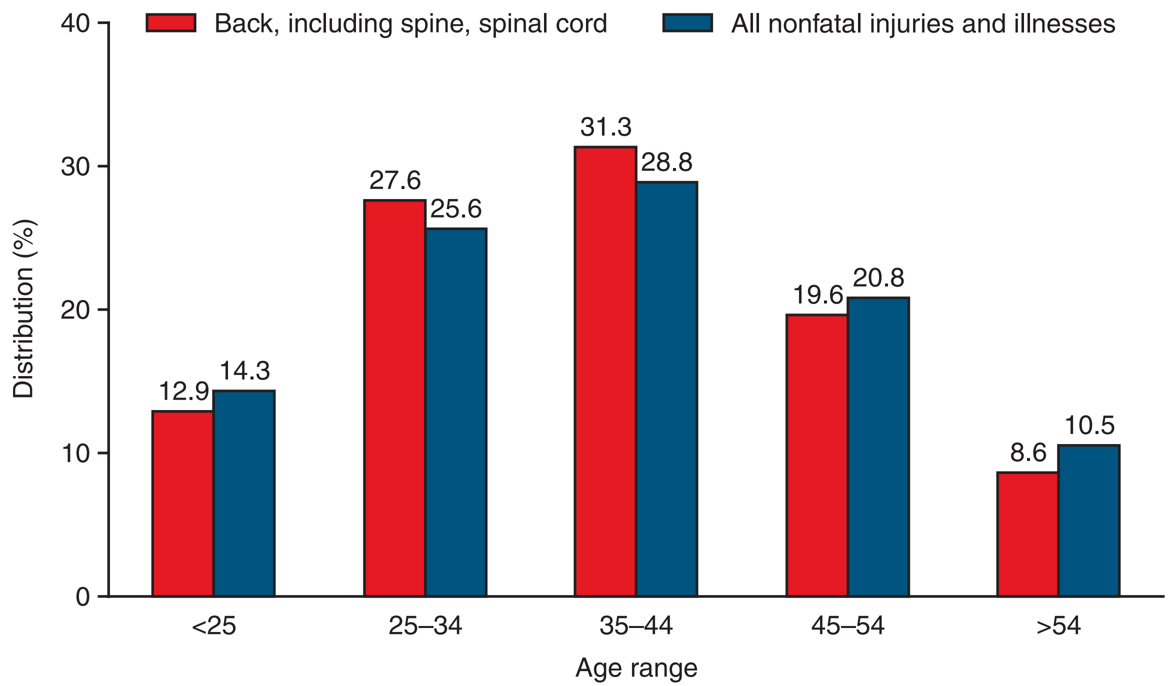
Figure 2–89. Number of back injury cases involving days away from work in private industry, 1992–2001. The annual number of back injury cases involving days away from work declined 43% during this 10-year period—from 653,385 cases in 1992 to 372,683 in 2001. ***(Sources: BLS [2003a,b].)***



How did the rates of back injuries change during 1992–2001?

Figure 2–90. Annual rates of back injury cases involving days away from work in private industry, 1992–2001. The annual rate of back injury cases involving days away from work declined 52% during this 10-year period—from 85.4 per 10,000 full-time workers in 1992 to 41.0 in 2001. ***(Sources: BLS [2003a,b].)***

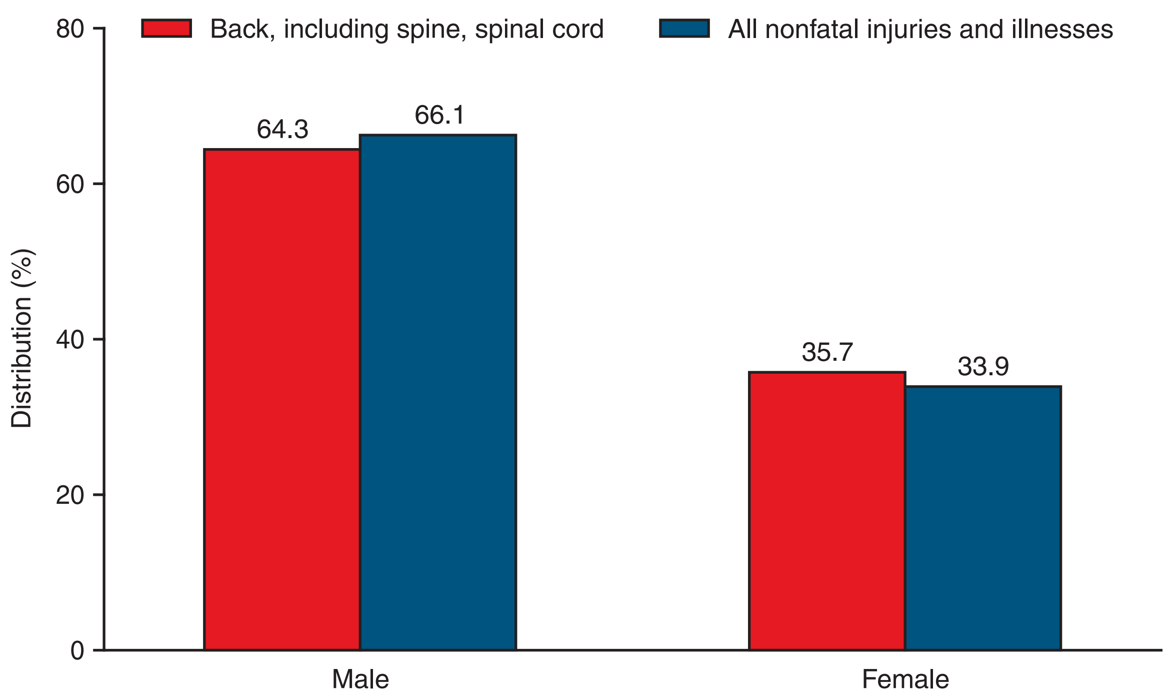




Age

How did back injuries compare with all nonfatal injuries and illnesses by age of worker in 2001?

Figure 2–91. **Distribution of back injury cases and all nonfatal injury and illness cases involving days away from work in private industry by age, 2001.** Age data are available for 369,351 of the 372,683 BLS-estimated back injury cases involving days away from work in 2001. Overall, three age groups (25–34, 35–44, and 45–54) accounted for 78.5% of back injury cases, slightly more than the 75.2% reported for all nonfatal injury and illness cases. ***(Source: BLS [2003a].)***



Sex

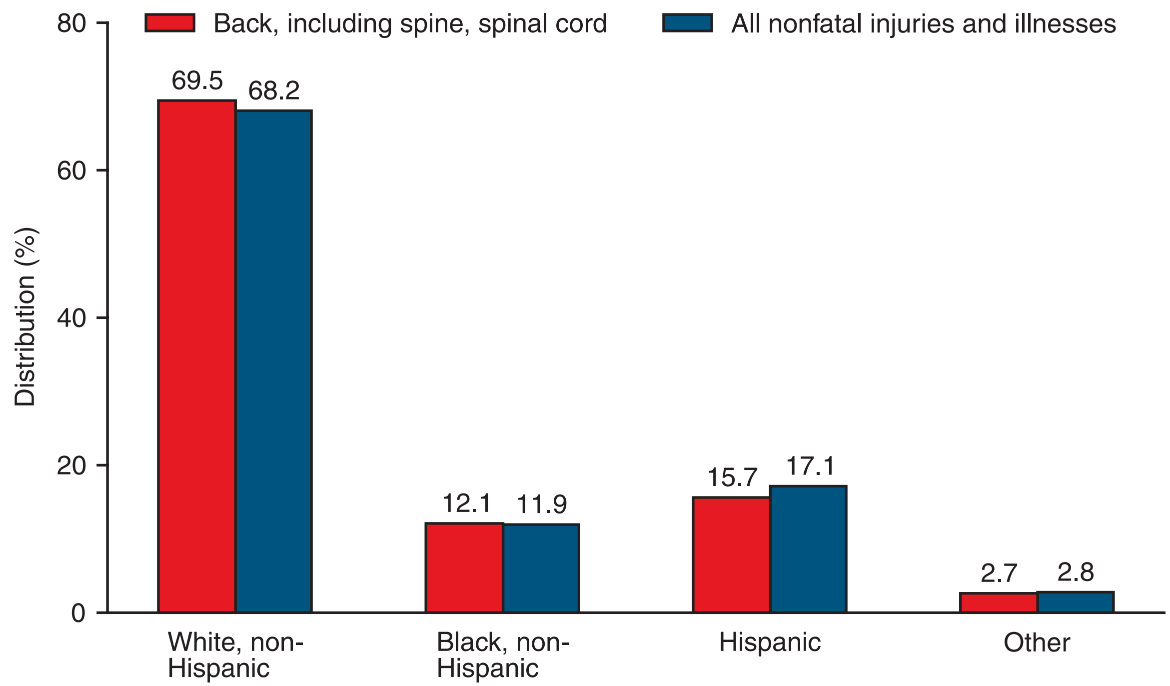
How did back injuries compare with all nonfatal injuries and illnesses by sex of worker in 2001?

Figure 2–92. **Distribution of back injury cases and all nonfatal injury and illness cases involving days away from work in private industry by sex, 2001.** Male workers accounted for 64.3% of back injury cases in 2001, slightly less than the 66.1% reported for all nonfatal injury and illness cases. Female workers accounted for a slightly greater percentage of back injury cases (35.7%) than all nonfatal injury and illness cases (33.9%). ***(Source: BLS [2003a].)***

Race/Ethnicity

How did back injuries compare with all nonfatal injuries and illnesses by race/ethnicity in 2001?

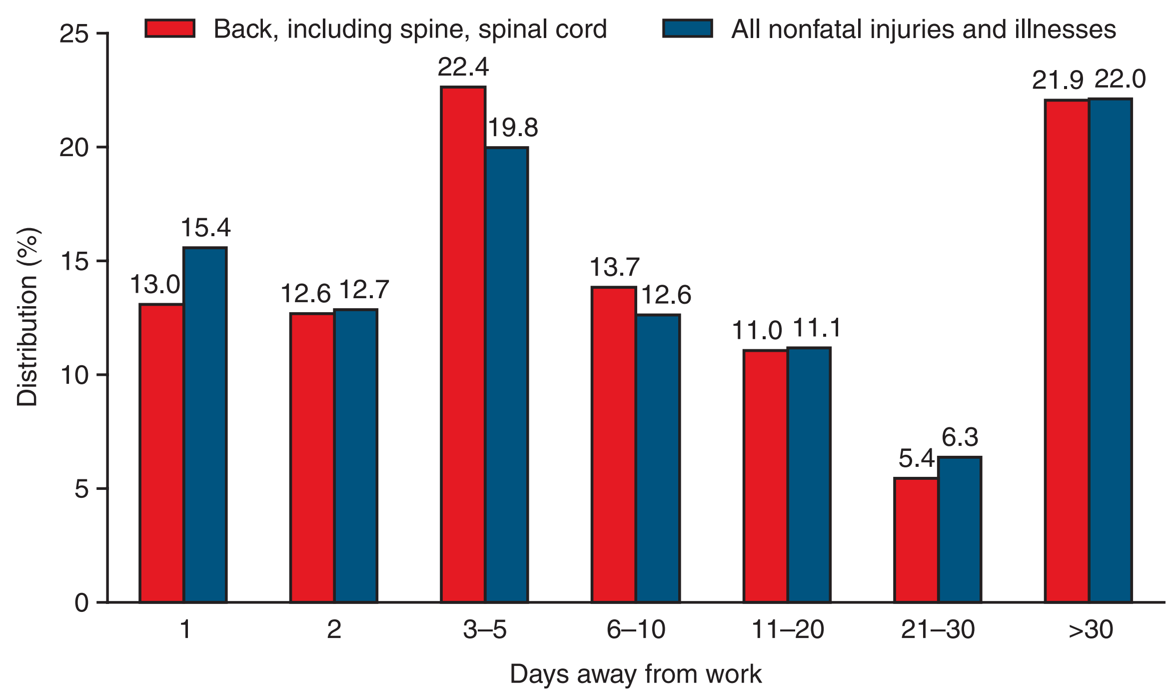
Figure 2–93. Distribution of back injury cases and all nonfatal injury and illness cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 269,108 of the 372,683 BLS-estimated back injury cases involving days away from work in 2001. Relatively small race/ethnicity differences existed between back injury cases and all nonfatal injury and illness cases in 2001. White, non-Hispanic workers accounted for 69.5% of back injury cases and 68.2% of all nonfatal injury and illness cases. Black, non-Hispanic workers accounted for 12.1% of back injury cases, and Hispanic workers accounted for 15.7%. ***(Source: BLS [2003a].)***

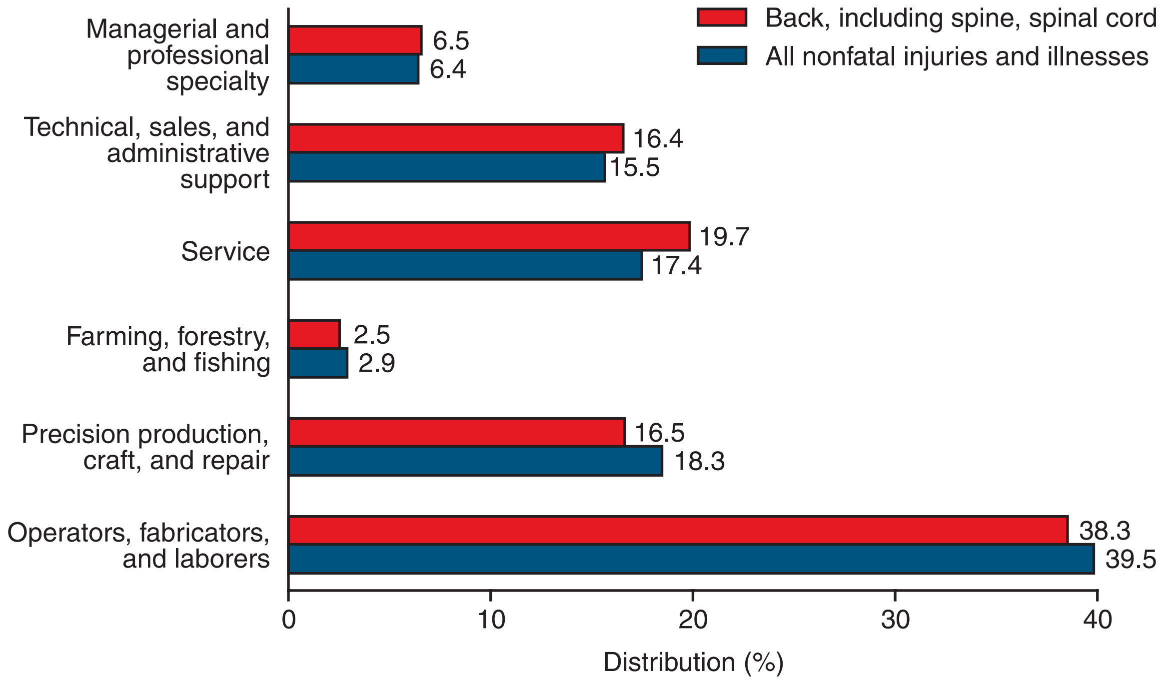


Severity

How did back injuries compare with all nonfatal injuries and illnesses when measured by days away from work in 2001?

Figure 2–94. Distribution of back injury cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Back injury cases tended to involve higher percentages of short-term disability than all nonfatal injury and illness cases in 2001: 22.4% of workers with back injuries reported 3–5 days away from work, and 13.7% reported 6–10 days away from work. Workers with back injuries had a median of 6 days away from work in 2001—as did workers with all nonfatal injuries and illnesses. ***(Source: BLS [2003a].)***

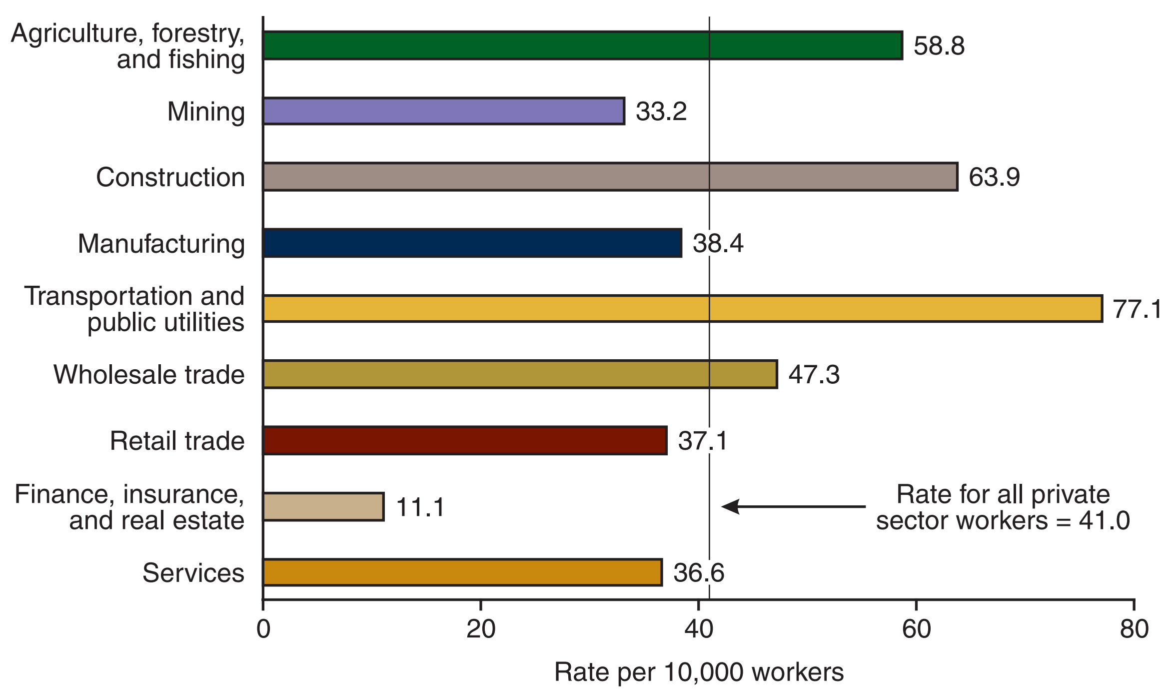




Occupation

How did back injuries compare with all nonfatal injuries and illnesses by occupation in 2001?

Figure 2–95. Distribution of back injury cases and all nonfatal injury and illness cases involving days away from work in private industry by occupation, 2001. Two occupational groups (operators, fabricators, and laborers and service workers) accounted for 58.0% of all back injury cases in 2001 and 56.9% of all nonfatal injury and illness cases. ***(Source: BLS [2003a].)***



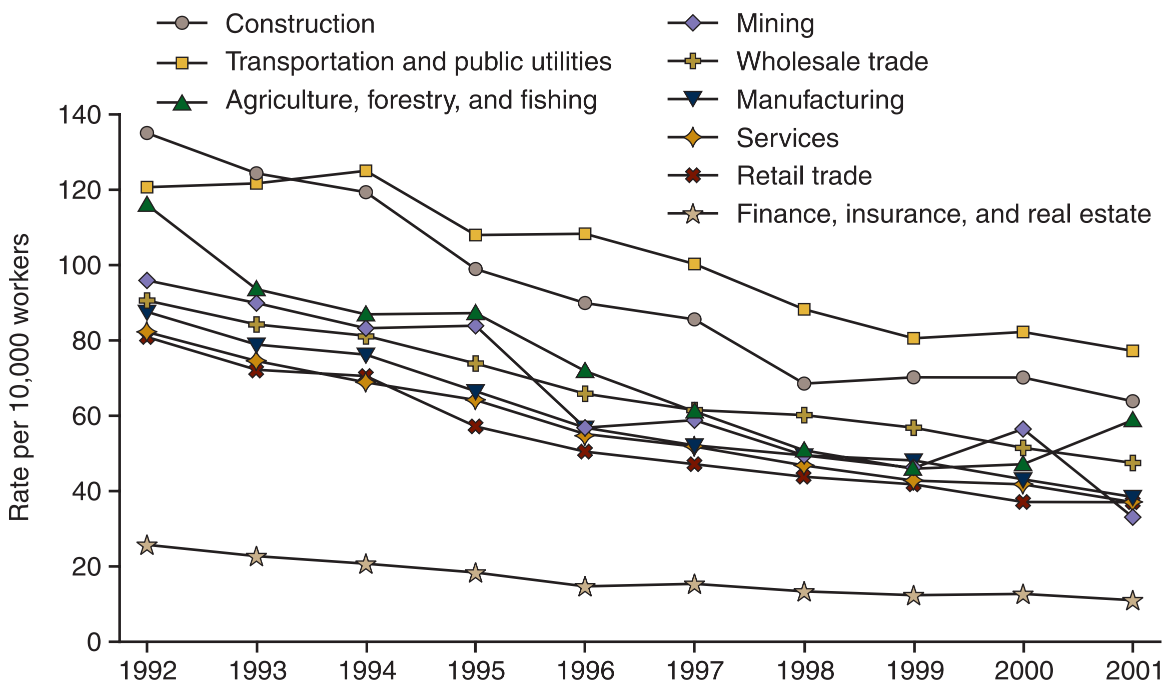
Industry

How did the rate of back injury differ by private industry sector in 2001?

Figure 2–96. Incidence rate of back injury cases involving days away from work in private industry by industry sector, 2001. In 2001, back injury incidence rates exceeding the private-sector rate (41.0 per 10,000 full-time workers) were reported for transportation and public utilities (77.1 per 10,000 full-time workers or 50,765 cases), construction (63.9 per 10,000 full-time workers or 38,973 cases), agriculture, forestry, and fishing (58.8 per 10,000 full-time workers or 8,830 cases), and wholesale trade (47.3 per 10,000 full-time workers or 30,421 cases). ***(Source: BLS [2003a].)***

How did the rates of back injuries change by private industry sector during 1992–2001?

Figure 2–97. Annual rates of back injury cases involving days away from work by private industry sector, 1992–2001. The annual rate for back injuries involving days away from work declined 52% during 1992–2001, and similar reductions occurred in each of the major industry sectors. Two industry sectors (transportation and public utilities and construction) had consistently higher rates than other industry sectors during this 10-year period and experienced 36.1% and 52.7% rate reductions, respectively. ***(Sources: BLS [2003a,b].)***



Bruises and Contusions

Bruises and contusions are superficial injuries in which the skin remains intact. These injuries accounted for 168,013 or 9.7% of all traumatic occupational injuries and disorders involving days away from work in 2001. Workers with bruises and contusions experienced a median of 3 days away from work (Figure 2–103), much lower than the median of 6 days for all nonfatal injuries and illnesses [BLS 2003a].

BLS reported 136,361 bruise and contusion cases involving days away from work in 2001 (Figure 2–98). Bruise and contusion rates declined 48.5% during 1992–2001, from 29.1 per 10,000 full-time workers in 1992 to 15.0 in 2001 (Figure 2–99). Most cases involved workers who were aged 25–54 (70.5%) (Figure 2–100), male (61.0%) (Figure 2–101), and white, non-Hispanic (64.3%) (Figure 2–102). Two occupational groups accounted for more than 60.5% of bruise and contusion cases: operators, fabricators, and laborers (42.0%) and service workers (18.5%) (Figure 2–104). Rates exceeding the private-sector rate were reported for transportation and public utilities (28.5 per 10,000 full-time workers), agriculture, forestry, and fishing (26.4), construction (20.8), mining (19.0), and wholesale trade (17.8) (Figure 2–105). During this 10-year period, four industry sectors had consistently higher rates of bruise and contusion cases than other industry sectors: transportation and public utilities, construction, mining, and agriculture, forestry, and fishing. These sectors experienced rate reductions of 35%, 49%, 50%, and 31%, respectively, during 1992–2001 (Figure 2–106).

Magnitude and Trend

How did the number of bruise and contusion cases change during 1992–2001?

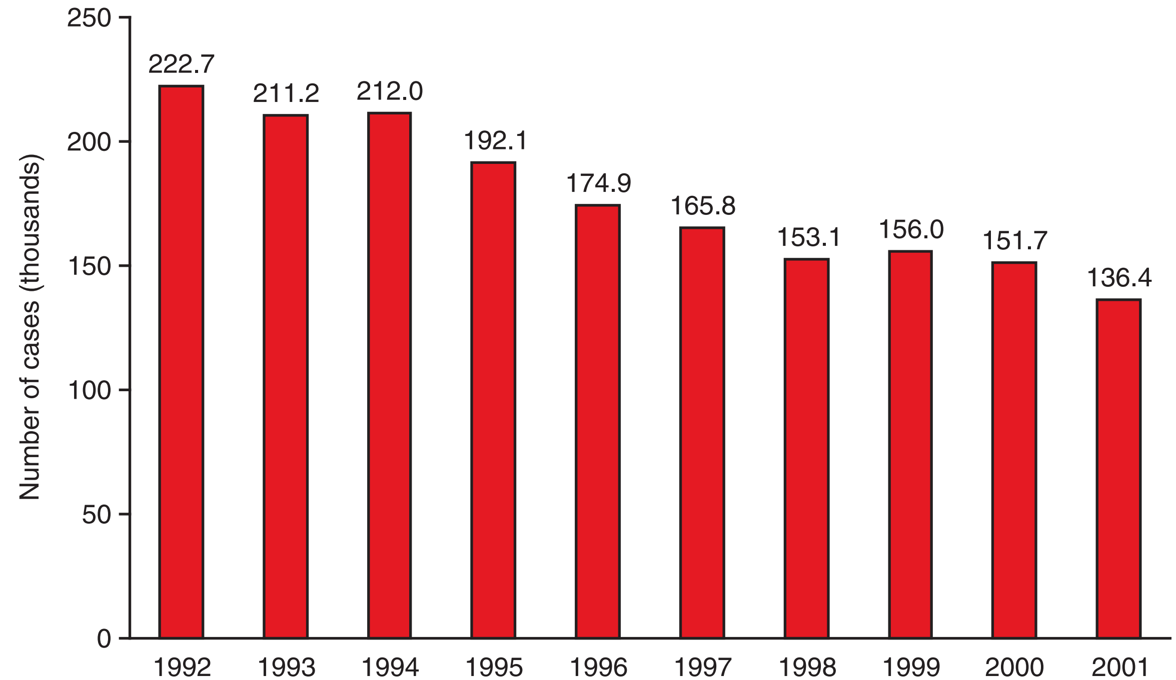


Figure 2–98. Number of bruise and contusion cases involving days away from work in private industry, 1992–2001. The annual number of bruise and contusion cases involving days away from work declined 38.8% during 1992–2001, from 222,650 cases in 1992 to 136,361 cases in 2001. *(Sources: BLS [2003a,b].)*

How did the rates of bruise and contusion cases change during 1992–2001?

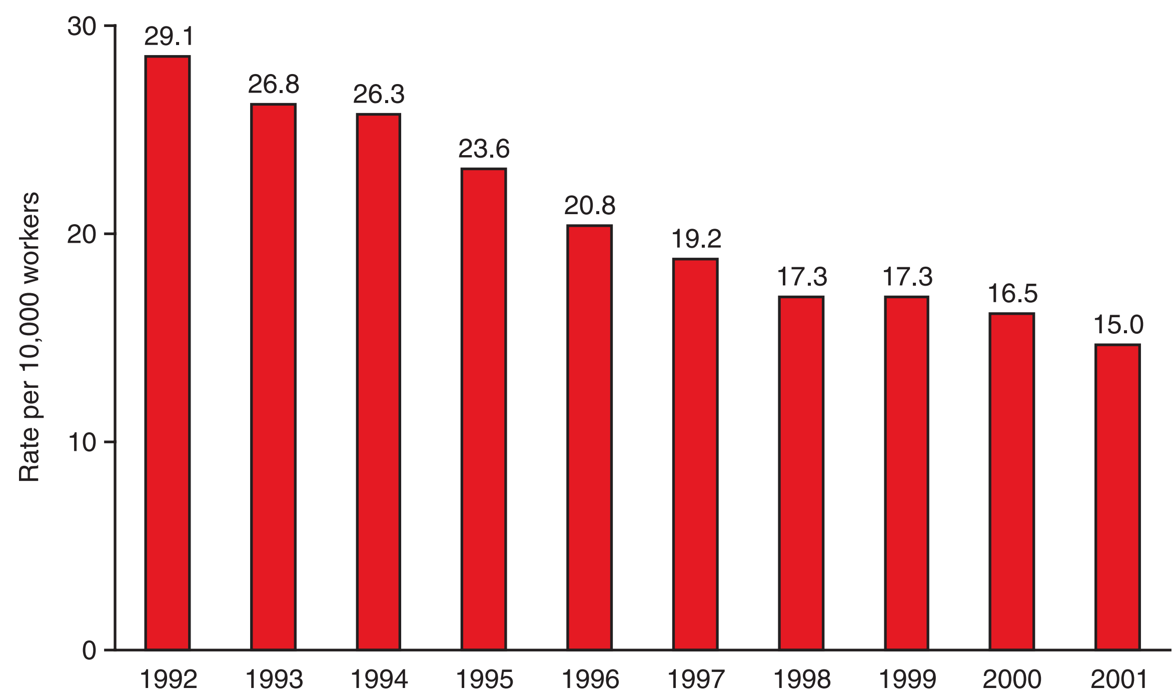
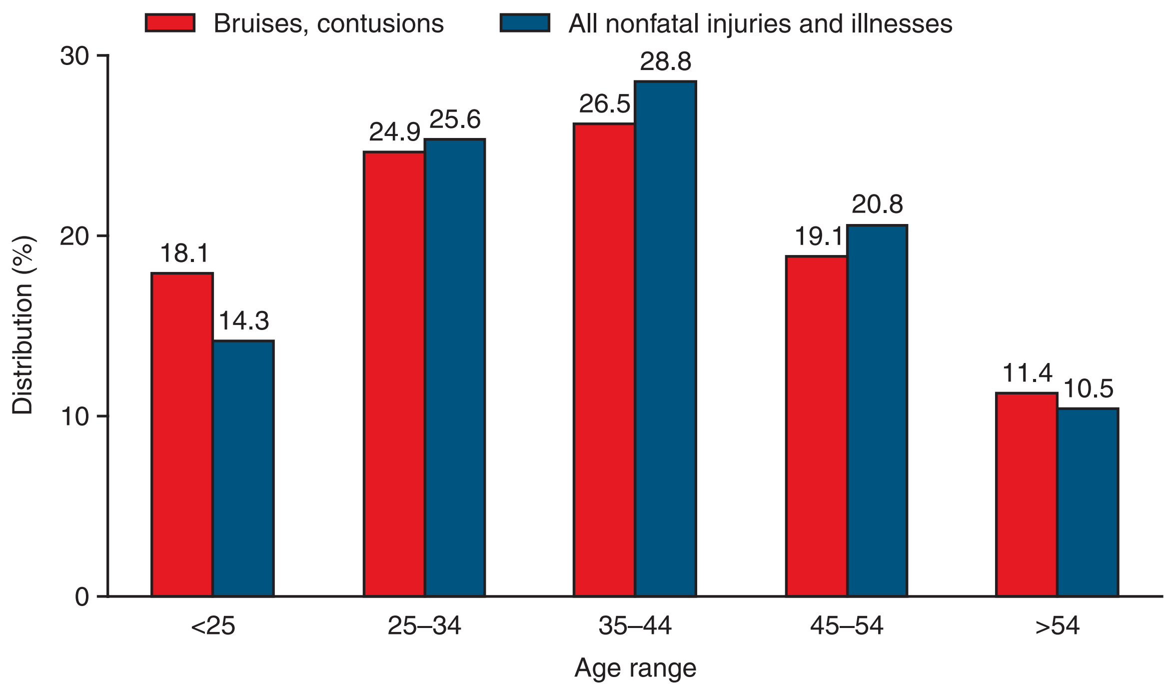


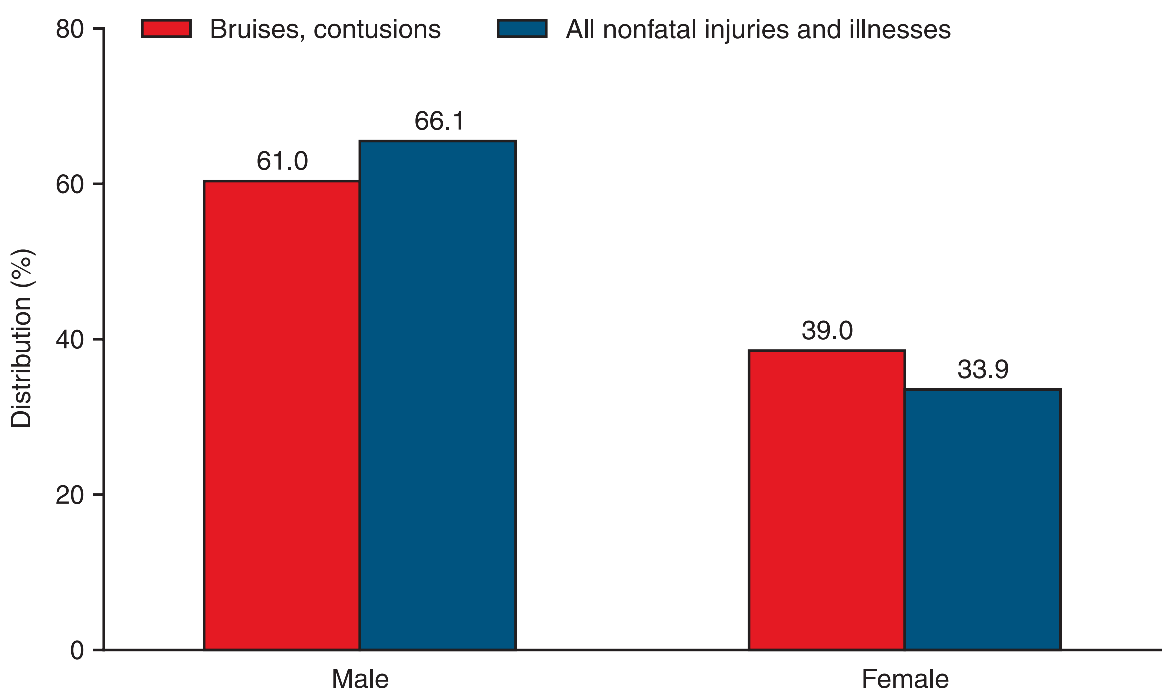
Figure 2–99. Annual rates of bruise and contusion cases involving days away from work in private industry, 1992–2001. The annual rate of bruise and contusion cases involving days away from work declined 48.5% during 1992–2001, from 29.1 per 10,000 full-time workers in 1992 to 15.0 in 2001. *(Sources: BLS [2003a,b].)*



Age

How did the number of bruise and contusion cases compare with all nonfatal injury and illness cases by age of worker in 2001?

Figure 2–100. Distribution of bruise and contusion cases and all nonfatal injury and illness cases involving days away from work in private industry by age, 2001. Age data are available for 134,783 of the 136,361 BLS-estimated bruise and contusion cases involving days away from work in 2001. Overall, three age groups (25–34, 35–44, and 45–54) accounted for 70.5% of bruise and contusion cases compared with 75.2% of all nonfatal injury and illness cases. More workers were under age 25 among bruise and contusion cases (18.1%) than among all nonfatal injury and illness cases (14.3%). ***(Source: BLS [2003a].)***



Sex

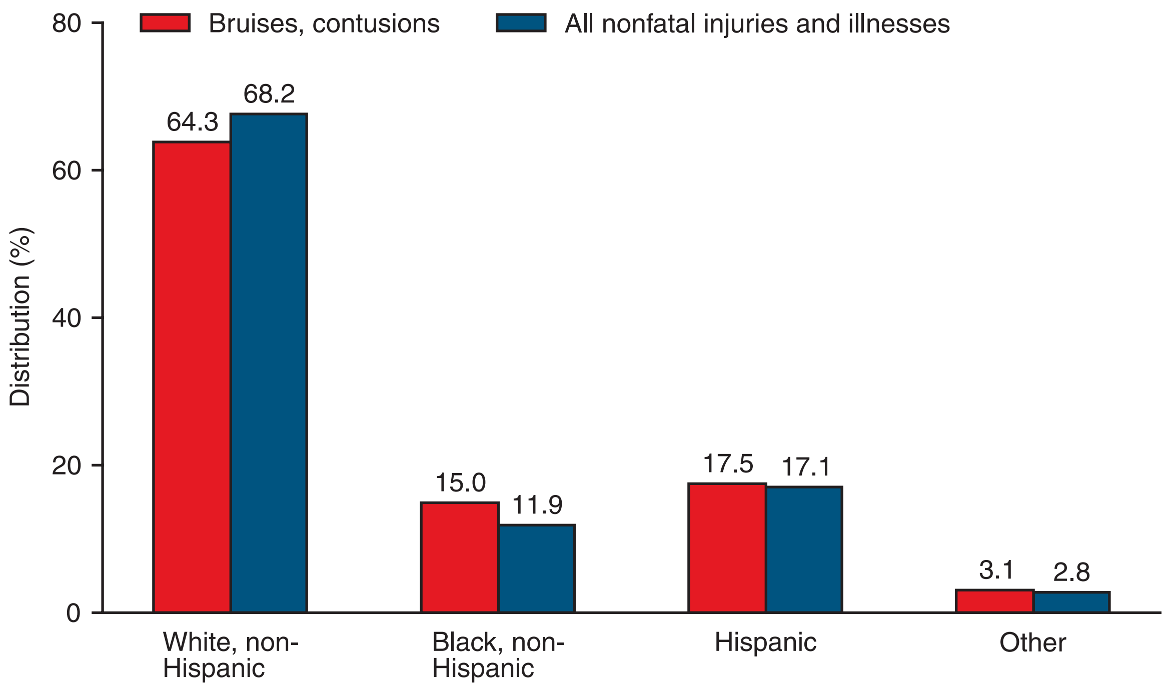
How did bruise and contusion cases compare with all nonfatal injury and illness cases by sex of worker?

Figure 2–101. Distribution of bruise and contusion cases and all nonfatal injury and illness cases involving days away from work in private industry by sex, 2001. Male workers accounted for fewer bruise and contusion cases in 2001 (61.0%) than all nonfatal injury and illness cases (66.1%). However, female workers accounted for more bruise and contusion cases (39.0%) than all nonfatal injury and illness cases (33.9%). ***(Source: BLS [2003a].)***

Race/Ethnicity

How did bruise and contusion cases compare with all nonfatal injury and illness cases by race/ethnicity?

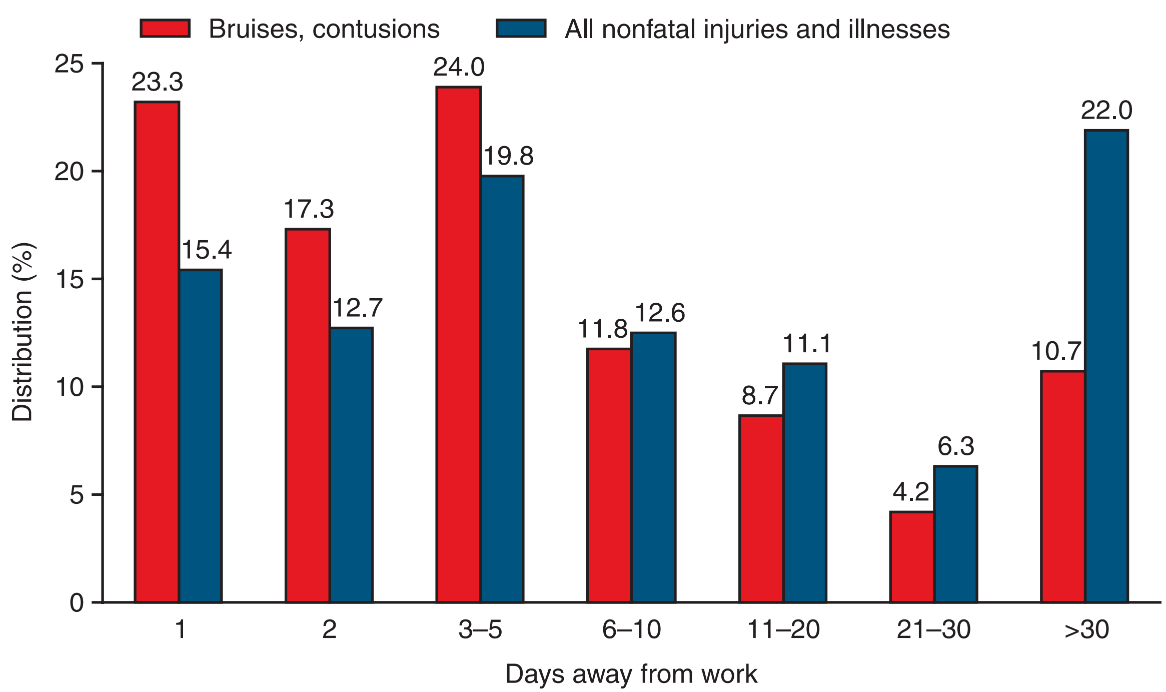
Figure 2–102. Distribution of bruise and contusion cases and all nonfatal injury and illness cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 96,014 of the 136,361 BLS-estimated bruise and contusion cases involving days away from work in 2001. For Hispanic workers and other workers, relatively small differences existed between the distribution of bruise and contusion cases and all nonfatal injury and illness cases in 2001. White, non-Hispanic workers accounted for 64.3% of bruise and contusion cases and 68.2% of nonfatal injury and illness cases. Black, non-Hispanic workers accounted for 15.0% of bruise and contusion cases and 11.9% of all nonfatal injuries and illnesses. ***(Source: BLS [2003a].)***

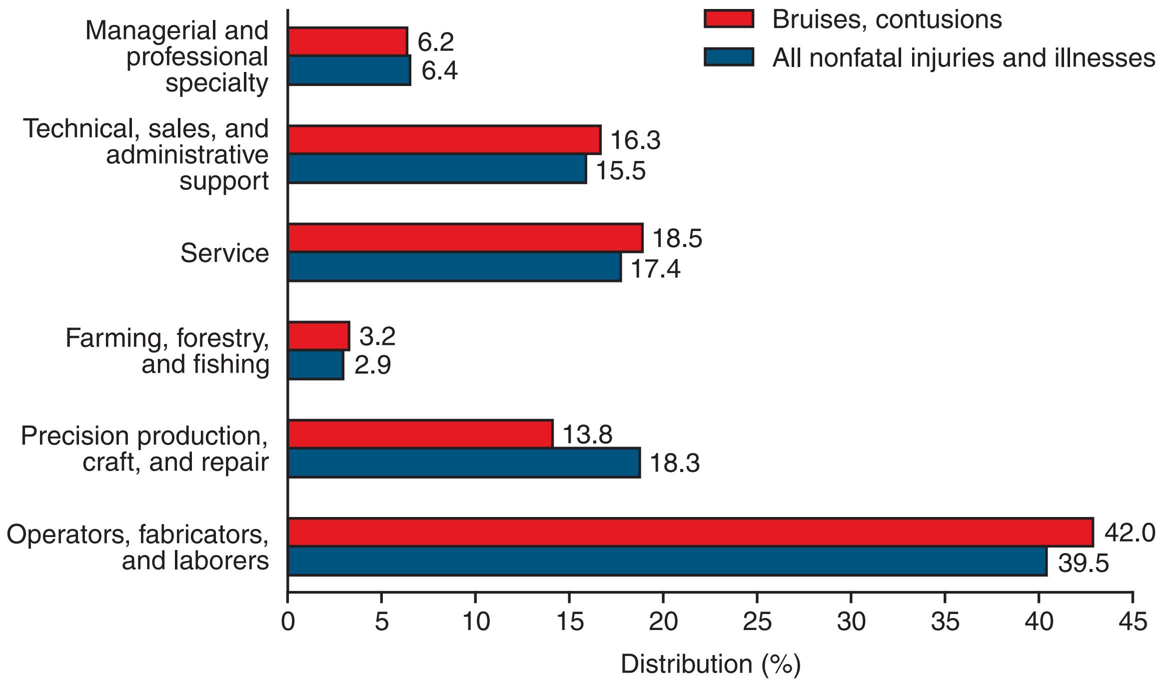


Severity

How did bruise and contusion cases compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–103. Distribution of bruise and contusion cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Compared with all nonfatal injury and illness cases in 2001, bruise and contusion cases tended to involve higher percentages of short-term disability, with 64.6% of cases requiring 5 or fewer days away from work. A median of 3 days away from work was reported for bruise and contusion cases in 2001—half the median of 6 days for all nonfatal injuries and illnesses. ***(Source: BLS [2003a].)***

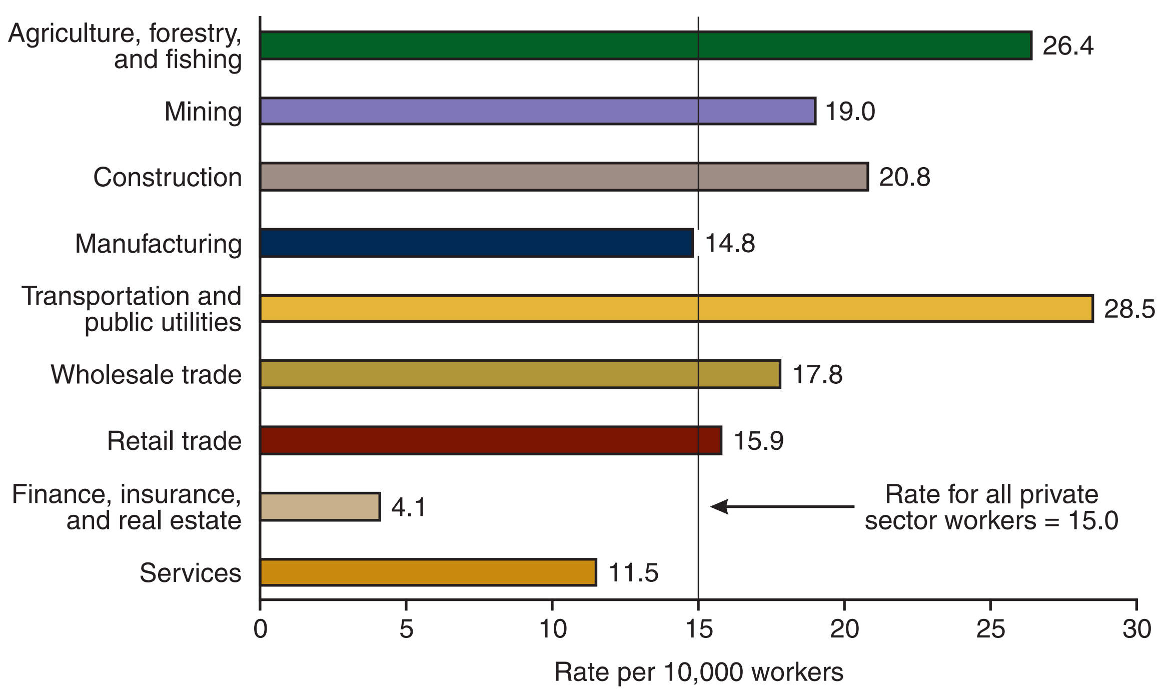




Occupation

How did bruise and contusion cases compare with all nonfatal injury and illness cases by occupation in 2001?

Figure 2–104. Distribution of bruise and contusion cases and all nonfatal injury and illness cases involving days away from work in private industry by occupation, 2001. Two occupational groups accounted for the majority (60.5%) of all bruise and contusion cases in 2001: operators, fabricators, and laborers (42% of bruise and contusion cases versus 39.5% of all nonfatal injuries and illnesses) and service (18.5% of bruise and contusion cases versus 17.4% of all nonfatal injuries and illnesses). Overall, the distributions by occupational group were comparable for bruise and contusion cases and all nonfatal injury and illness cases. *(Source: BLS [2003a].)*



Industry

How did the rate of bruise and contusion cases differ by private industry sector in 2001?

Figure 2–105. Incidence rate of bruise and contusion cases by private industry sector, 2001. Private industry reported an incidence rate of 15.0 per 10,000 full-time workers for bruise and contusion cases in 2001. Higher rates were reported for transportation and public utilities (28.5 per 10,000 full-time workers or 18,742 cases), agriculture, forestry, and fishing (26.4 per 10,000 full-time workers or 3,964 cases), construction (20.8 per 10,000 full-time workers or 12,689 cases), mining (19.0 per 10,000 full-time workers or 1,127 cases), wholesale trade (17.8 per 10,000 full-time workers or 11,461 cases), and retail trade (15.9 per 10,000 full-time workers or 27,689 cases). *(Source: BLS [2003a].)*

How did the rates of bruise and contusion cases change by private industry sector during 1992–2001?

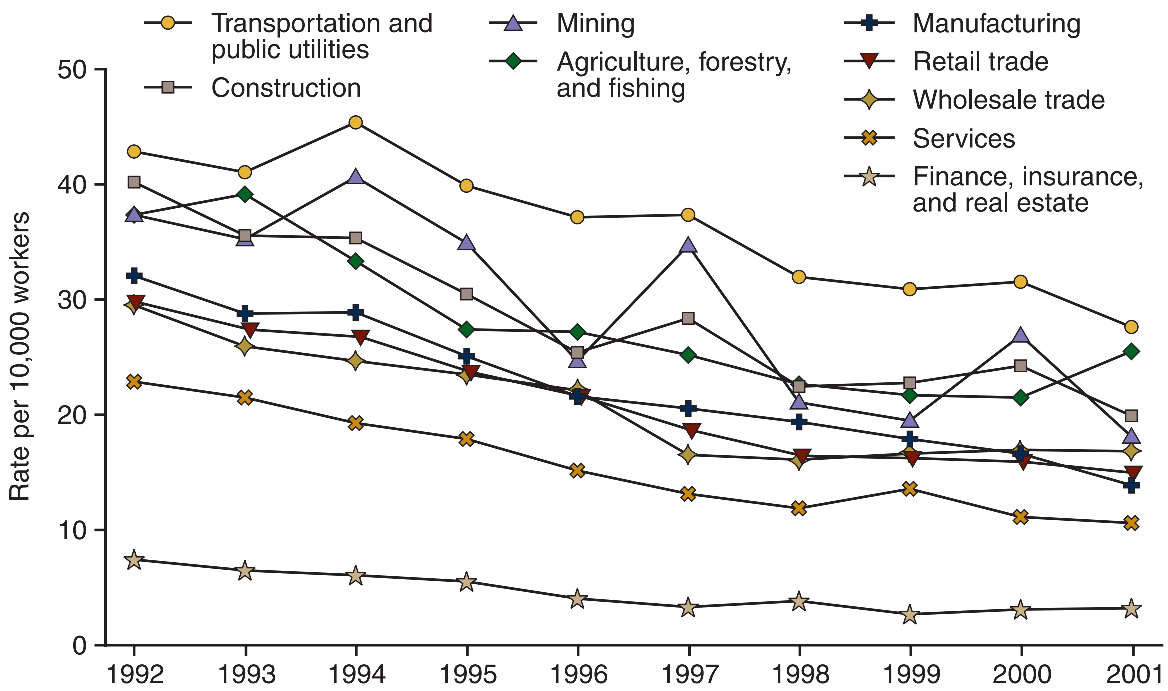


Figure 2–106. Annual rate of bruise and contusion cases involving days away from work by private industry sector, 1992–2001. The private-sector annual rate of bruise and contusion cases declined 48% during 1992—2001, and rate reductions were reported for each of the major industry sectors. Four industry sectors (transportation and public utilities, construction, mining, and agriculture, forestry, and fishing) had consistently higher rates than other sectors during this 10-year period and experienced rate reductions of 35%, 49%, 50%, and 31%, respectively. ***(Sources: BLS [2003a,b].)***

Heat Burns and Scalds

Heat burns and scalds constituted the major category of traumatic injury among the 35,960 burns reported in 2001. This category excludes chemical, electrical, and unspecified burns. Heat burn and scald cases are of moderate severity (Figure 2–114), with injured workers experiencing a median of 5 days away from work [BLS 2003a].

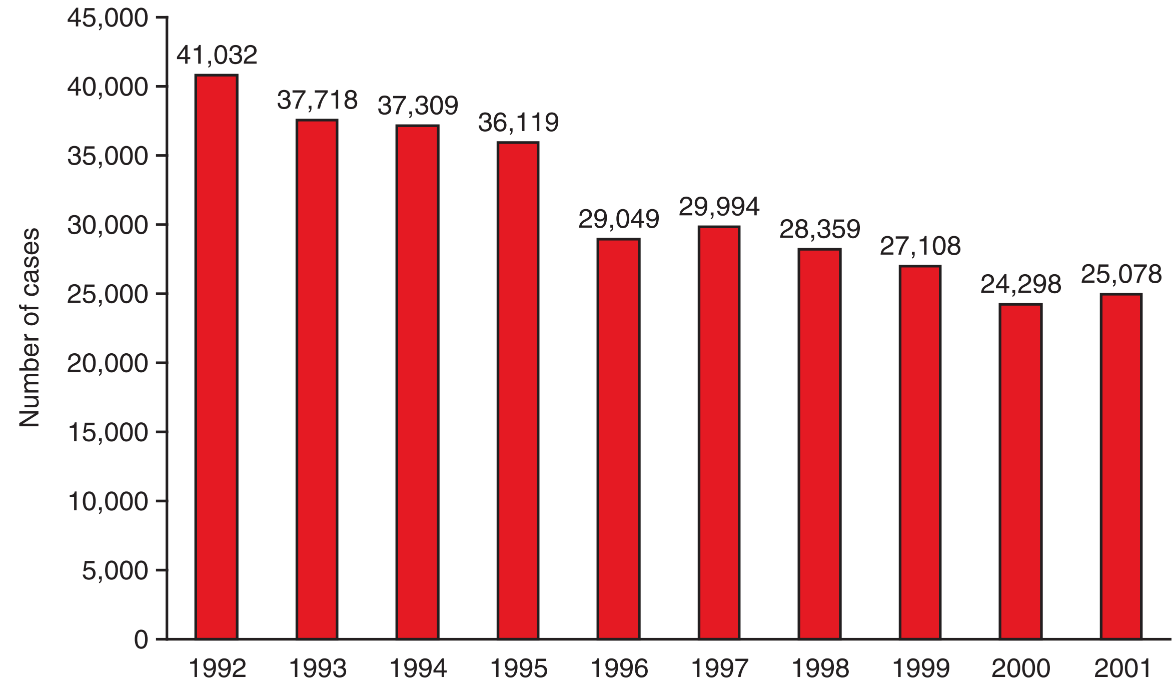
In 1999, more than 142,000 occupational burns of all types (thermal, chemical, and radiation) were treated in emergency departments for workers aged 15 and older. The rate of these burns was about 11 per 10,000 full-time workers. Workers under age 25 had an incidence rate 2- to 5-fold that of older age groups (Figure 2–109). The number of burns among male workers was twice the number among female workers (Figure 2–111).

BLS reported 25,078 heat burn and scald cases involving days away from work in 2001 (Figure 2–107). Annual rates declined 48.1% during 1992–2001, from 5.4 per 10,000 full-time workers in 1992 to 2.8 in 2001 (Figure 2–108). Most cases involved workers who were aged 25–54 (67.4%) (Figure 2–110), male (68.2%) (Figure 2–112), and white, non-Hispanic (66.6%) (Figure 2–113). Two occupational groups accounted for the majority (72.7%) of all heat burn and scald cases: service occupations (47.6%) and operators, fabricators, and laborers (25.1%) (Figure 2–115). Incidence rates exceeding the private-sector rate were reported for retail trade (5.8 per 10,000 full-time workers) and construction (4.0) (Figure 2–116). Three industry sectors (retail trade, construction, and manufacturing) had consistently higher rates than other industry sectors during 1992–2001 and experienced rate reductions of 50%, 37.5%, and 50%, respectively (Figure 2–117).

Magnitude and Trend

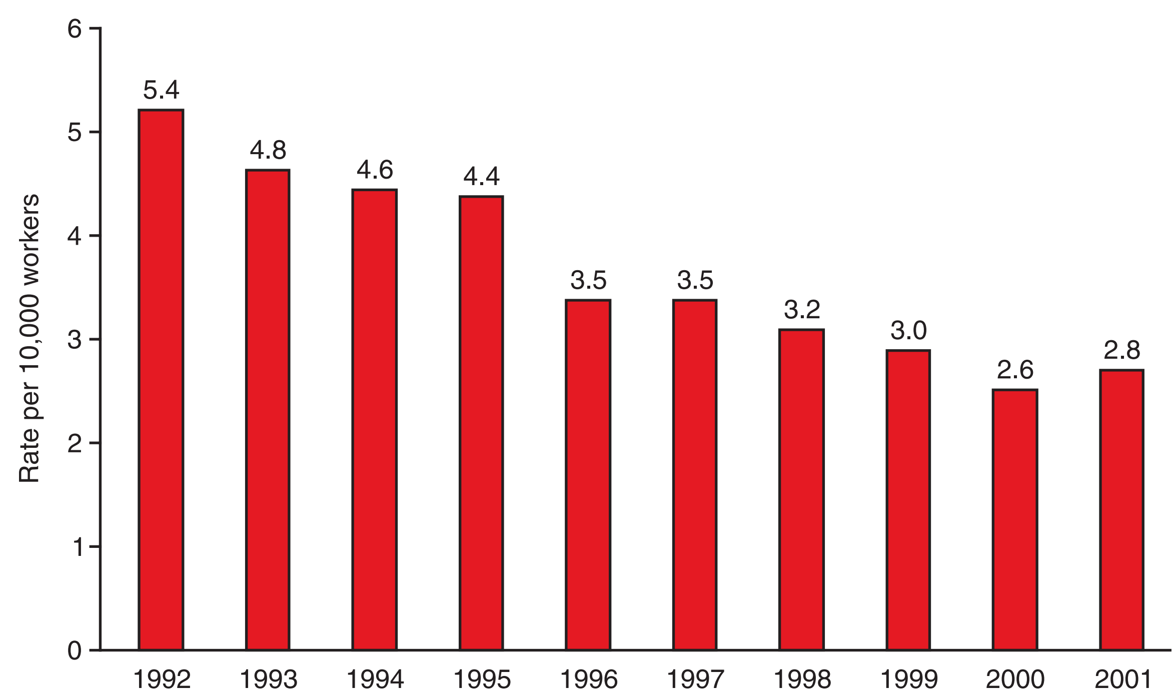
How did the number of heat burn and scald cases change during 1992–2001?

Figure 2–107. Number of heat burn and scald cases involving days away from work in private industry, 1992–2001. The annual number of heat burn and scald cases involving days away from work declined 38.9% during this 10-year period, from a high of 41,032 cases in 1992 to 25,078 cases in 2001. *(Sources: BLS [2003a,b].)*



How did the annual rate of heat burn and scald cases change during 1992–2001?

Figure 2–108. Annual rates of heat burn and scald cases involving days away from work in private industry, 1992–2001. The annual rate of heat burn and scald cases involving days away from work declined 48.1% during 1992–2001, from a high of 5.4 per 10,000 full-time workers in 1992 to 2.8 in 2001. *(Sources: BLS [2003a,b].)*



Age

How did burns treated in hospital emergency departments differ by age of worker in 1999?

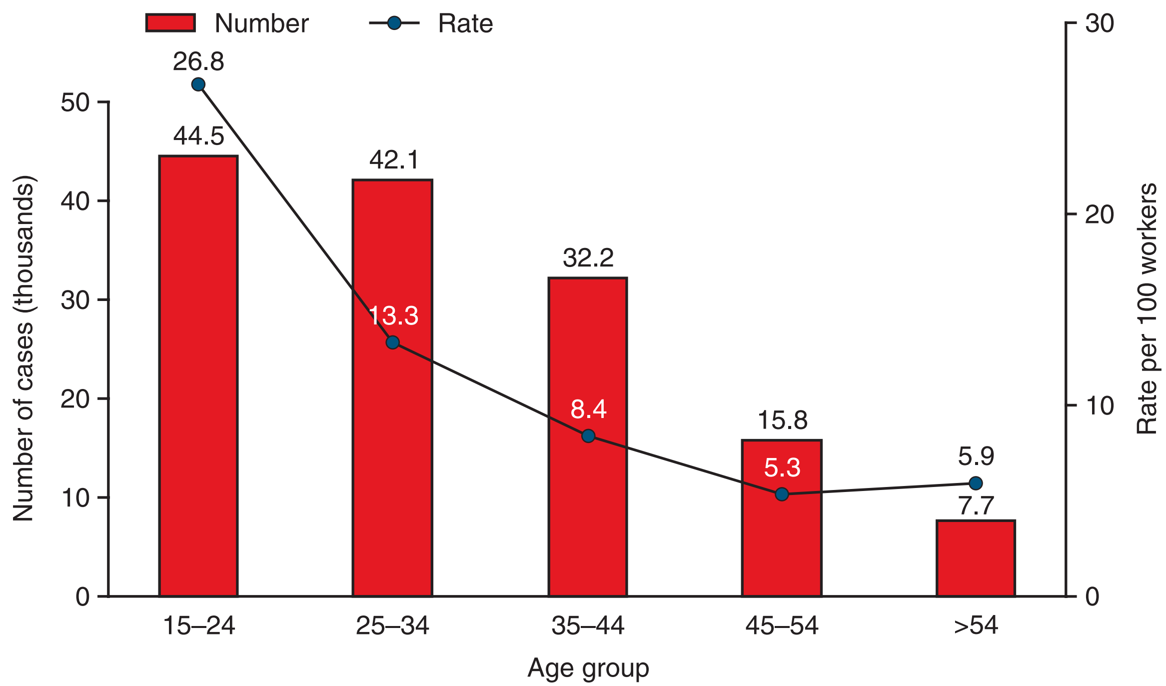


Figure 2–109. Number and rate of nonfatal occupational burns treated in an emergency department, by age of worker, 1999. In 1999, more than 142,000 occupational burns of all types (thermal, chemical, and radiation) were treated in emergency departments for workers aged 15 and older. The rate of these burns was about 11 per 10,000 full-time workers. Workers under age 25 had an incidence rate that was 2 to 5 times the rates for older age groups. ***(Sources: NEISS [2003]; Jackson [2003].)***

How did heat burn and scald cases compare with all nonfatal injury and illness cases by age of worker in 2001?

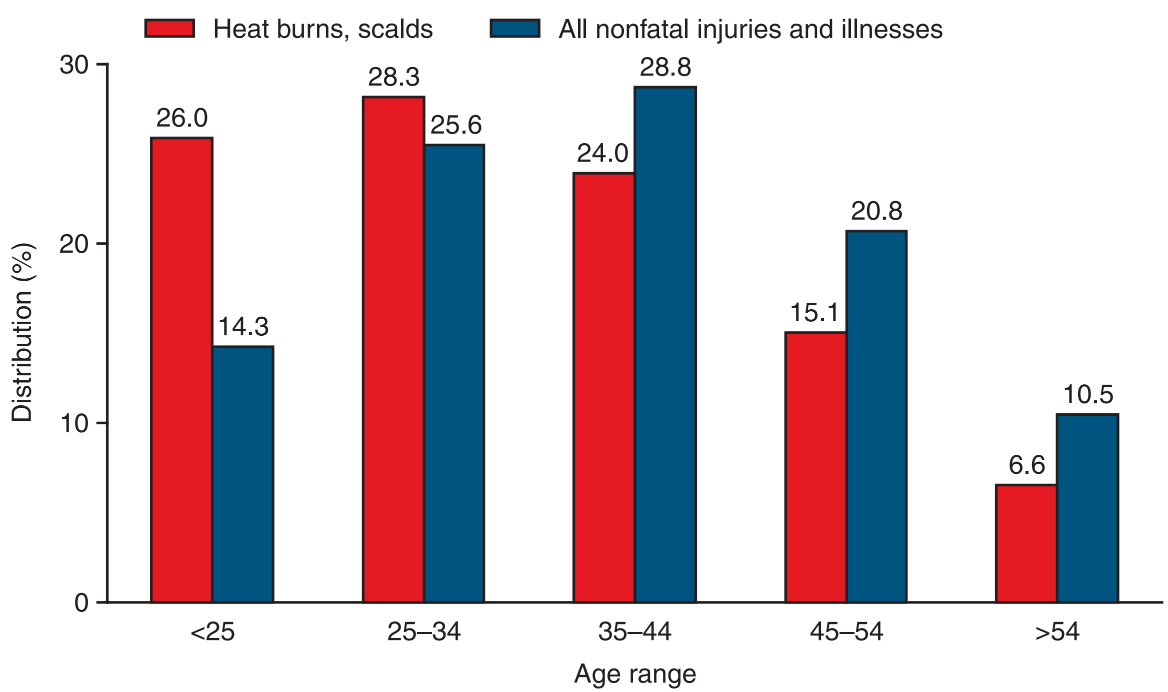


Figure 2–110. Distribution of heat burn and scald cases and all nonfatal injury and illness cases involving days away from work in private industry by age, 2001. Age data are available for 24,244 of the 25,078 BLS-estimated heat burn and scald cases involving days away from work in 2001. Overall, three age groups (25–34, 35–44, and 45–54) accounted for 67.4% of heat burn and scald cases compared with 75.2% of all nonfatal injury and illness cases. More workers were under age 35 in heat burn and scald cases (54.3%) than in all nonfatal injury and illness cases (39.9%). ***(Source: BLS [2003a].)***

Sex

How did the numbers and rates of burn cases treated in hospital emergency departments differ by sex of worker in 1999?

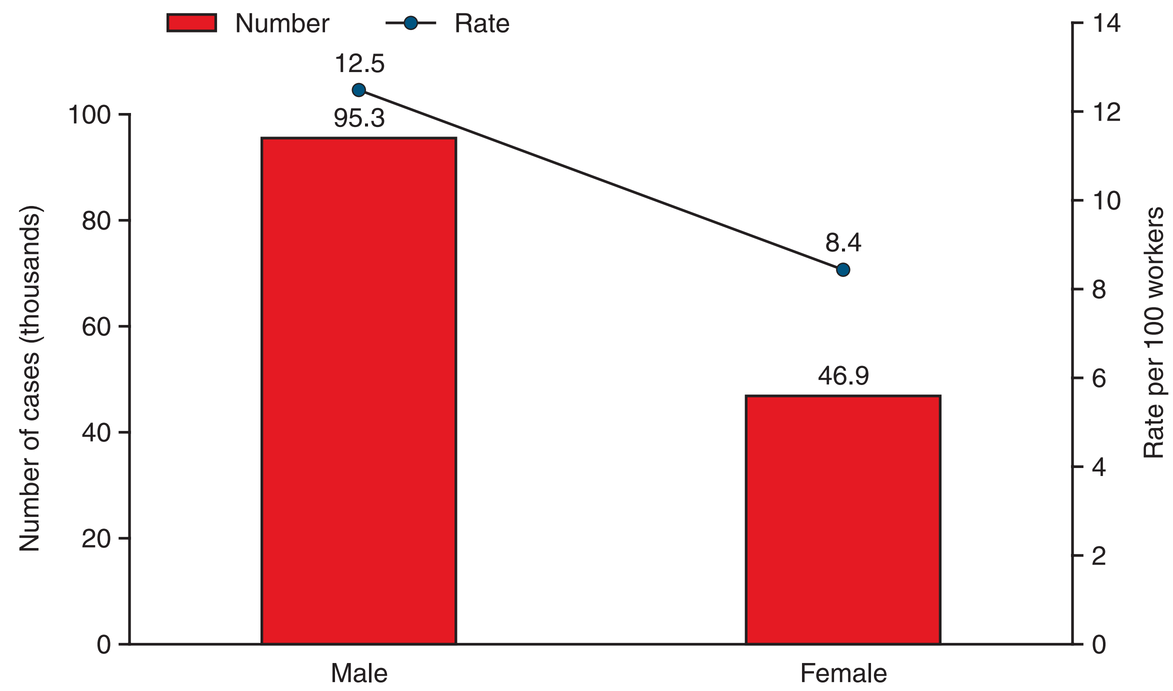


Figure 2–111. Numbers and rates of nonfatal occupational burns treated in an emergency department, by sex of worker, 1999. The number of burns among male workers was twice the number among female workers in 1999. ***(Sources:* NEISS *[2003]; Jackson [2003].)***

How did heat burn and scald cases compare with all nonfatal injury and illness cases by sex of worker in 2001?

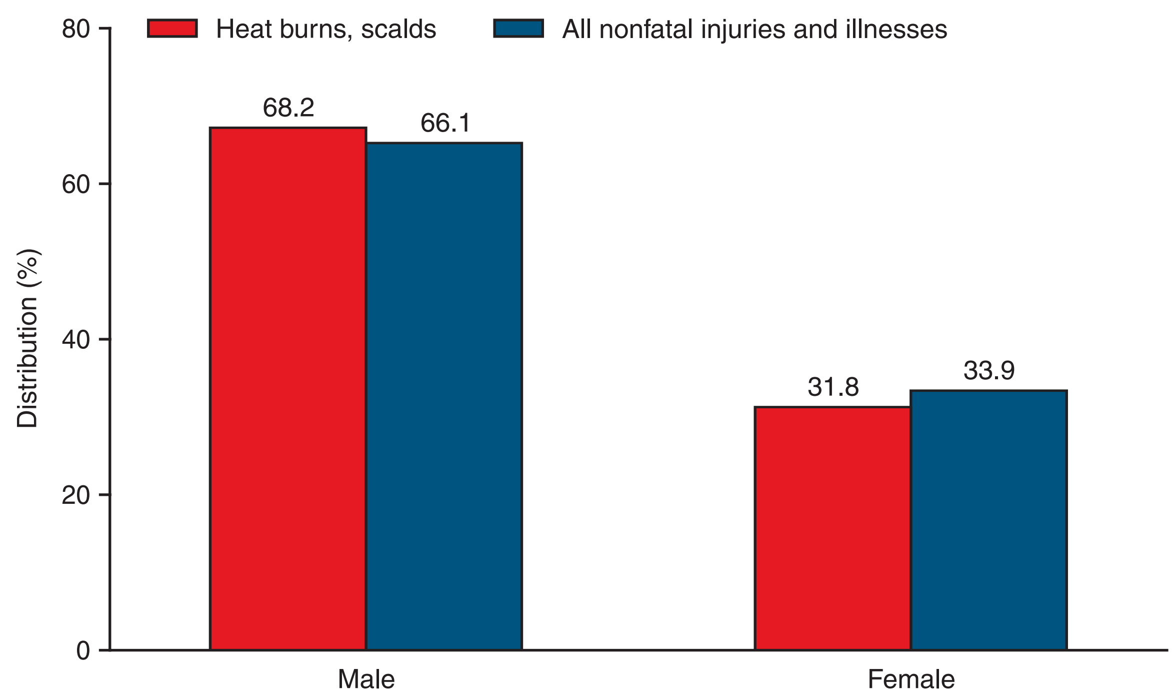
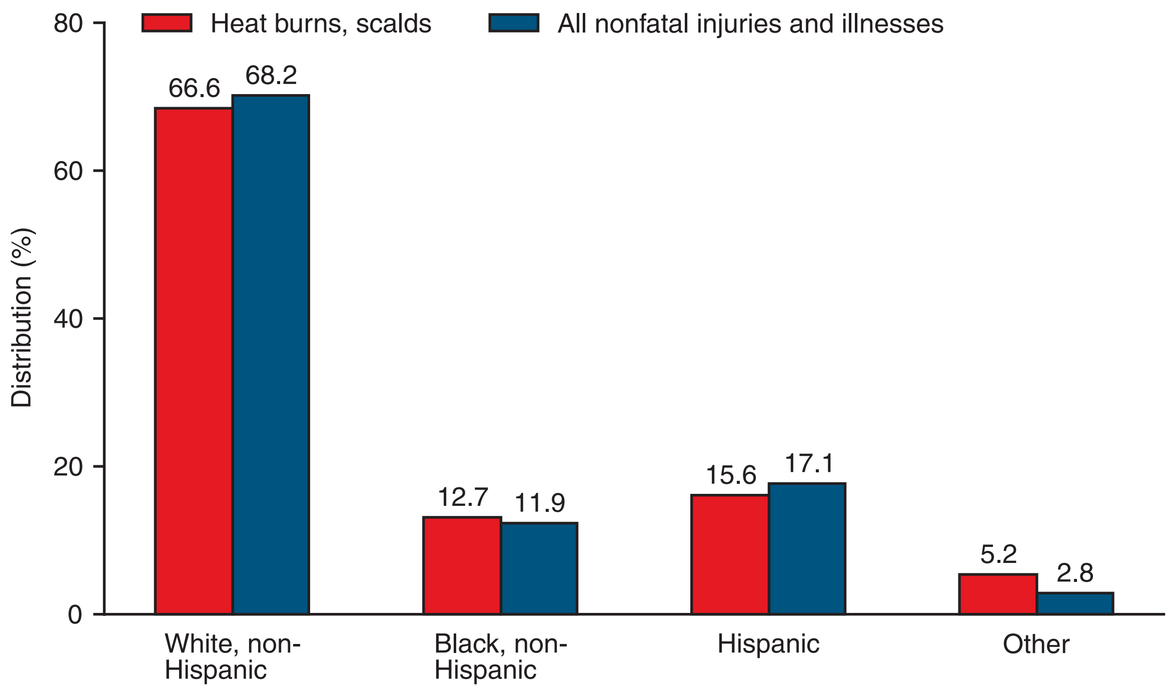


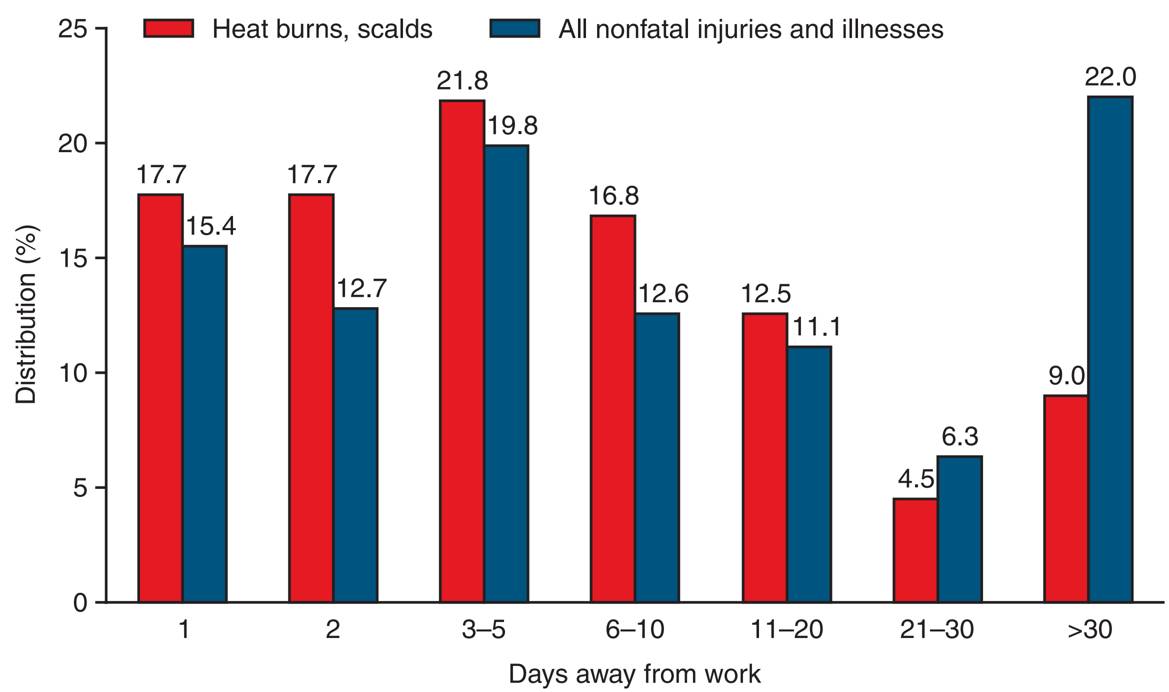
Figure 2–112. Distribution of heat burn and scald cases and all nonfatal injury and illness cases involving days away from work in private industry by sex, 2001. Male workers accounted for 68.2% of heat burn and scald cases in 2001 and 66.1% of all nonfatal injury and illness cases. Female workers accounted for a lower percentage of heat burn and scald cases (31.8%) than all nonfatal injury and illness cases (33.9%). ***(Source:* BLS *[2003a].)***



Race/Ethnicity

How did heat burn and scald cases compare with all nonfatal injury and illness cases by race/ethnicity in 2001?

Figure 2–113. Distribution of heat burn and scald cases and all nonfatal injury and illness cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 18,617 of the 25,078 BLS-estimated heat burn and scald cases involving days away from work in 2001. White, non-Hispanic workers accounted for 66.6% of heat burn and scald cases and 68.2% of all nonfatal injury and illness cases. Black, non-Hispanic workers accounted for 12.7% of heat burn and scald cases (slightly more than for all nonfatal injury and illness cases), and Hispanic workers accounted for 15.6% of heat burn and scald cases (slightly less than for all nonfatal injury and illness cases). ***(Source: BLS [2003a].)***



Severity

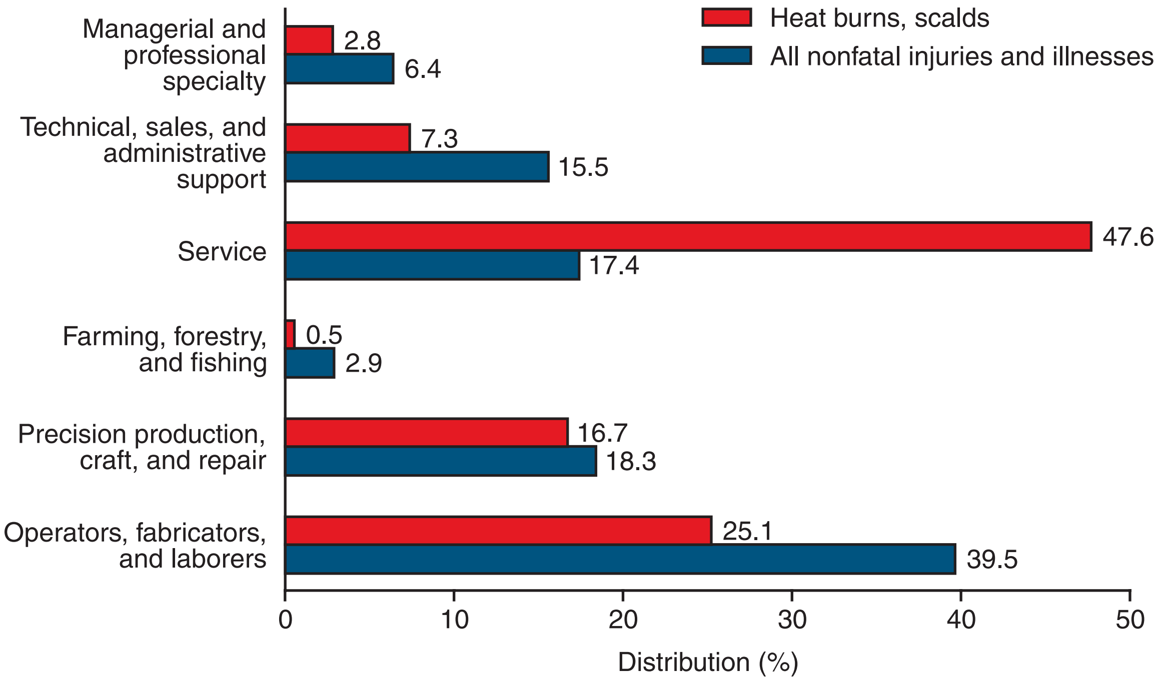
How did heat burn and scald cases compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–114. Distribution of heat burn and scald cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. In 2001, more heat burn and scald cases (85.6%) involved short-term periods of disability (1–20 days) than did nonfatal injury and illness cases (71.6%). The median number of days away from work was 5 for heat burn and scald cases and 6 for all nonfatal injury and illness cases. ***(Source: BLS [2003a].)***

Occupation

How did heat burn and scald cases compare with all nonfatal injury and illness cases by occupation in 2001?

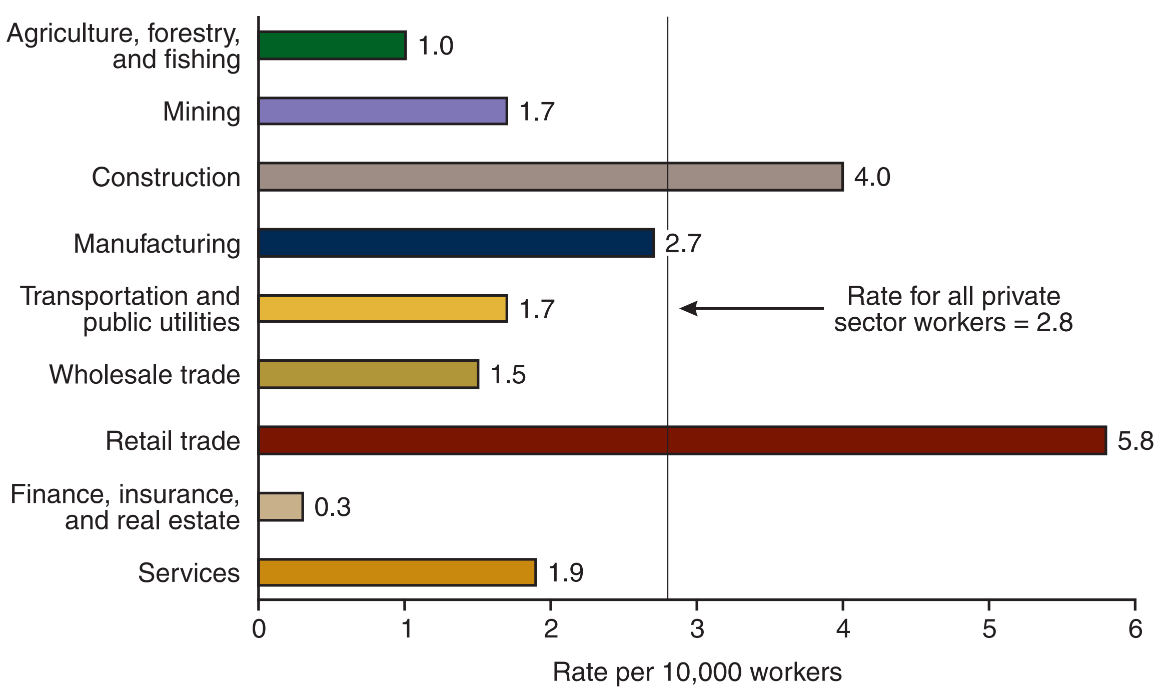
Figure 2–115. Distribution of heat burn and scald cases and all nonfatal injury and illness cases involving days away from work in private industry by occupation, 2001. Service occupations accounted for nearly half (47.6%) of all heat burn and scald cases compared with 17.4% of all nonfatal injury and illness cases in 2001. Operators, fabricators, and laborers accounted for another 25.1% of heat, burn, and scald cases and for 39.5% of all nonfatal injury and illness cases. ***(Source: BLS [2003a].)***

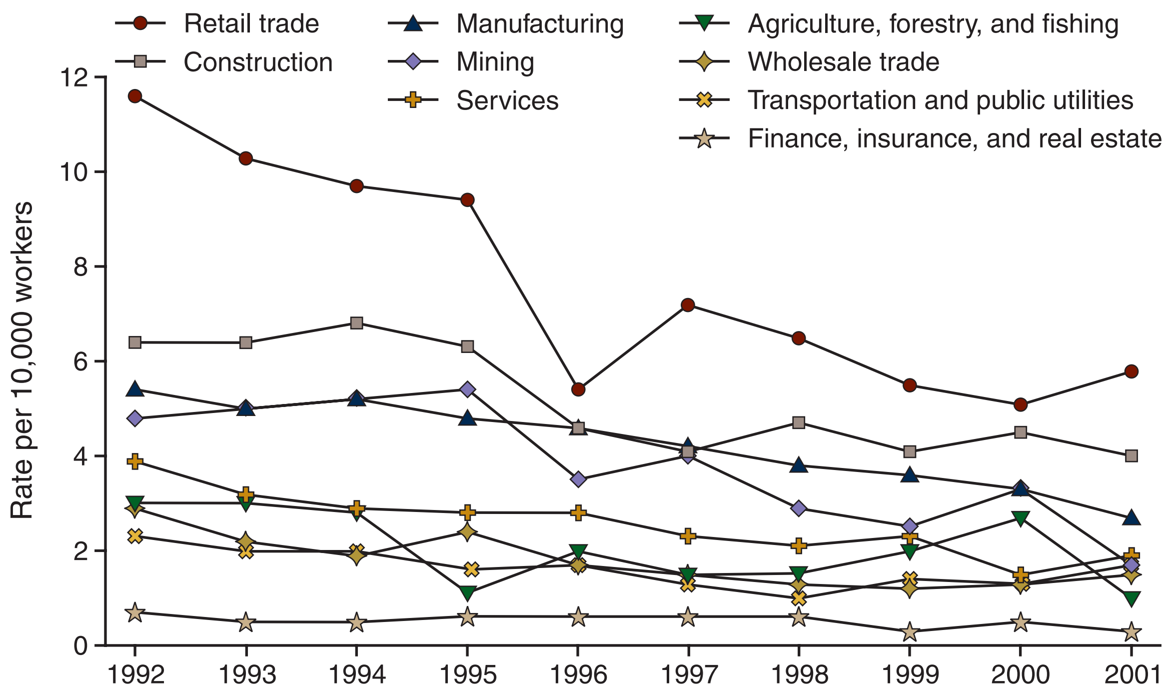


Industry

How did the rate of heat burn and scald cases differ by private industry sector in 2001?

Figure 2–116. Incidence rate of heat burn and scald cases in private industry by industry sector, 2001. Private industry reported an incidence rate of 2.8 per 10,000 full-time workers for heat burn and scald cases in 2001. Incidence rates exceeding the private-sector rate were reported for retail trade (5.8 per 10,000 full-time workers or 10,082 cases) and construction (4.0 per 10,000 full-time workers or 2,453 cases). ***(Source: BLS [2003a].)***





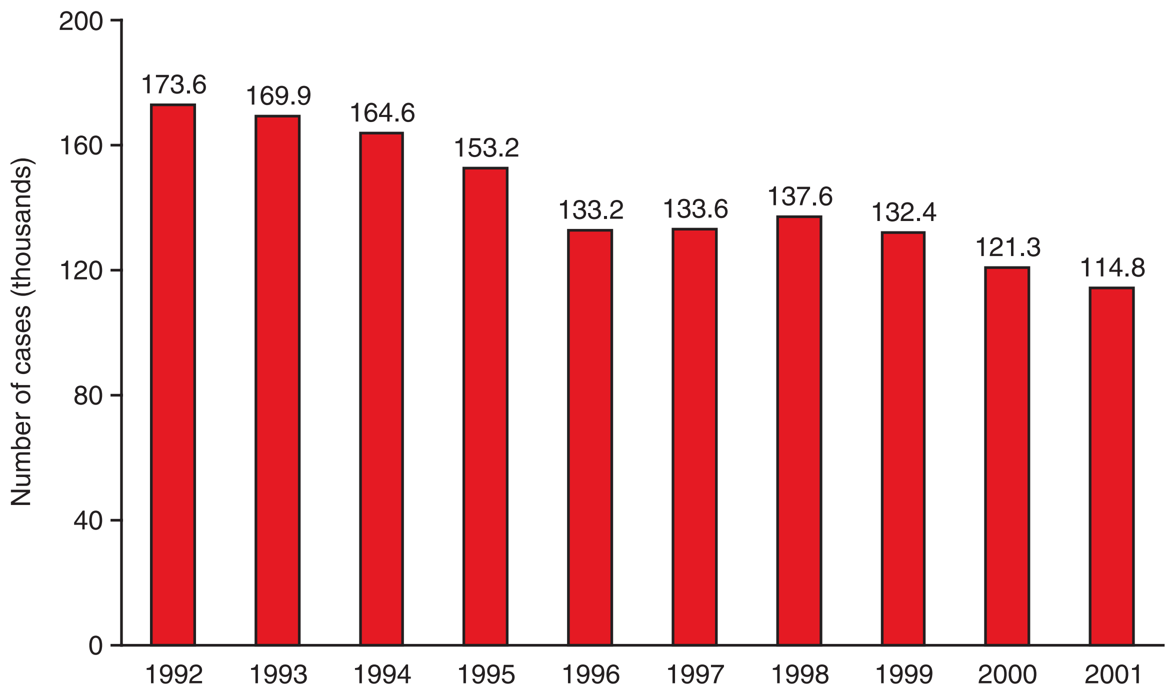
How did the rates of heat burn and scald cases change by private industry sector during 1992–2001?

Figure 2–117. Annual rates of heat burn and scald cases involving days away from work by private industry sector, 1992–2001. The annual rate of heat burn and scald cases declined by nearly half (48.1%) during 1992–2001, and rate reductions occurred among each of the major industry sectors. Three sectors (retail trade, construction, and manufacturing) had higher rates than the other sectors and experienced rate reductions of 50%, 37.5%, and 50%, respectively, during this 10-year period. ***(Sources: BLS [2003a,b].)***

Cuts and Lacerations

Cuts and lacerations constituted the major category of traumatic injury among the 150,376 open-wounds injury cases reported in 2001. Cut and laceration cases are less severe than the average nonfatal injury or illness case. They involved a median of 3 days away from work in 2001 compared with 6 days for all nonfatal injuries and illnesses (Figure 2–123) [BLS 2003a].

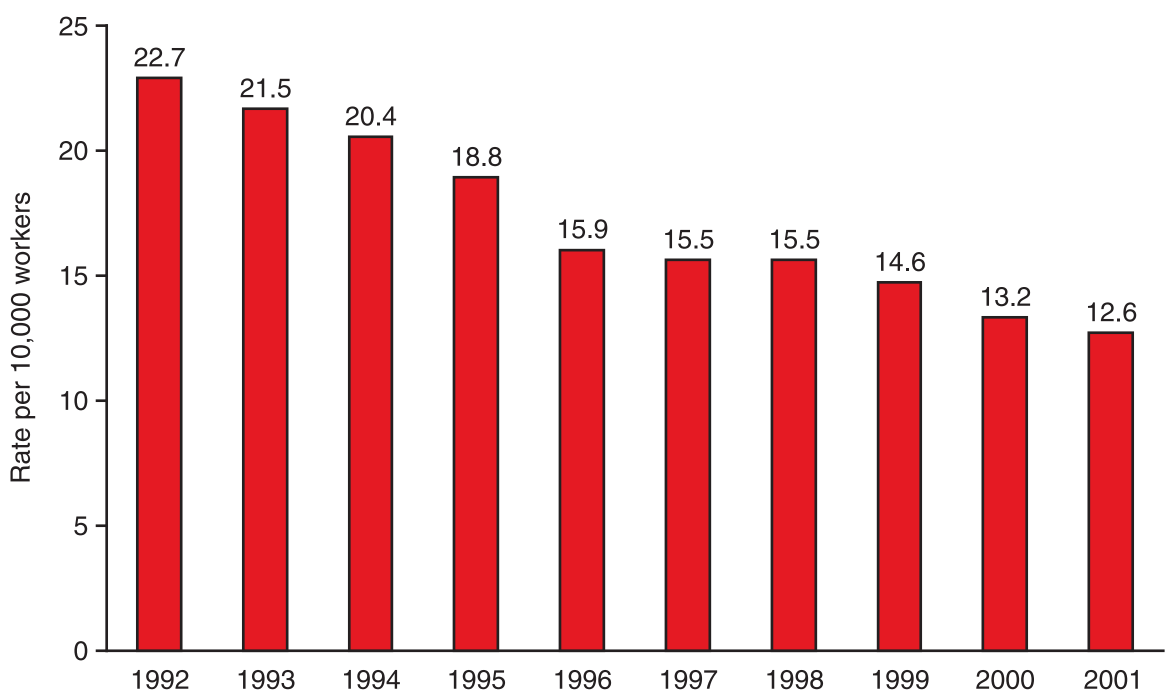
BLS reported 114,791 cut and laceration cases involving days away from work in 2001 (Figure 2–118). Rates declined 44.5% during 1992–2001, from 22.7 per 10,000 workers in 1992 to 12.6 in 2001 (Figure 2–119). Most cases involved workers who were aged 25–54 (69.4%) (Figure 2–120), male (81.9%) (Figure 2–121), and white, non-Hispanic (60.7%) (Figure 2–122). Together, two occupational groups accounted for more than 67% of cut and laceration cases: operators, fabricators, and laborers (40.0%) and precision production, craft, and repair (27.2%) (Figure 2–124). Rates exceeding the private-sector rate were reported for construction (35.8 per 10,000 full-time workers), agriculture, forestry, and fishing (26.5), manufacturing (16.1), and retail trade (15.4) (Figure 2–125). Two industry sectors (construction and agriculture, forestry, and fishing) had consistently higher annual rates of cut and laceration cases than other sectors during 1992–2001, and they experienced reductions of 26.3% and 41.2%, respectively (Figure 2–126).



Magnitude and Trend

How did the number of cut and laceration cases change during 1992–2001?

Figure 2–118. Number of cut and laceration cases involving days away from work in private industry, 1992–2001. The annual number of cut and laceration cases involving days away from work declined 33.9% during 1992–2001, from 173,573 cases in 1992 to 114,791 cases in 2001. ***(Sources: BLS [2003a,b].)***



How did the annual rate of cut and laceration cases change during 1992–2001?

Figure 2–119. Annual rates of cut and laceration cases involving days away from work in private industry, 1992–2001. The annual rate of cut and laceration cases involving days away from work declined 44.5% during 1992–2001, from 22.7 per 10,000 full-time workers in 1992 to 12.6 in 2001. ***(Sources: BLS [2003a,b].)***

Age

How did cut and laceration cases compare with all nonfatal injury and illness cases by age of worker in 2001?

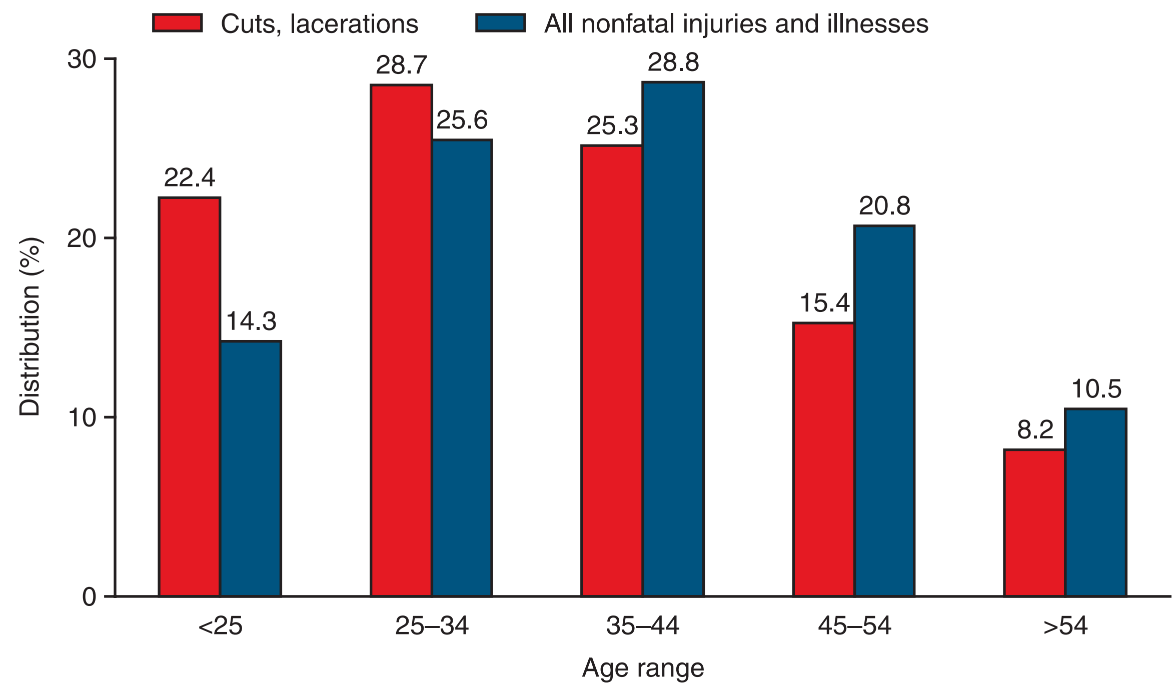


Figure 2–120. Distribution of cut and laceration cases and all nonfatal injury and illness cases involving days away from work in private industry by age, 2001. Age data are available for 113,072 of the 114,791 BLS-estimated cut and laceration cases involving days away from work in 2001. Overall, three age groups (25–34, 35–44, and 45–54) accounted for 69.4% of cases compared with 75.2% reported for all nonfatal injury and illness cases. More workers were under age 35 in cut and laceration cases (51.1%) than in all nonfatal injury and illness cases (39.9%). ***(Source: BLS [2003a].)***

Sex

How did cut and laceration cases compare with all nonfatal injury and illness cases by sex of worker in 2001?

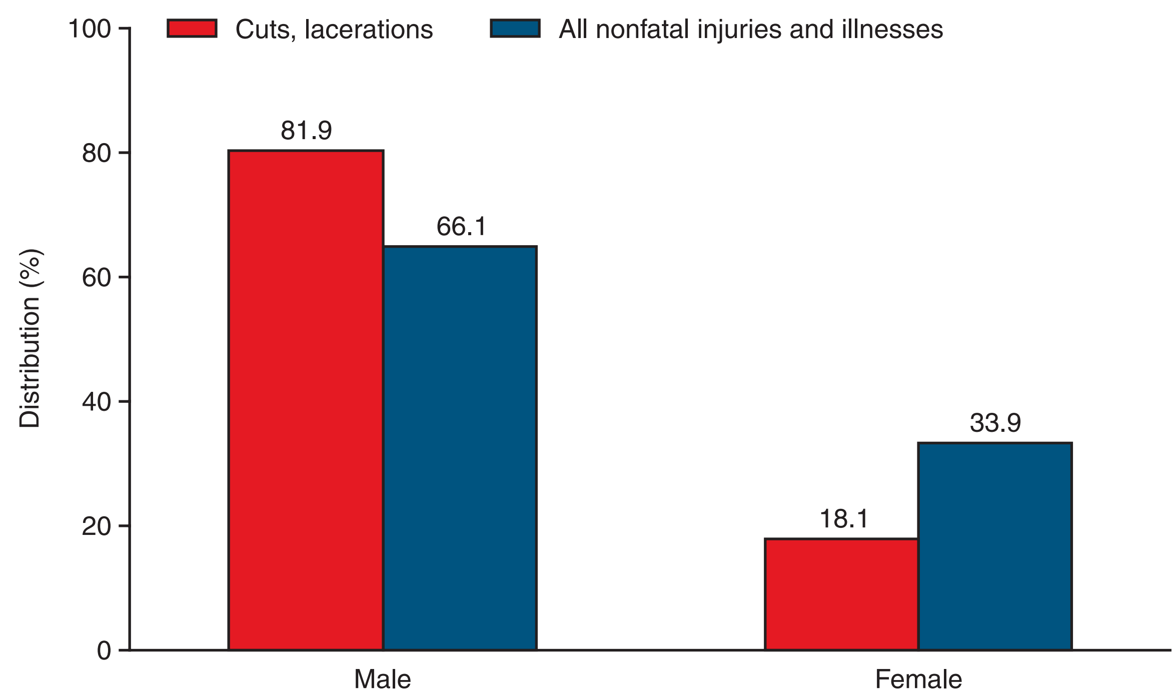
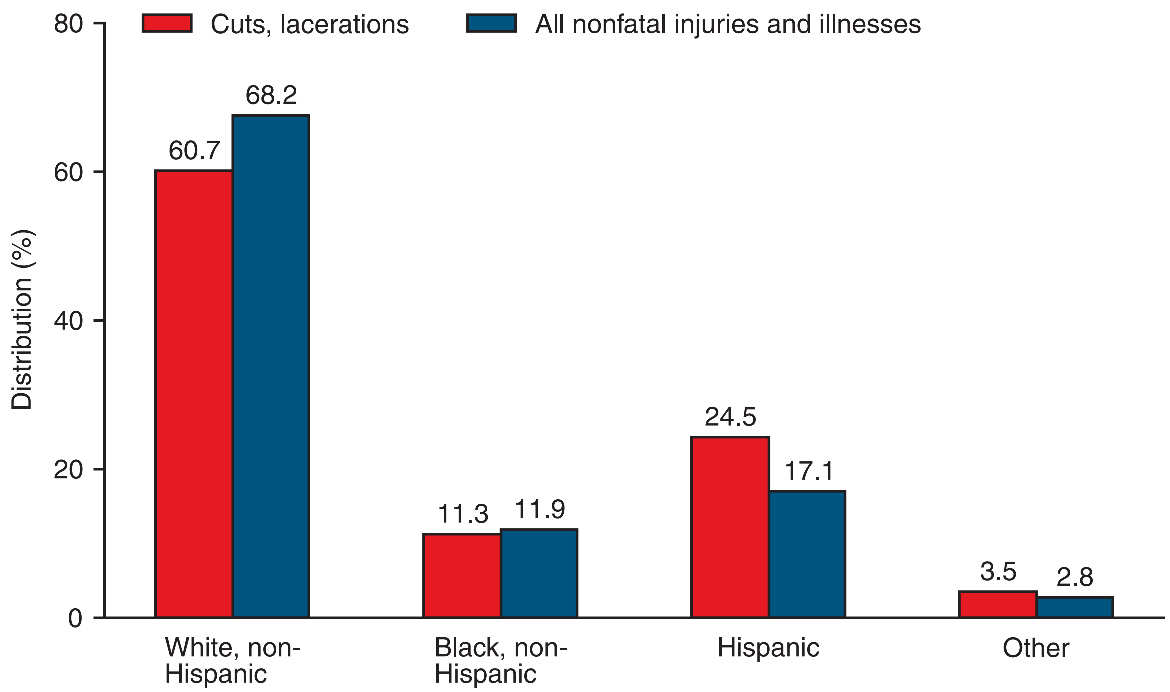


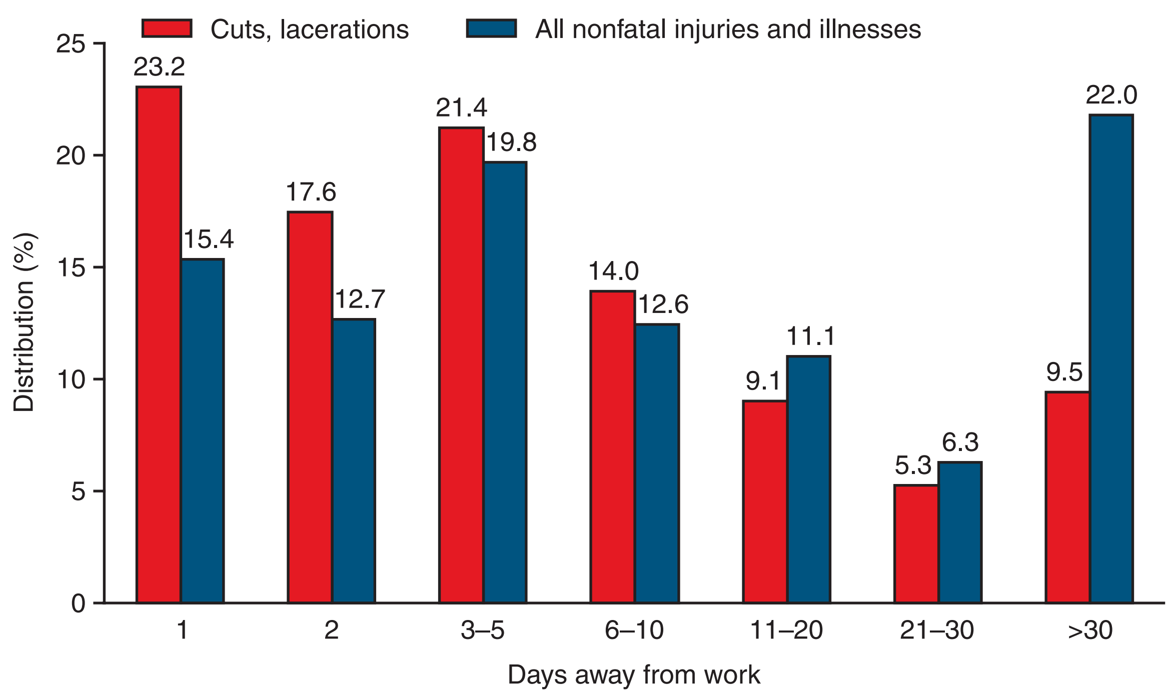
Figure 2–121. Distribution of cut and laceration cases and all nonfatal injury and illness cases involving days away from work in private industry by sex, 2001. Male workers accounted for more cut and laceration cases than all nonfatal injury and illness cases (81.9% versus 66.1%). Female workers accounted for fewer cut and laceration cases than all nonfatal injury and illness cases (18.1% versus 33.9%). ***(Source: BLS [2003a].)***



Race/Ethnicity

How did cut and laceration cases compare with all nonfatal injury and illness cases by race/ethnicity in 2001?

Figure 2–122. Distribution of cut and laceration cases and all nonfatal injury and illness cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 87,995 of the 114,791 BLS-estimated cut and laceration cases involving days away from work in 2001. White, non-Hispanic workers accounted for fewer cut and laceration cases (60.7%) than all nonfatal injury and illness cases (68.2%). Black, non-Hispanic workers accounted for 11.3% of cut and laceration cases, and Hispanic workers accounted for 24.5%— a much greater percentage than the 17.1% reported for all nonfatal injury and illness cases. ***(Source: BLS [2003a].)***



Severity

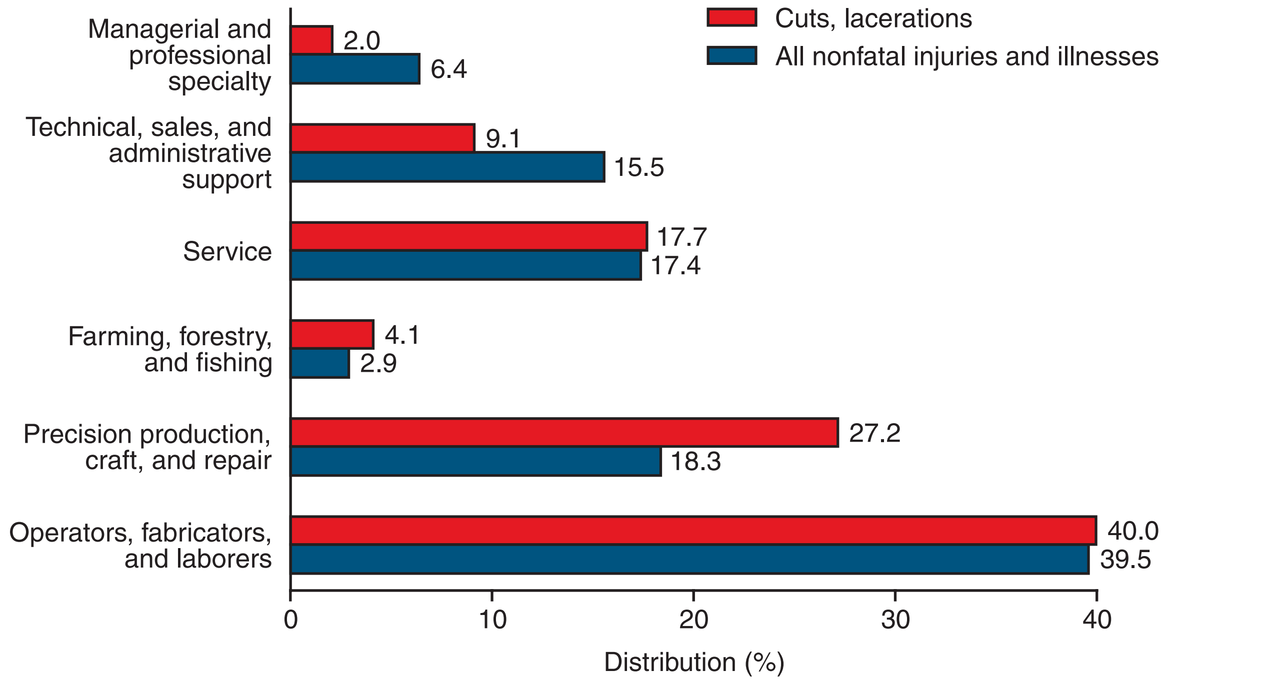
How did cut and laceration cases compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–123. Distribution of cut and laceration cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Compared with all nonfatal injury and illness cases in 2001, cut and laceration cases involved more short-term disability (periods of 1–10 days away from work). The median number of days away from work was 3 for cut and laceration cases and 6 for all nonfatal injury and illness cases. ***(Source: BLS [2003a].)***

Occupation

How did cut and laceration cases compare with all nonfatal injury and illness cases by occupation in 2001?

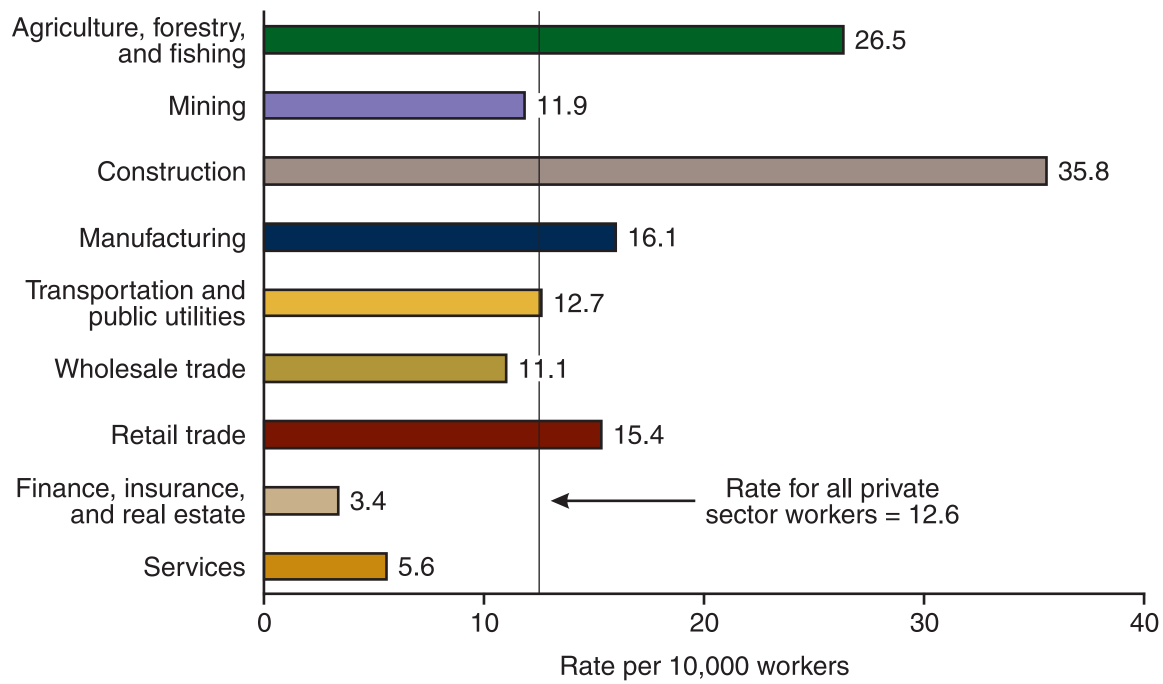
Figure 2–124. Distribution of cut and laceration cases and all nonfatal injury and illness cases involving days away from work in private industry by occupation, 2001. Two occupational groups accounted for the majority (67.2%) of cut and laceration cases in 2001: operators, fabricators, and laborers (40% versus 39.5% for all nonfatal injuries and illnesses) and precision production, craft, and repair (27.2%, versus 18.3% for all nonfatal injuries and illnesses). ***(Source: BLS [2003a].)***

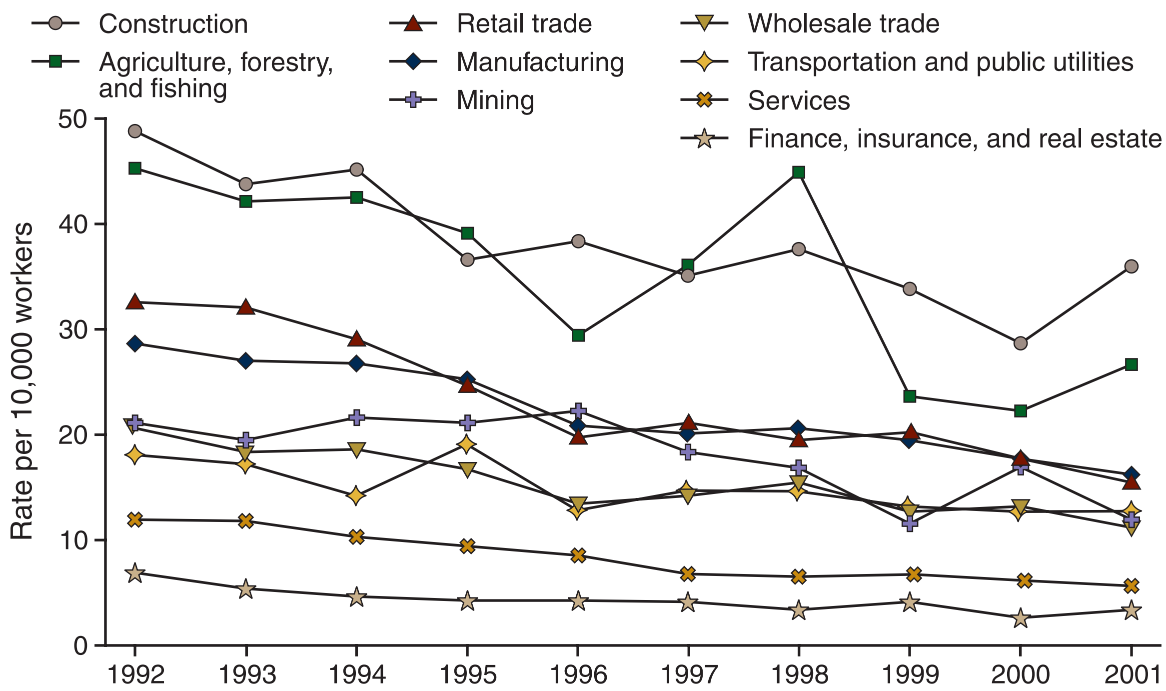


Industry

How did the rate of cut and laceration cases differ by private industry sector in 2001?

Figure 2–125. Incidence rate of cut and laceration cases in private industry by industry sector, 2001. For 2001, incidence rates exceeding the private-sector rate of 12.6 per 10,000 full-time workers were reported for construction (35.8 per 10,000 full-time workers or 21,849 cases), agriculture, forestry, and fishing (26.5 per 10,000 full-time workers or 3,984 cases), manufacturing (16.1 per 10,000 full-time workers or 27,881 cases), and retail trade (15.4 per 10,000 full-time workers or 26,739 cases). ***(Source: BLS [2003a].)***





How did the rates of cut and laceration cases change by private industry sector during 1992–2001?

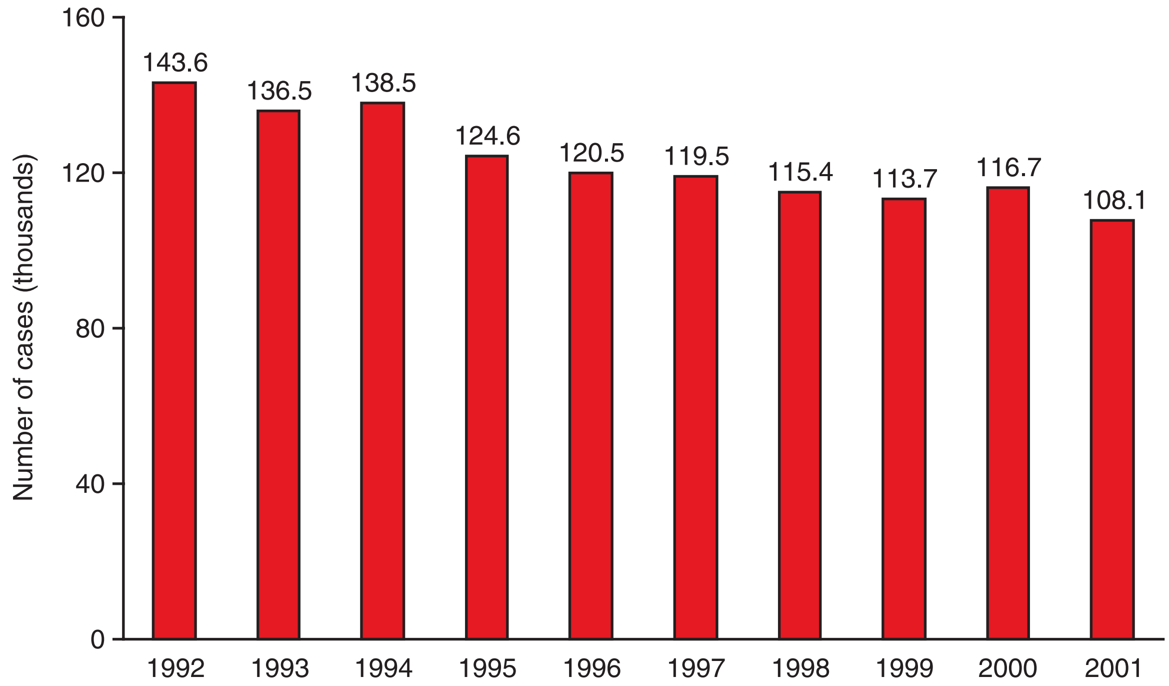
Figure 2–126. Annual rates of cut and laceration cases involving days away from work by private industry sector, 1992–2001. The annual rate of cut and laceration cases declined 44.5% during 1992–2001, and rates declined for each major industry sector. Two sectors (construction and agriculture, forestry, and fishing) had consistently higher rates than other industry sectors during this 10-year period and experienced rate reductions of 26.3% and 41.2%, respectively. ***(Sources: BLS [2003a,b].)***

Fractures

Fractures accounted for 7.0% of all reported nonfatal injuries and illnesses involving days away from work in 2001. This category includes both open (compound) and closed fractures of bone and teeth. The category excludes cases of fractures or broken cartilage unless accompanied by a fracture of a bone or tooth. Fracture cases are severe injuries. In 2001, they involved a median of 21 days away from work (Figure 2–134) compared with a median of 6 days for all nonfatal injuries and illnesses [BLS 2003a].

In 1999, an estimated 210,000 occupational fractures were treated in U.S. hospital emergency departments. This number corresponded to a rate of 15.9 fractures per 10,000 full-time workers. Although workers aged 35–44 experienced the highest number of fractures, workers aged 15–24 had the highest rate of fractures. Workers aged 55 and older had the smallest number of fractures, but they experienced a slightly higher rate of fractures than workers aged 25–54 (Figure 2–129). Men experienced 2 to 3 times more fractures at work than women. (Figure 2–131).

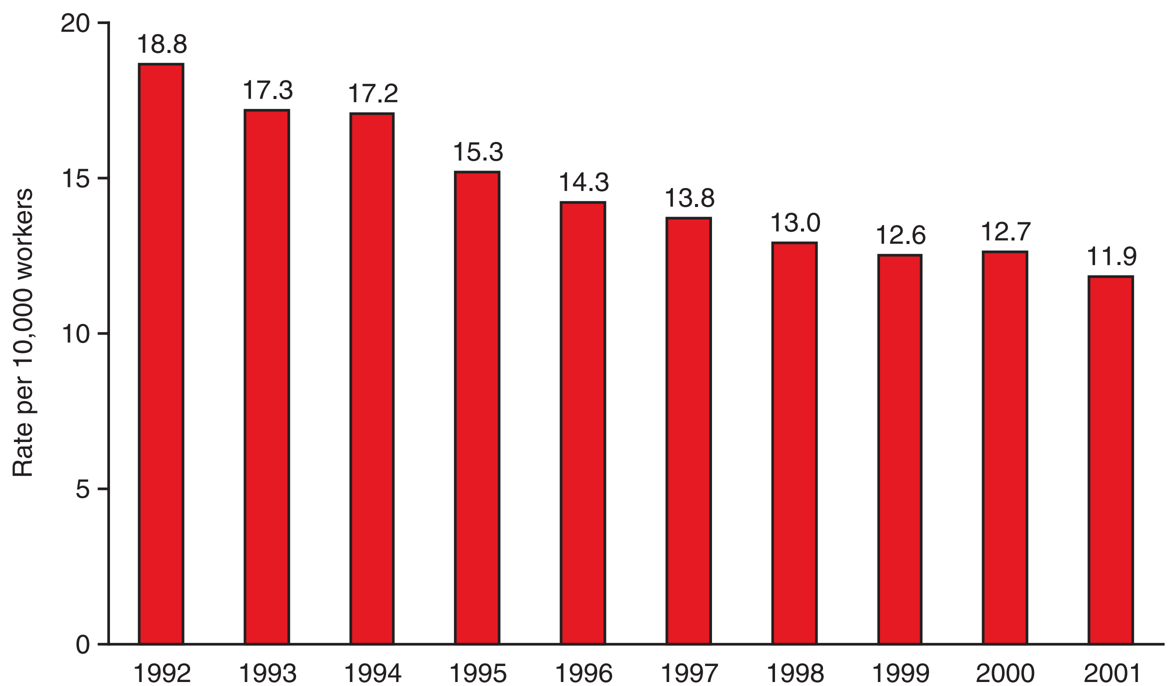
BLS reported 108,127 fracture cases involving days away from work in 2001 (Figure 2–127). Rates declined 36.7% during 1992–2001, from 18.8 per 10,000 full-time workers in 1992 to 11.9 in 2001 (Figure 2–128). Most cases involved workers who were aged 25–54 (71.0%) (Figure 2–130), male (73.8%) (Figure 2–132), and white, non-Hispanic (73.9%) (Figure 2–133). Two occupational groups accounted for more than 63% of fracture cases: operators, fabricators, and laborers (41.7%) and precision production, craft, and repair (22.2%) (Figure 2–135). Rates exceeding the private-sector rate were reported for construction (32.5 per 10,000 full-time workers), mining (25.4), agriculture, forestry, and fishing (21.7), transportation and public utilities (20.9), and manufacturing (13.0) (Figure 2–136). Three industry sectors (construction, mining, and agriculture, forestry, and fishing) had consistently higher rates than other sectors during this 10-year period and experienced rate reductions of 38.9%, 35.5%, and 33.6%, respectively (Figure 2–137).



Magnitude and Trend

How did the number of fracture cases change during 1992–2001?

Figure 2–127. Number of fracture cases involving days away from work in private industry, 1992–2001. The annual number of fracture cases involving days away from work in 2001 declined 24.7% during 1992–2001, from 143,627 cases in 1992 to 108,127 cases in 2001. ***(Sources: BLS [2003a,b].)***



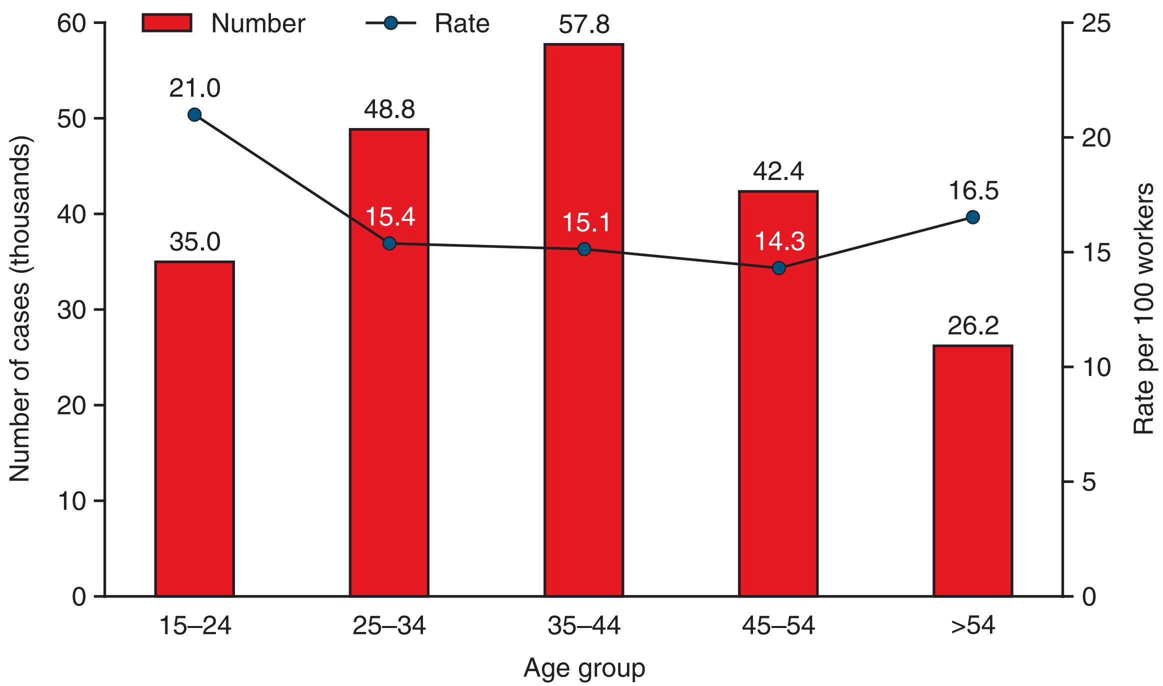
How did the annual rates of fracture cases change during 1992–2001?

Figure 2–128. Annual rates of fracture cases involving days away from work in private industry, 1992–2001. The annual rate of fracture cases involving days away from work declined 36.7% during 1992–2001, from 18.8 per 10,000 full-time workers in 1992 to 11.9 in 2001. ***(Sources: BLS [2003a,b].)***

Age

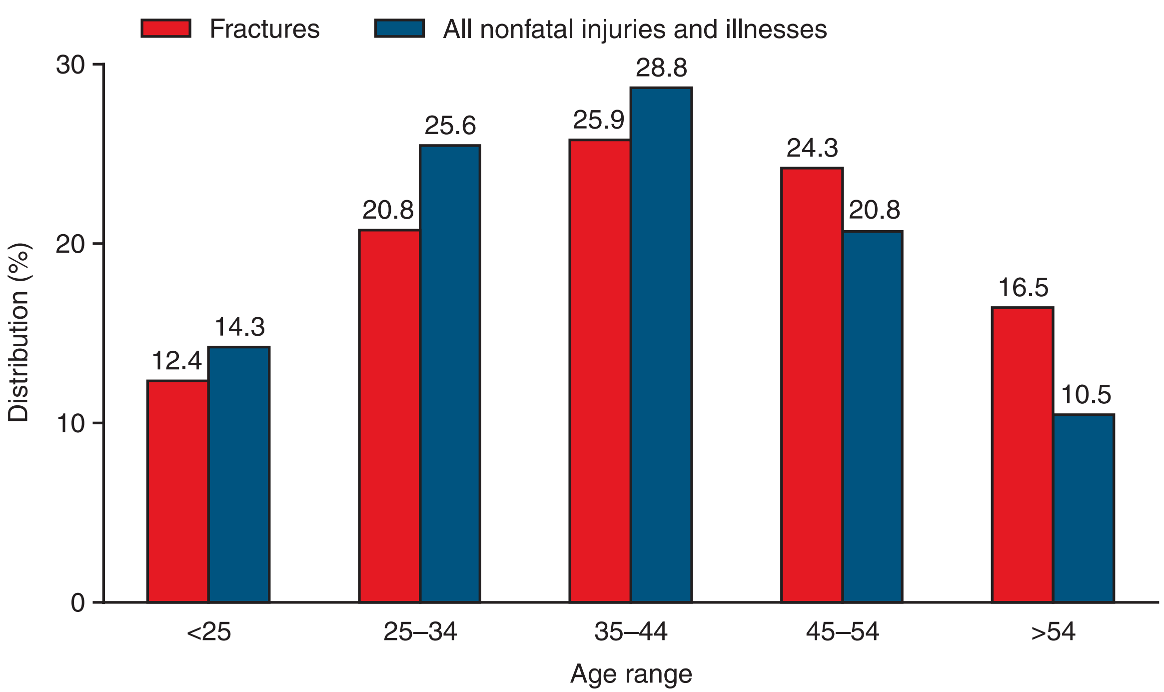
How did occupational fractures treated in hospital emergency departments differ by age of worker in 1999?

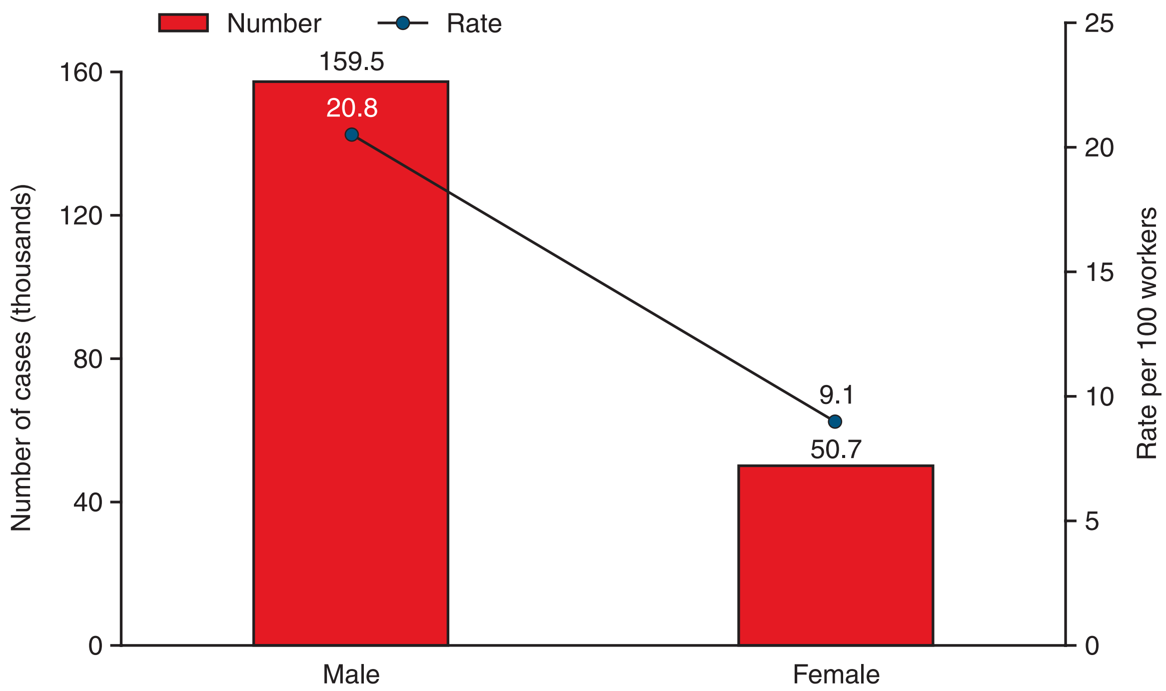
Figure 2–129. Number and rate of nonfatal occupational fractures treated in emergency departments, by age of worker, 1999. In 1999, an estimated 210,000 occupational fractures were treated in U.S. hospital emergency departments. This number corresponded to a rate of 15.9 fractures per 10,000 full-time workers. Although workers aged 35–44 experienced the highest number of fractures, workers aged 15–24 had the highest rate of fractures. Workers aged 55 and older had the smallest number of fractures, but they experienced a slightly higher rate of fractures than workers aged 25–54. ***(Sources: NEISS [2003]; Jackson [2003].)***



How did fracture cases compare with all nonfatal injury and illness cases by age of worker in 2001?

Figure 2–130. Distribution of fracture cases and all nonfatal injury and illness cases involving days away from work in private industry by age, 2001. Age data are available for 107,001 of the 108,127 BLS-estimated fracture cases involving days away from work in 2001. Overall, three age groups (25–34, 35–44, and 45–54) accounted for 71% of fracture cases and 75.2% of all nonfatal injury and illness cases. More workers were aged 45 or older in fracture cases (40.8%) than in all nonfatal injury and illness cases (31.3%). ***(Source: BLS [2003a].)***

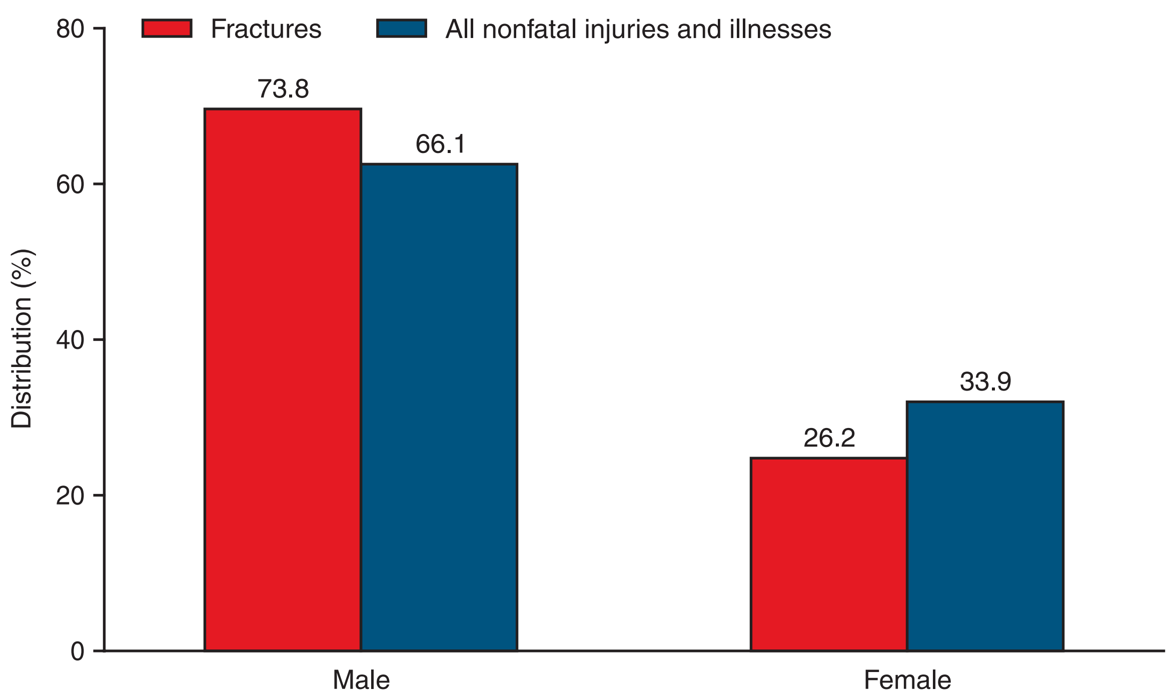




Sex

How did occupational fractures treated in hospital emergency departments differ by sex of worker in 1999?

Figure 2–131. Number and rate of nonfatal occupational fractures treated in emergency departments, by sex of worker, 1999. Men experienced 2 to 3 times more fractures at work than women. ***(Sources: NEISS [2003]; Jackson [2003].)***



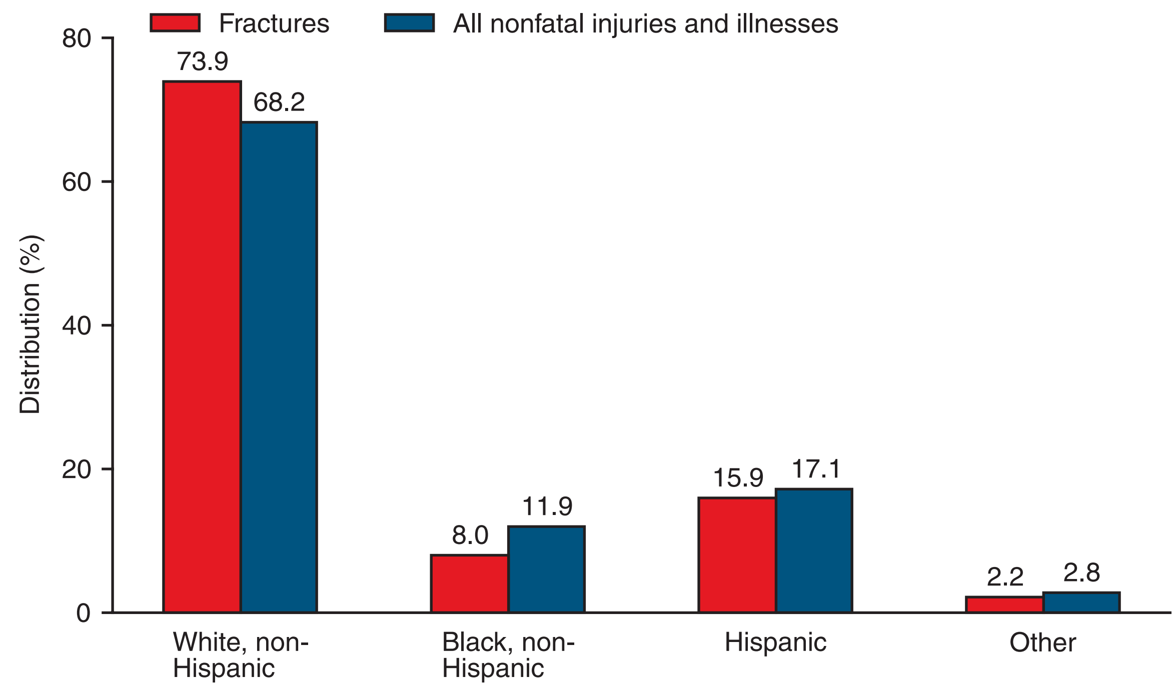
How did fracture cases compare with all nonfatal injury and illness cases by sex of worker in 2001?

Figure 2–132. Distribution of fracture cases and all nonfatal injury and illness cases involving days away from work in private industry by sex, 2001. Male workers accounted for a larger proportion of fracture cases (73.8%) than all nonfatal injury and illness cases (66.1%). However, female workers accounted for a smaller proportion of fracture cases (26.2%) than all nonfatal injury and illness cases (33.9%). ***(Source: BLS [2003a].)***

Race/Ethnicity

How did fracture cases compare with all nonfatal injury and illness cases by race/ethnicity in 2001?

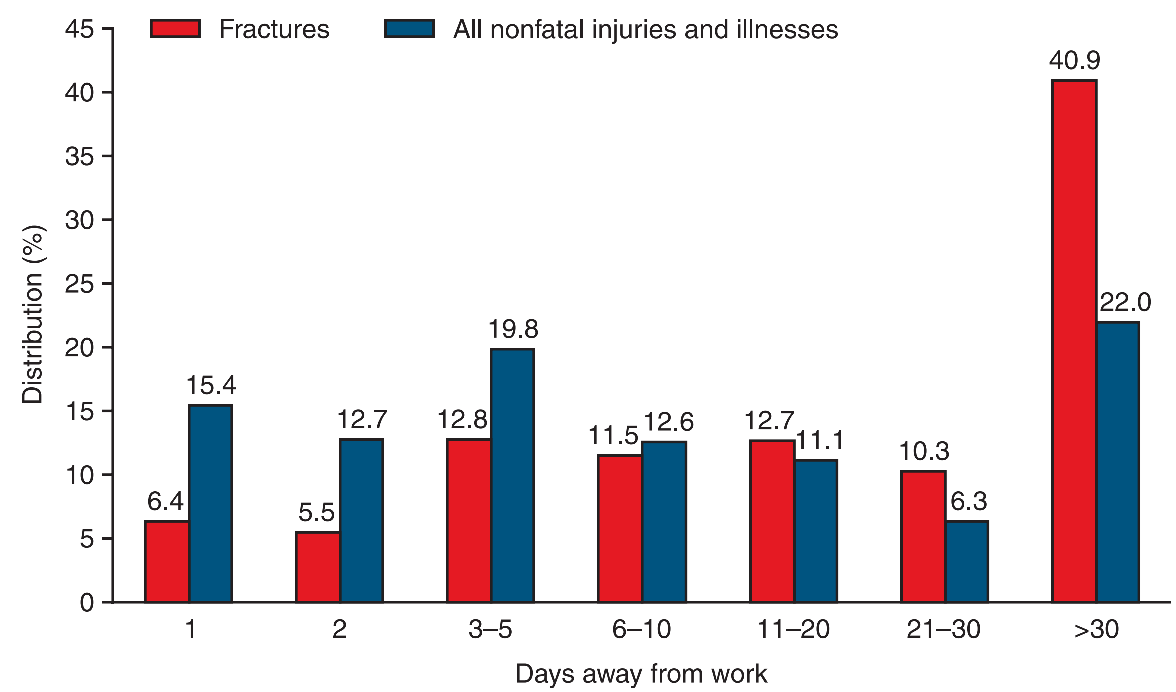
Figure 2–133. Distribution of fracture cases and all nonfatal injury and illness cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 84,480 of the 108,127 BLS-estimated fracture cases involving days away from work in 2001. White, non-Hispanic workers accounted for a greater proportion of fracture cases (73.9%) than for all nonfatal injury and illness cases (68.2%). Black, non-Hispanic workers accounted for 8% of fracture cases and Hispanic workers accounted for 15.9%—both smaller proportions than reported for all nonfatal injury and illness cases. *(Source: BLS [2003a].)*

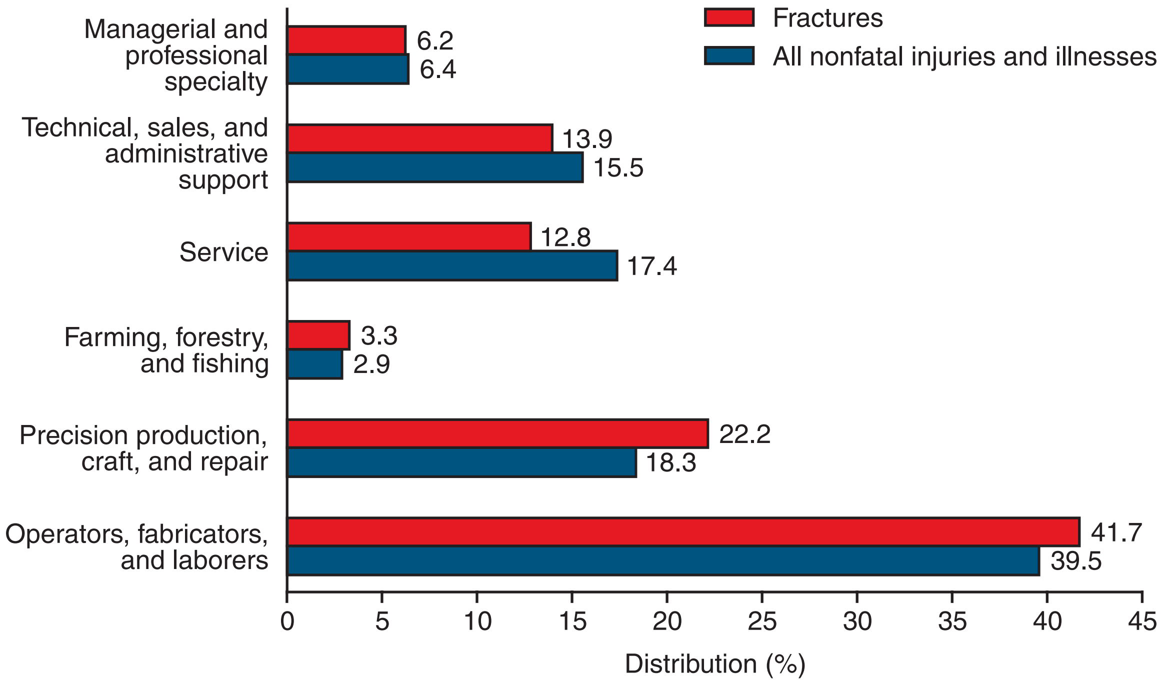


Severity

How did fracture cases compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–134. Distribution of fracture cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. In 2001, fracture cases involved more long-term work loss (11–20 or more days away from work) than all nonfatal injuries and illnesses (63.9% versus 39.4%). Fracture cases involved a median of 21 days away from work—3.5 times the median of 6 days for all nonfatal injury and illness cases. *(Source: BLS [2003a].)*

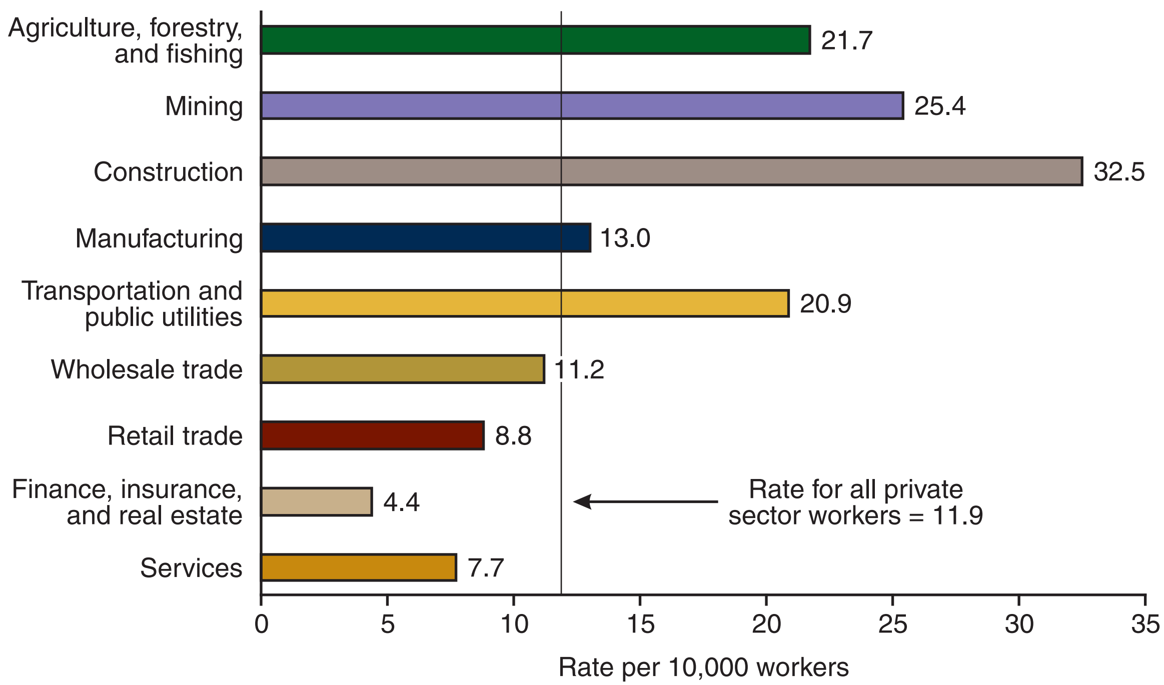




Occupation

How did fracture cases compare with all nonfatal injury and illness cases by occupation in 2001?

Figure 2–135. **Distribution of fracture cases and all nonfatal injury and illness cases involving days away from work in private industry by occupation, 2001.** Two occupational groups accounted for the majority (63.9%) of all fracture cases in 2001: operators, fabricators, and laborers and precision production, craft, and repair. These two groups accounted for 57.8% of all nonfatal injury and illness cases. *(Source: BLS [2003a].)*



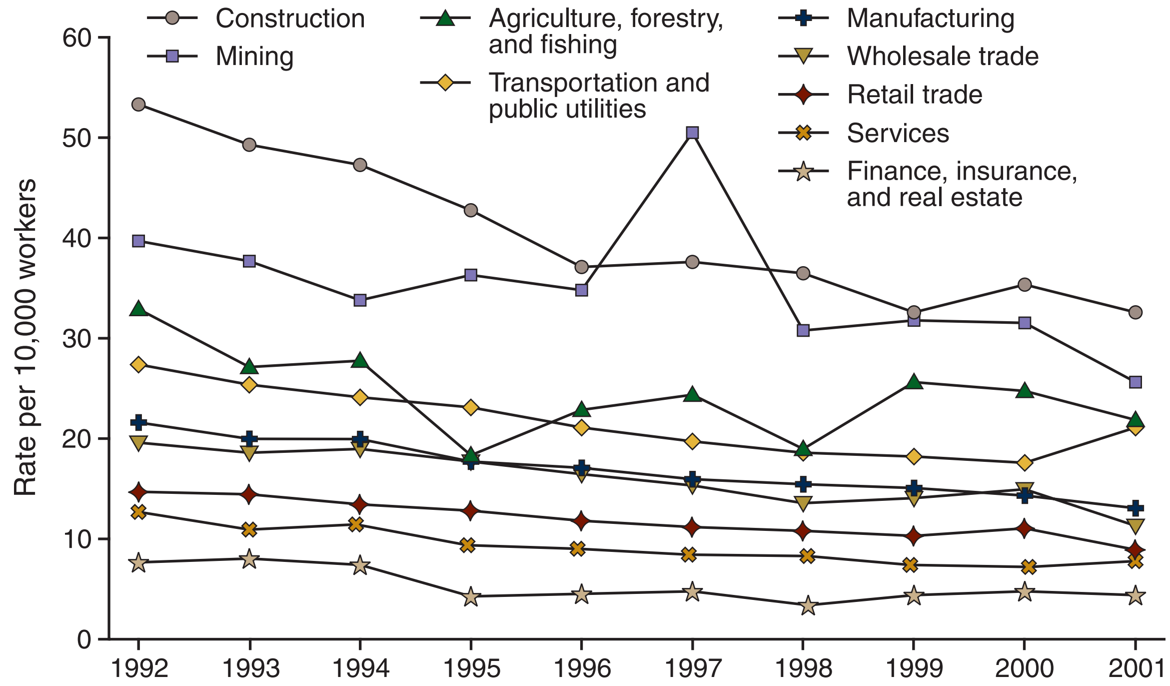
Industry

How did the rate of fracture cases differ by private industry sector in 2001?

Figure 2–136. **Incidence rate of fracture cases by private industry sector, 2001.** Private industry reported an incidence rate of 11.9 per 10,000 full-time workers for fracture cases in 2001. Incidence rates exceeding the private-sector rate were reported for construction (32.5 per 10,000 full-time workers or 19,786 cases), mining (25.4 per 10,000 full-time workers or 1,505 cases), agriculture, forestry, and fishing (21.7 per 10,000 full-time workers or 3,260 cases), transportation and public utilities (20.9 per 10,000 full-time workers or 13,758 cases), and manufacturing (13.0 per 10,000 full-time workers or 22,493 cases). *(Source: BLS [2003a].)*

How did the rates of fracture cases change by private industry sector during 1992–2001?

Figure 2–137. Annual rates of fracture cases involving days away from work by private industry sector, 1992–2001. The annual rate of fracture cases in the private sector declined 36.7% during 1992–2001. Rate reductions occurred among each of the major industry sectors. Three sectors (construction, mining, and agriculture, forestry, and fishing) had higher rates than other industry sectors during this 10-year period. They experienced rate reductions of 38.9%, 35.5%, and 33.6%, respectively. ***(Sources: BLS [2003a,b].)***



Sprains, Strains, and Tears

Sprains, strains, and tears accounted for 4 out of 10 nonfatal injuries and illnesses involving days away from work in 2001 [BLS 2003e]. Sprains, strains, and tears constituted the leading injury and illness category for every major private industry division. Slightly more than a fourth of these cases (27.3%) resulted from overexposure to lifting, and 45.1% of the cases were back sprains, strains, or tears [BLS 2003e]. Sprain, strain, and tear cases include avulsion, hemarthrosis, rupture, strain, sprain, or tear of joint capsule, ligament, muscle, or tendon. Sprain, strain, and tear cases are of moderate severity (Figure 2–143). In 2001, they involved a median of 6 days away from work—the same median reported for all nonfatal injuries and illnesses [BLS 2003a].

BLS reported 669,889 sprain, strain, and tear cases involving days away from work in 2001 (Figure 2–138). Rates declined 44.9% during 1992–2001, from 133.7 per 10,000 full-time workers in 1992 to 73.7 in 2001 (Figure 2–139). Most cases involved workers who were aged 25–54 (77.8%) (Figure 2–140), male (64.1%) (Figure 2–141), and white, non-Hispanic (69.9%) (Figure 2–142). Two occupational groups accounted for more than 57.6% of sprain, strain, and tear cases: operators, fabricators, and laborers (38.8%) and service workers (18.8%) (Figure 2–144). Rates exceeding the private-sector rate were reported for transportation and public utilities (147 per 10,000 full-time workers), construction (116.8), agriculture, forestry, and fishing (91.6), and wholesale trade (81.2) (Figure 2–145). Two industry sectors (transportation and public utilities and construction) had consistently higher rates than other sectors during this 10-year period. These sectors experienced rate reductions of 41.5% and 30.4%, respectively (Figure 2–146).

Magnitude and Trend

How did the number of sprain, strain, and tear cases change during 1992–2001?

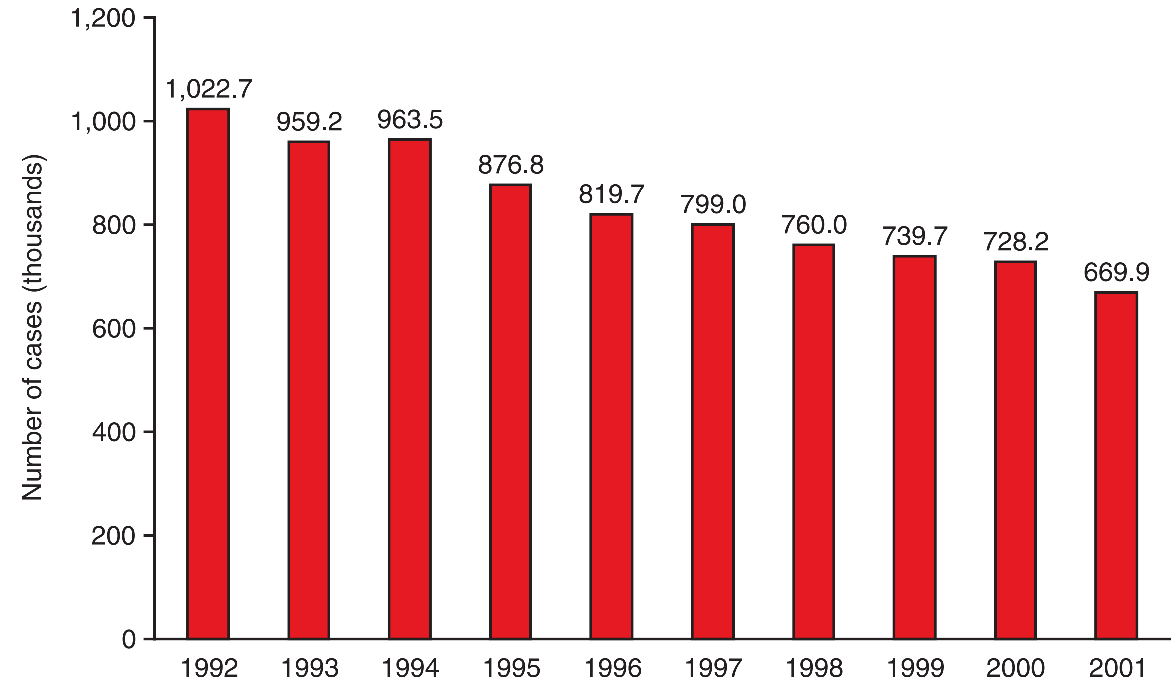


Figure 2–138. Number of sprain, strain, and tear cases involving days away from work in private industry, 1992–2001. The annual number of sprain, strain, and tear cases involving days away from work declined 34.5% during 1992–2001, from 1,022,746 cases in 1992 to 669,889 cases in 2001. *(Sources: BLS [2003a,b].)*

How did the rates of sprain, strain, and tear cases change during 1992–2001?

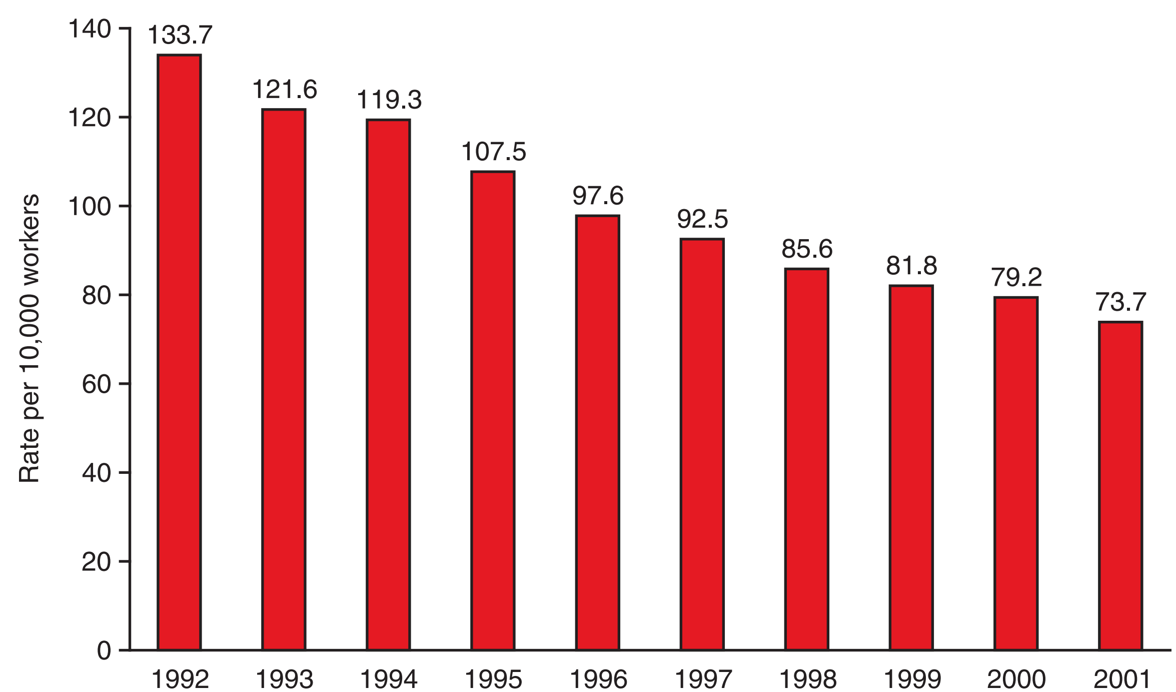
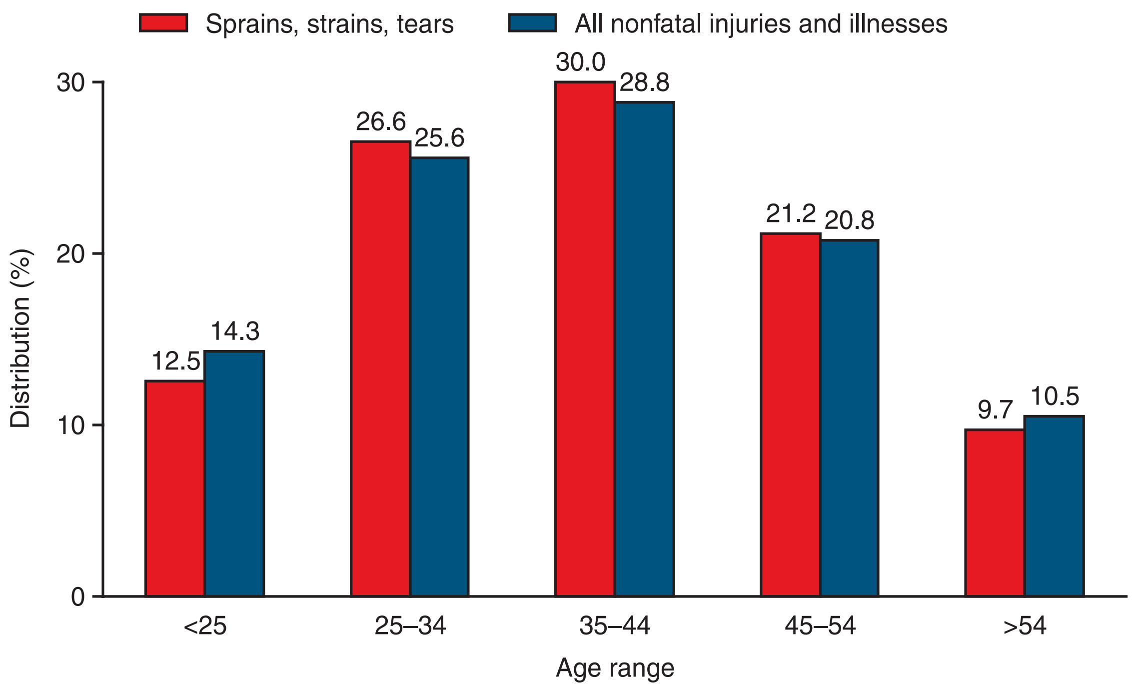


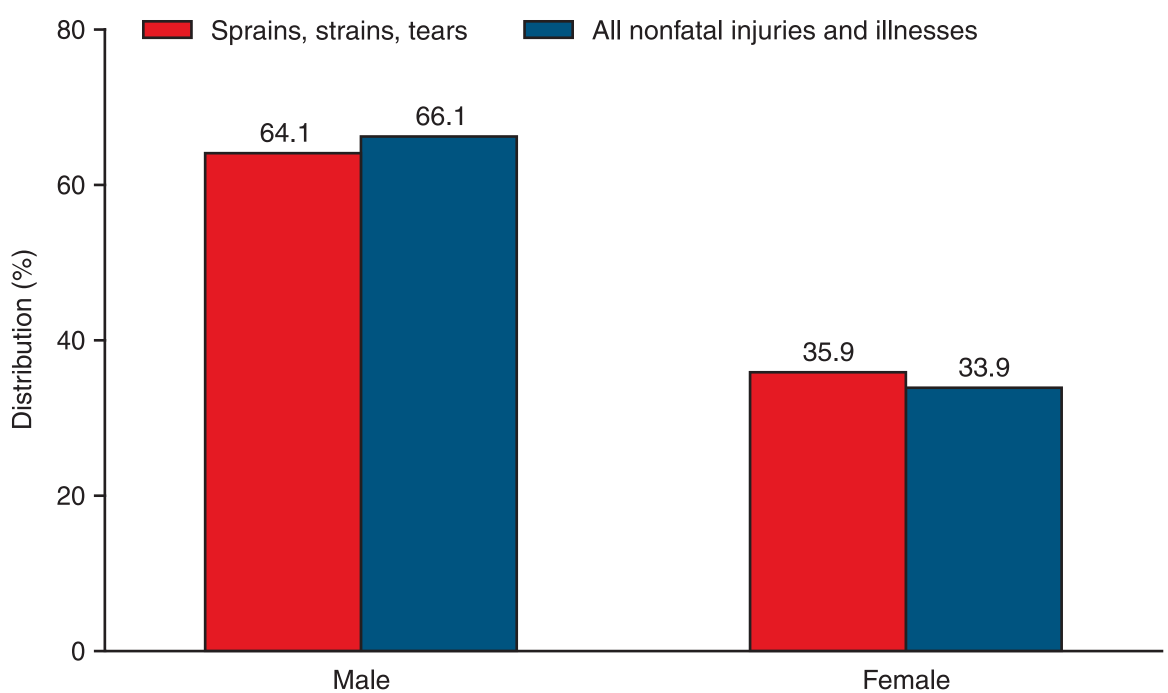
Figure 2–139. Annual rates of sprain, strain, and tear cases involving days away from work in private industry, 1992–2001. The annual rate of sprain, strain, and tear cases involving days away from work declined 44.9% during 1992–2001, from 133.7 per 10,000 full-time workers in 1992 to 73.7 in 2001. *(Sources: BLS [2003a,b].)*



Age

How did sprain, strain, and tear cases compare with all nonfatal injury and illness cases by age of worker in 2001?

Figure 2–140. Distribution of sprain, strain, and tear cases and all nonfatal injury and illness cases involving days away from work in private industry by age, 2001. Age data are available for 663,779 of the 669,889 BLS-estimated sprain, strain, and tear cases involving days away from work in 2001. Overall, three age groups (25–34, 35–44, and 45–54) accounted for 77.8% of sprain, strain, and tear cases compared with 75.2% of all nonfatal injury and illness cases. ***(Source: BLS [2003a].)***



Sex

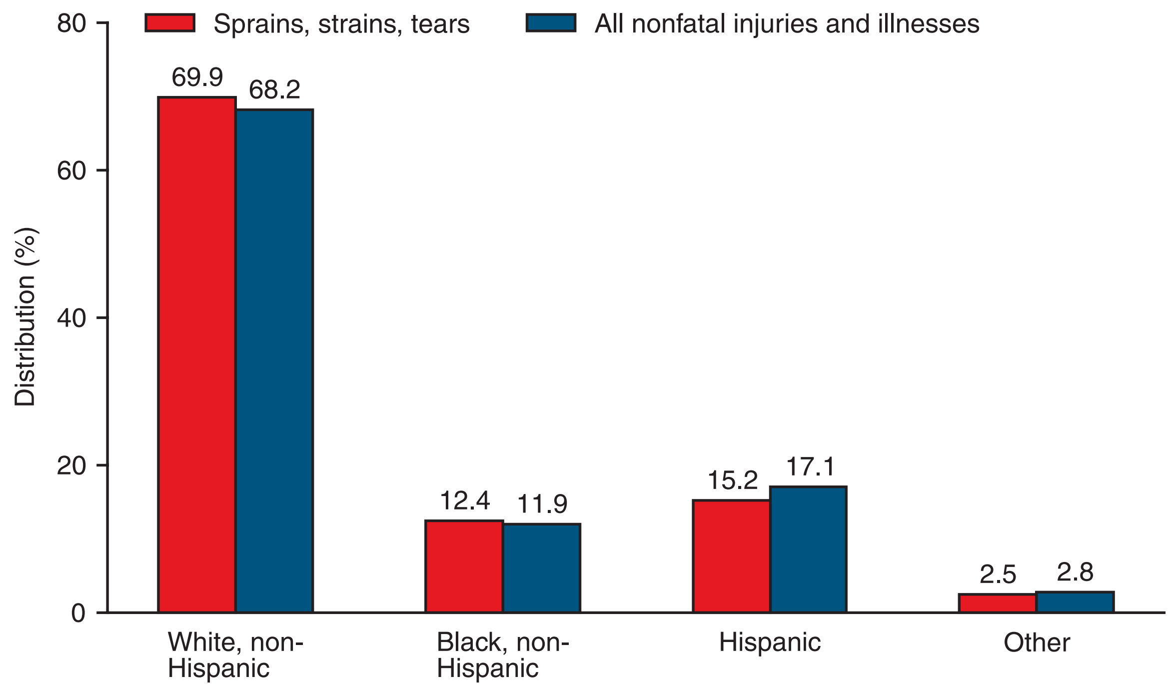
How did sprain, strain, and tear cases compare with all nonfatal injury and illness cases by sex of worker in 2001?

Figure 2–141. Distribution of sprain, strain, and tear cases and all nonfatal injury and illness cases involving days away from work in private industry by sex, 2001. Male workers accounted for 64.1% of sprain, strain, and tear cases compared with 66.1% of all nonfatal injury and illness cases. Female workers accounted for 35.9% of sprain, strain, and tear cases compared with 33.9% of all nonfatal injury and illness cases (33.9%). ***(Source: BLS [2003a].)***

Race/Ethnicity

How did sprain, strain, and tear cases compare with all nonfatal injury and illness cases by race/ethnicity in 2001?

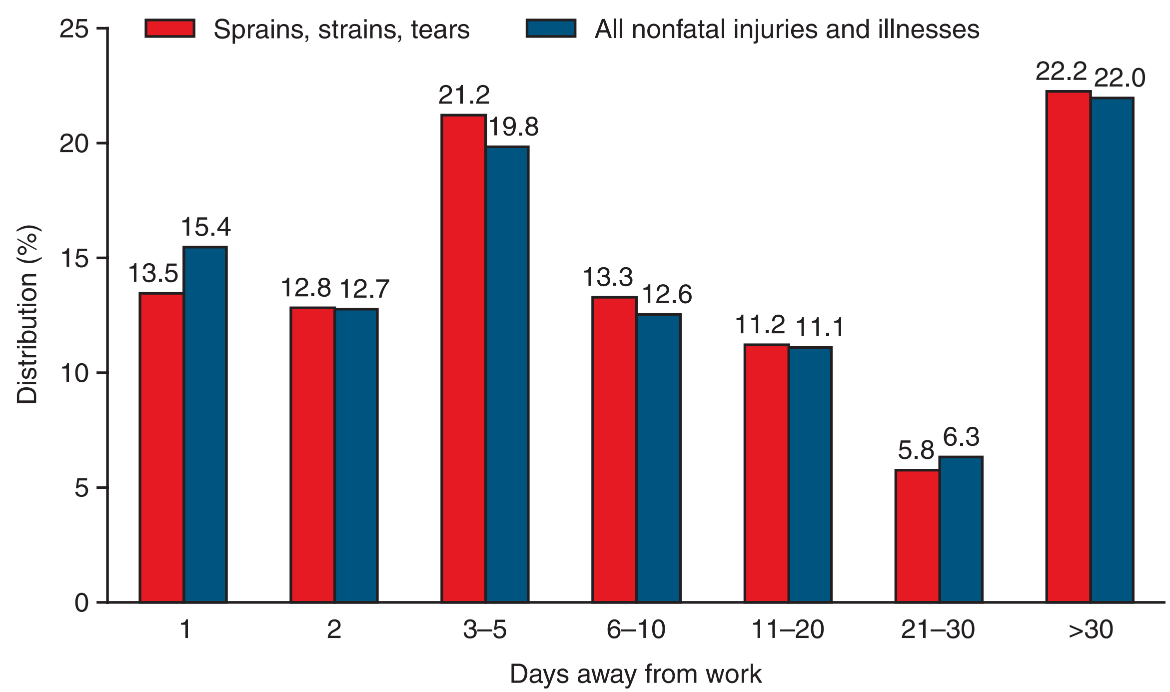
Figure 2–142. Distribution of sprain, strain, and tear cases and all nonfatal injury and illness cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 481,012 of the 669,889 BLS-estimated sprain, strain, and tear cases involving days away from work in 2001. White, non-Hispanic workers accounted for more sprain, strain, and tear cases (69.9%) than all nonfatal injury and illness cases (68.2%). Black, non-Hispanic workers accounted for 12.4% of sprain, strain, and tear cases, and Hispanic workers accounted for 15.2%. ***(Source: BLS [2003a].)***

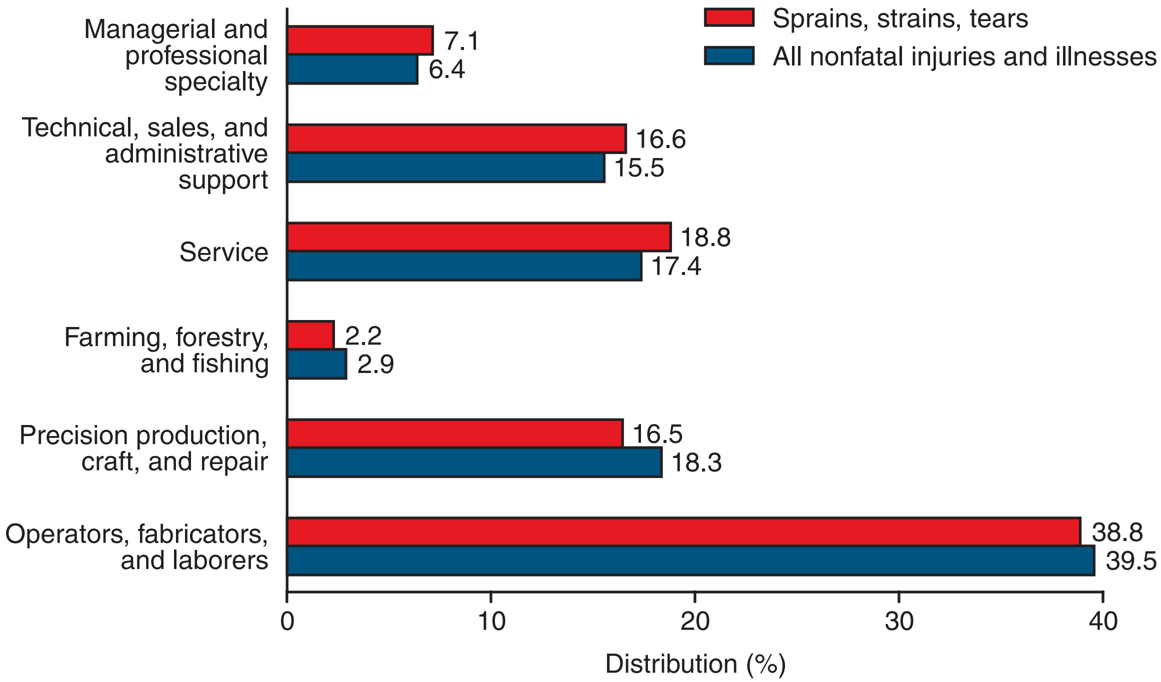


Severity

How did sprain, strain, and tear cases compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–143. Distribution of sprain, strain, and tear cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Compared with all nonfatal injuries and illnesses in 2001, sprains, strains, and tears involved a higher percentage of cases with 3–5 days away from work (21.2% compared with 19.8%). But overall, the distributions of work losses were similar. This similarity was reflected by the median of 6 days away from work for both types of cases. ***(Source: BLS [2003a].)***

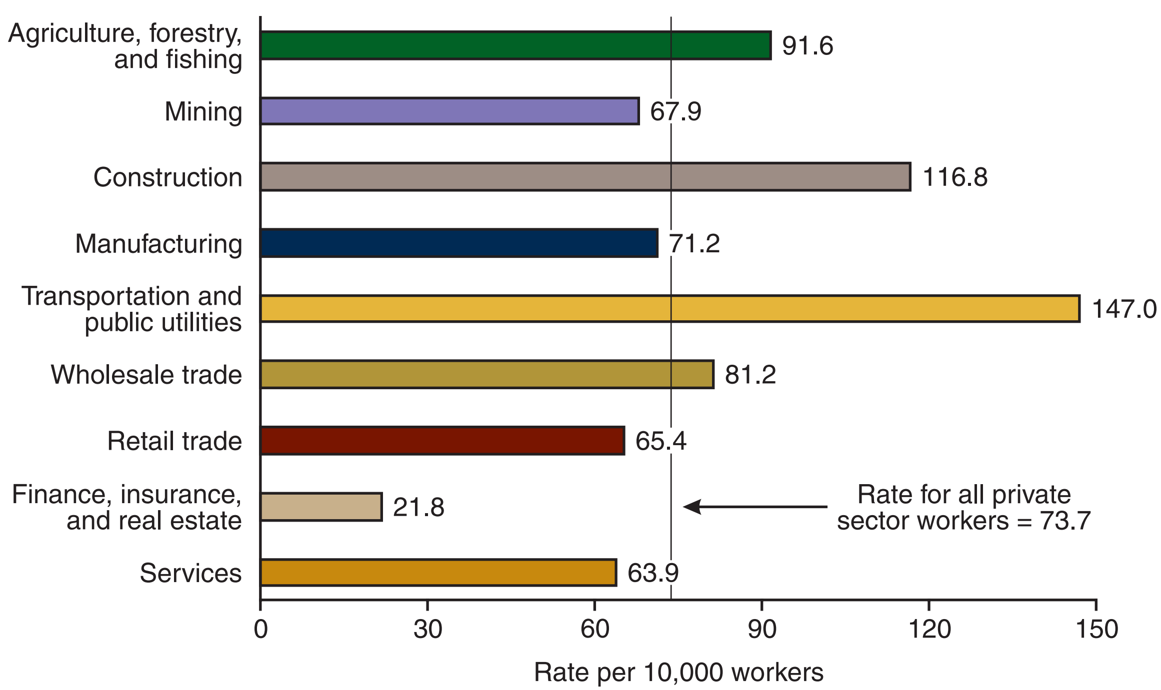




Occupation

How did sprain, strain, and tear cases compare with all nonfatal injury and illness cases by occupation in 2001?

Figure 2–144. Distribution of sprain, strain, and tear cases and all nonfatal injury and illness cases involving days away from work in private industry by occupation, 2001. Two occupational groups accounted for the majority (57.6%) of all sprain, strain, and tear cases: operators, fabricators, and laborers and service workers. These two groups accounted for 56.9% of all nonfatal injury and illness cases. ***(Source: BLS [2003a].)***



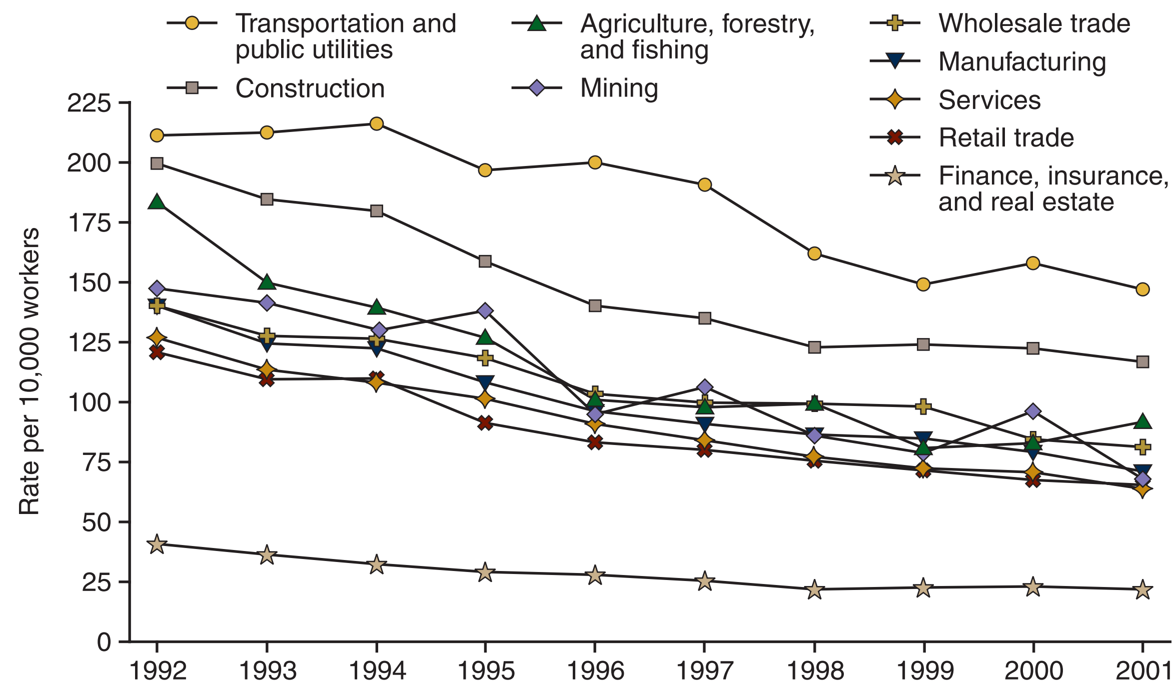
Industry

How did the rate of sprain, strain, and tear cases differ by private industry sector in 2001?

Figure 2–145. Incidence rate of sprain, strain, and tear cases by private industry sector, 2001. Private industry reported an incidence rate of 73.7 per 10,000 full-time workers for sprain, strain, and tear cases in 2001. Incidence rates exceeding the private-sector rate were reported for transportation and public utilities (147.0 per 10,000 full-time workers or 96,700 cases), construction (116.8 per 10,000 full-time workers or 71,225 cases), agriculture, forestry, and fishing (91.6 per 10,000 full-time workers or 13,758 cases), and wholesale trade (81.2 per 10,000 full-time workers or 52,261 cases). ***(Source: BLS [2003a].)***

How did the rates of sprain, strain, and tear cases change by private industry sector during 1992–2001?

Figure 2–146. Annual rates of sprain, strain, and tear cases involving days away from work by private industry sector, 1992–2001. The annual rate for sprain, strain, and tear cases declined 44.9% during 1992–2001. Rate reductions occurred for each major industry sector. Two sectors (transportation and public utilities and construction) had consistently higher rates than other industry sectors during this 10-year period. They experienced rate reductions of 41.5% and 30.4%, respectively. ***(Sources: BLS [2003a,b].)***



Disorders Due to Physical Agents

Occupational disorders due to physical agents include heatstroke, sunstroke, heat exhaustion, and other effects of environmental heat; freezing and frostbite; effects of ionizing radiation (isotopes, X-rays, and radium); and effects of nonionizing radiation (welding flash, ultraviolet rays, microwaves, and sunburn). During 1972–2001, the number of BLS-estimated disorders due to physical agents ranged from a high of approximately 30,100 cases in 1972 to a low of 8,300 cases in 1982; 14,600 cases were reported in 2001 (Figure 2–147). Rates varied during 1984–2001 from 1.3 to 2.9 per 10,000 full-time workers; in 2001, the rate was 1.6 (Figure 2–148). Within reporting States in 2001, the number of disorders due to physical agents ranged from fewer than 50 cases to 1,300 (Figure 2–149). Rates varied by State in 2001, from a reported low of 0.2 per 10,000 full-time workers in Delaware to a high of 4.1 in Nebraska. The U.S. rate was 1.6 per 10,000 full-time workers. (Figure 2–150).

Magnitude and Trend

How did the number of occupational disorders due to physical agents change during 1972–2001?

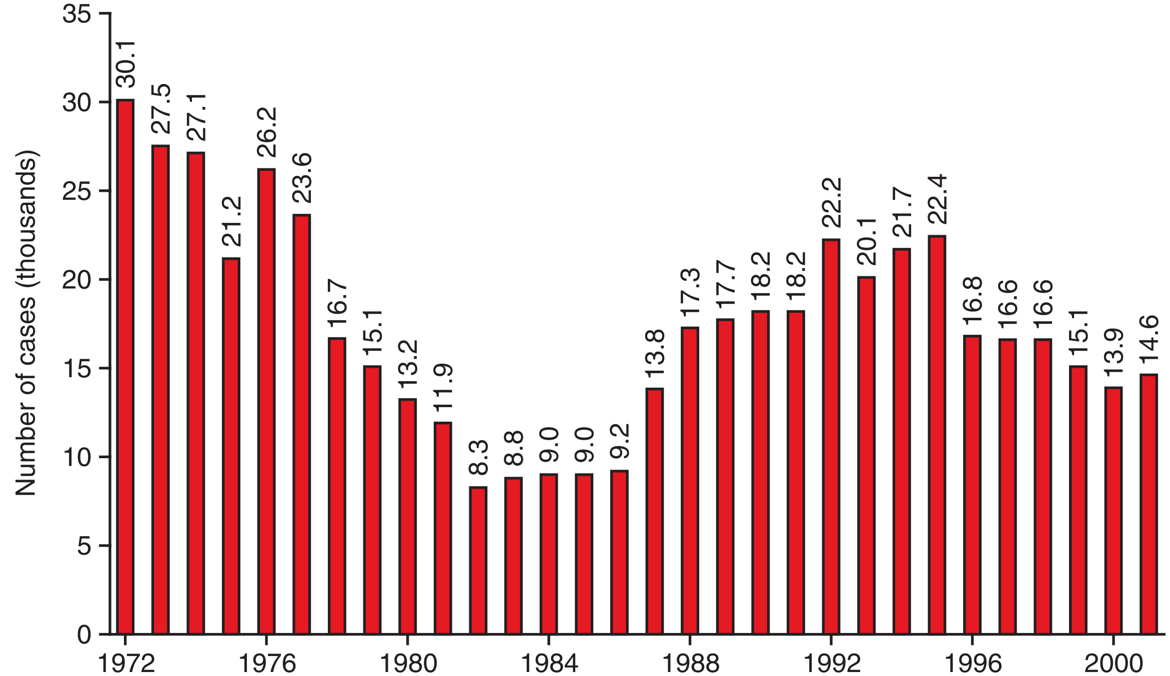


Figure 2–147. Number of occupational disorders due to physical agents in private industry, 1972–2001. The number of BLS-estimated disorders due to physical agents ranged from a high of approximately 30,100 cases in 1972 to a low of 8,300 cases in 1982. In 2001, BLS reported 14,600 cases. The pattern of increases and decreases after 1984 seems to parallel disorders associated with repeated trauma, though at substantially lower orders of magnitude. ***(Source: BLS [2002].)***

How did the rates of occupational disorders due to physical agents change during 1984–2001?

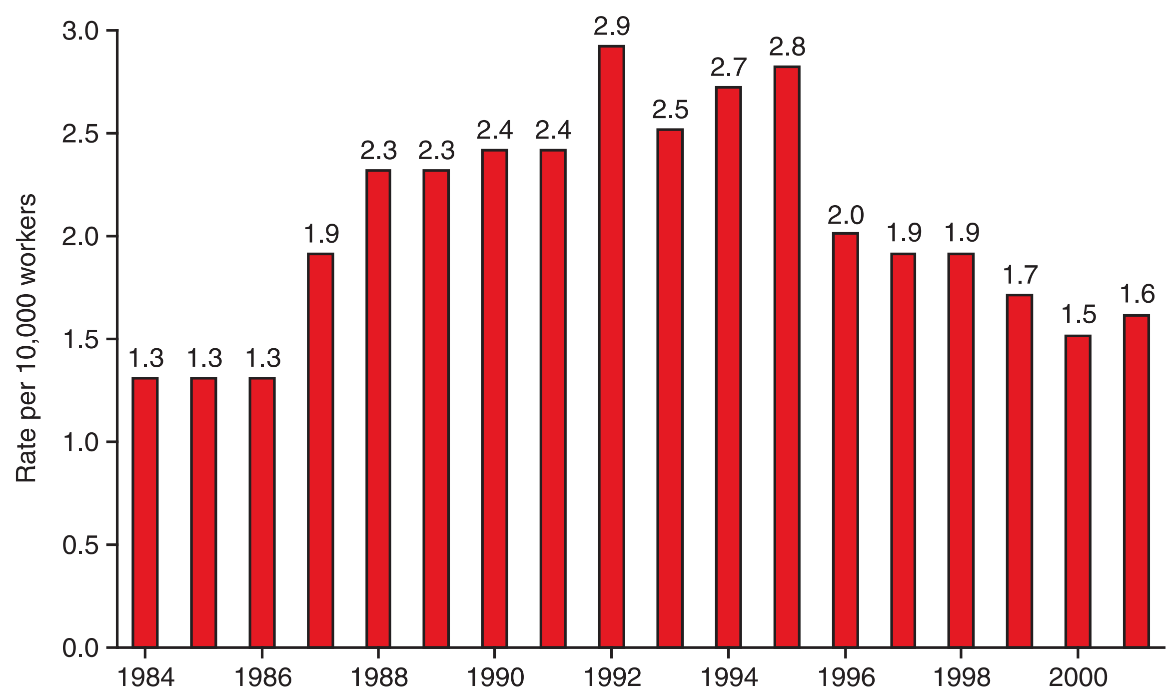


Figure 2–148. Incidence rates for occupational disorders due to physical agents in private industry, 1984–2001. BLS reported rates of disorders due to physical agents ranging from 1.3 to 2.9 per 10,000 full-time workers during 1984–2001. The rate was 1.6 per 10,000 full-time workers in 2001. Disorders due to physical agents accounted for approximately 4% of all reported illness cases. The pattern of rate increases and decreases after 1984 seems to parallel disorders associated with repeated trauma. ***(Source: BLS [2002].)***

Numbers and Rates among States

How did the number of occupational disorders due to physical agents differ by State in 2001?

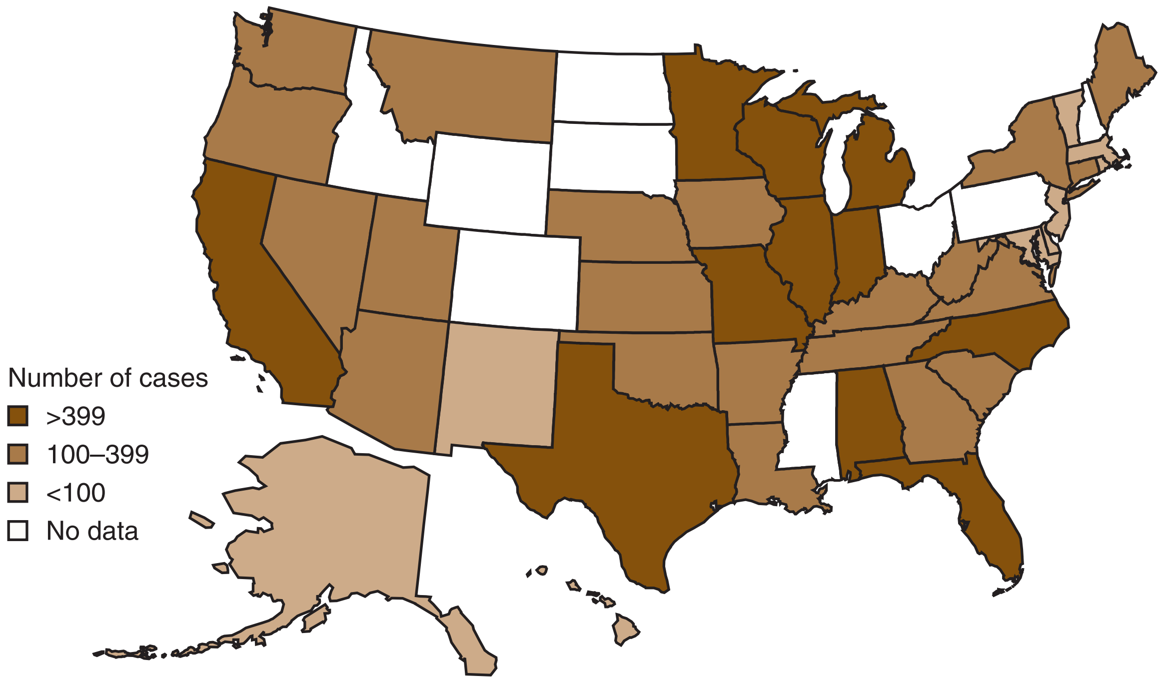


Figure 2–149. Number of occupational disorders due to physical agents in private industry by State, 2001. In 2001, the number of disorders due to physical agents within reporting States ranged from fewer than 50 cases to 1,300. States with the highest numbers included California (1,300), Michigan (1,200), Indiana (800), Illinois (700), and Wisconsin (700). *(Source: BLS [2002].)*

How did the rates of occupational disorders due to physical agents differ by State in 2001?

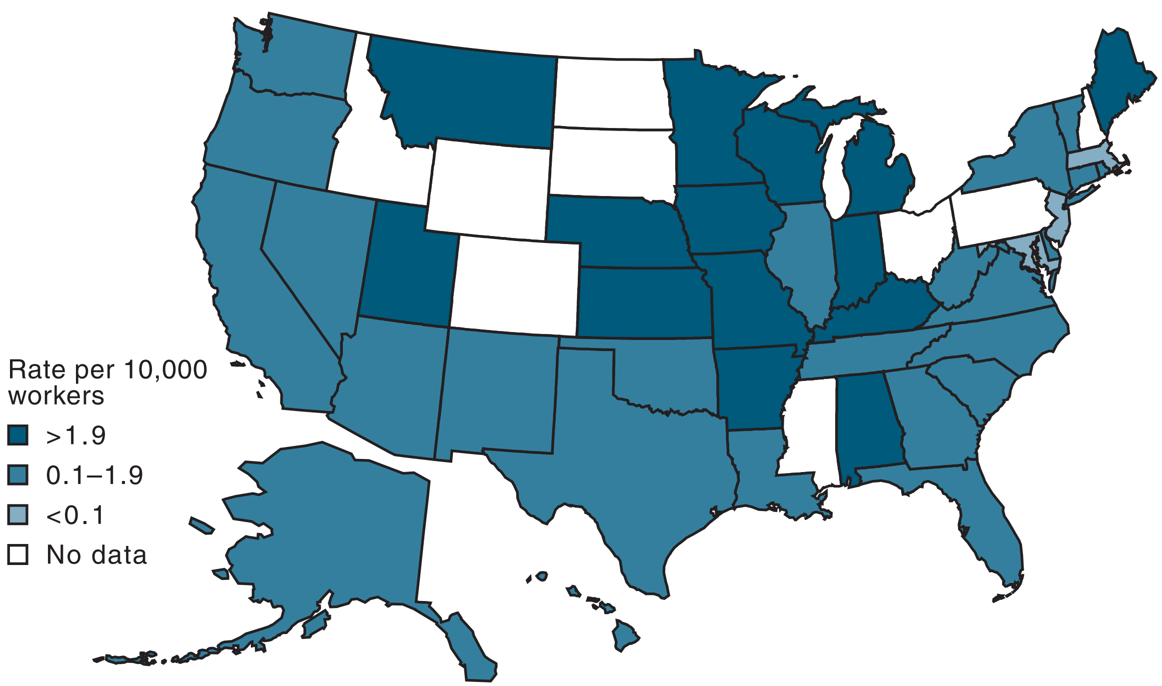


Figure 2–150. Incidence rates for occupational disorders due to physical agents in private industry by State, 2001. Rates of occupational disorders due to physical agents vary among the States from a reported low of 0.2 per 10,000 full-time workers in Delaware to a high of 4.1 in Nebraska. The U.S. rate was 1.6 per 10,000 full-time workers. *(Source: BLS [2002].)*

Poisoning

Preventing occupational poisonings and pesticide-related illnesses and injuries requires ongoing activities to determine the underlying causes of overexposure to chemicals and pesticides in the workplace. Surveillance promotes prevention by describing the magnitude and distribution of these adverse health conditions among workers and by serving as an early warning system of harmful effects not detected by product manufacturers. Two sources of data advance these surveillance objectives: the BLS annual survey of employers for occupational poisonings (part of SOII) and case-based reporting of pesticide-related illnesses and injuries by SENSOR.

Annual Survey of Employers: Reports of Occupational Poisonings (BLS)

Poisonings (systemic effects of toxic materials) include poisoning by the following: (1) lead, mercury, cadmium, arsenic, or other metals; (2) carbon monoxide, hydrogen sulfide, or other gases; (3) benzol, carbon tetrachloride, or other organic solvents; (4) insecticide sprays such as parathion and lead arsenate; and (5) other chemicals such as formaldehyde, plastics, and resins. During 1972–2001, the number of occupational poisonings ranged from a high of 7,600 cases in 1993 to a low of 2,800 cases in 2001 (Figure 2–151). Rates varied during 1984–2001 from a high of 1.0 per 10,000 full-time workers in 1993 to a low of 0.3 in 2001 (Figure 2–152). Within reporting States in 2001, the number of occupational poisoning cases ranged from fewer than 50 to 300 (Figure 2–153). Rates in 2001 varied by State from a low of less than 0.1 per 10,000 full-time workers in many States to a high of 1.2 in Maine; the U.S. rate was 0.3 per 10,000 full-time workers (Figure 2–154).

Magnitude and Trend

How did the number of occupational poisonings change during 1972–2001?

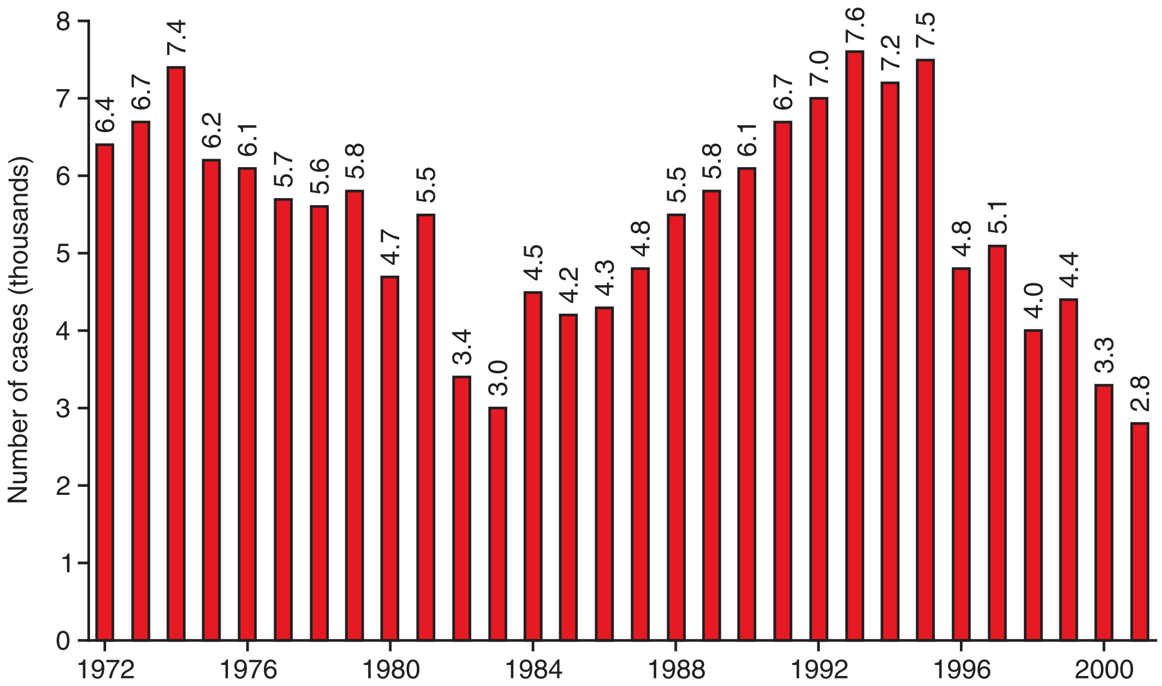


Figure 2–151. Number of occupational poisoning cases in private industry, 1972–2001. During 1972–2001, occupational poisonings peaked at 7,400 cases in 1974, declined to 3,000 cases in 1983, peaked again in 1993 at 7,600 cases, then declined to 2,800 cases in 2001. ***(Source: BLS [2002].)***

How did the rates of occupational poisonings change during 1984–2001?

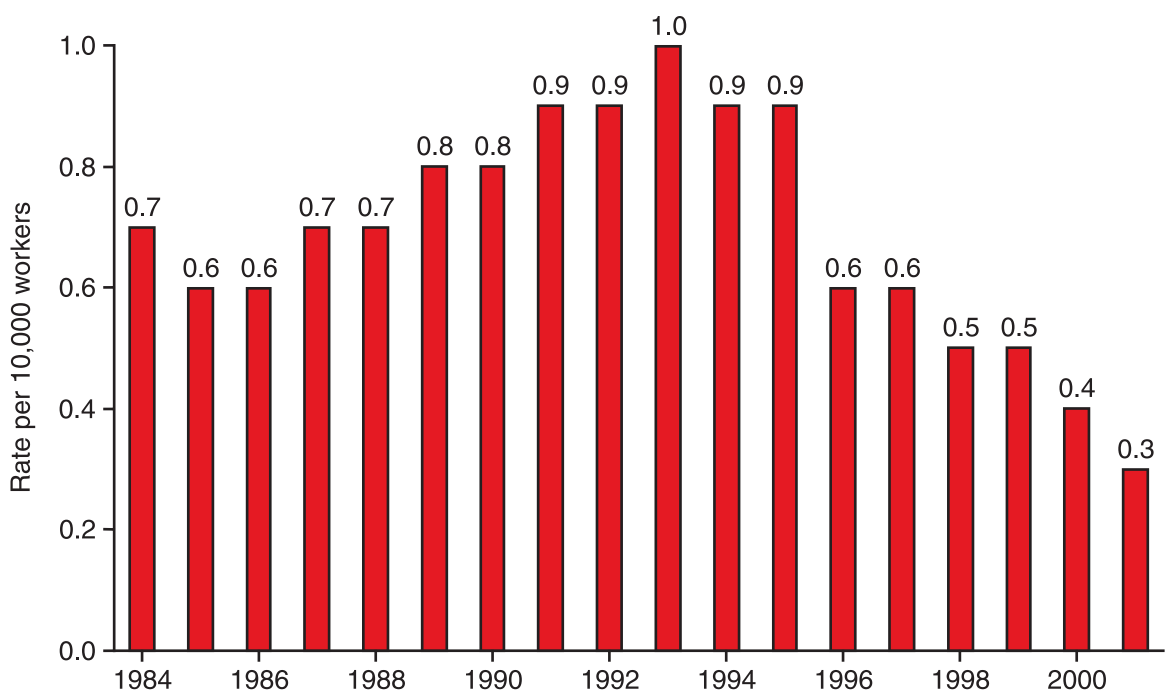
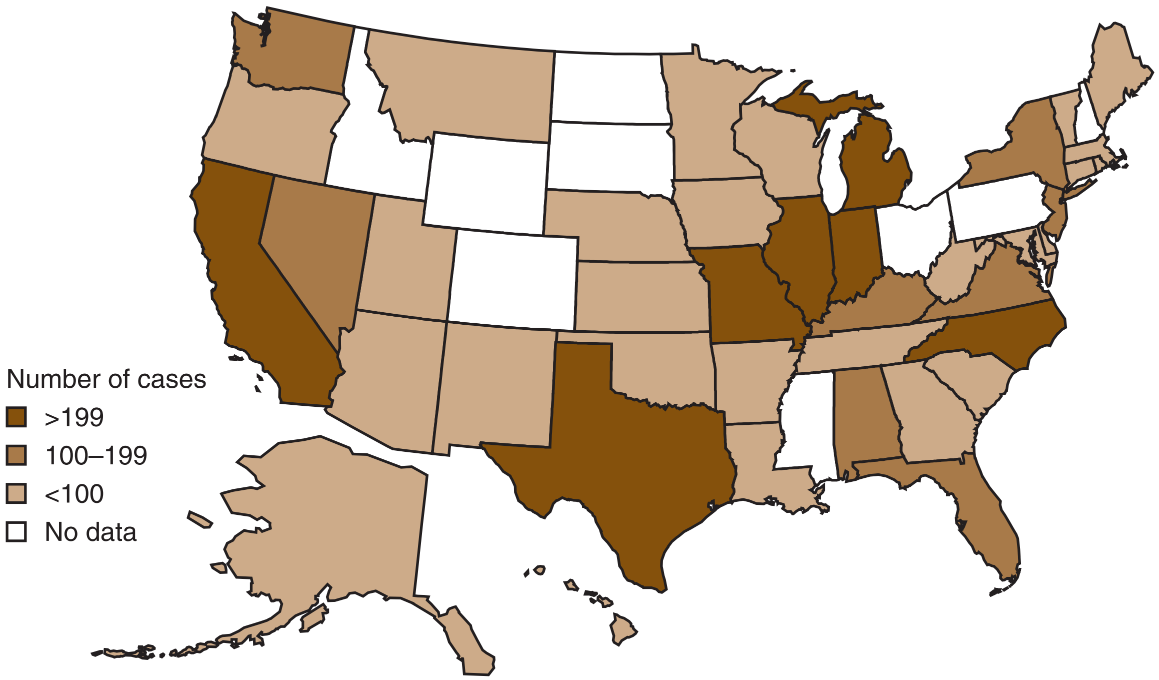


Figure 2–152. Annual rates of occupational poisoning in private industry, 1984–2001. BLS reported poisoning rates ranging from a high of 1.0 per 10,000 full-time workers in 1993 to a low of 0.3 in 2001. Occupational poisonings have low rates and generally account for only about 1% of all illnesses. ***(Source: BLS [2002].)***

Numbers and Rates among States

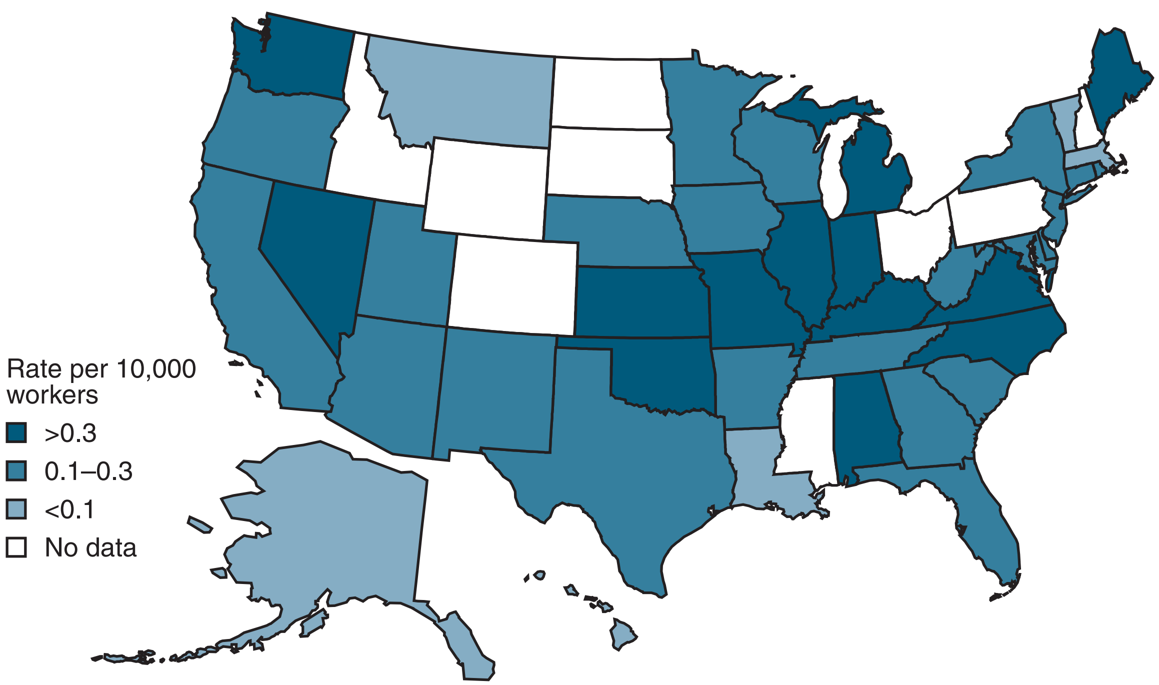
How did the number of occupational poisonings differ by State in 2001?

Figure 2–153. Number of occupational poisoning cases in private industry by State, 2001. The number of occupational poisoning cases within reporting States ranged from fewer than 50 to 300 in 2001. BLS reported a total of 2,800 occupational poisoning cases in 2001. States with the highest numbers included California (300), Illinois (200), Indiana (200), Michigan (200), Missouri (200), North Carolina (2002) and Texas (200). ***(Source: BLS [2002].)***



How did the rates of occupational poisoning differ by State in 2001?

Figure 2–154. Incidence rates for occupational poisoning in private industry by State, 2001. Occupational poisoning rates varied from a low of less than 0.1 per 10,000 full-time workers in many States to a high of 1.2 per 10,000 full-time workers in Maine. The U.S. rate was 0.3 per 10,000 full-time workers. ***(Source: BLS [2002].)***



Case-Based Reporting of Pesticide-Related Illness and Injury (SENSOR)

Pesticides are substances used to prevent, destroy, repel, or mitigate pests. They are used to protect the food supply and to control disease vectors. No perfectly safe form of pest control exists. Pesticides continue to raise concerns about their potential toxicity to humans. NIOSH provides technical and financial support for State-based surveillance of acute, occupational, pesticide-related illness and injury through the SENSOR program. The SENSOR-pesticides program is partially funded by the U.S. Environmental Protection Agency (EPA).

Between 1998 and 1999, a total of 1,009 cases of acute, pesticide-related occupational illness were identified by the seven States participating in the SENSOR-pesticides program (Arizona, California, Florida, Louisiana, New York, Oregon, and Texas) [Calvert et al. 2004]. Cases totaled 523 in 1998 and 486 in 1999. The incidence rate was 1.17 per 100,000 full-time workers overall, 18.2 for agricultural workers, and 0.53 for nonagricultural workers. As measured by days away from work during this period, the severity of most pesticide-related illnesses was low for 69.1% of cases, moderate for 29.6%, and high for 0.4%; three fatalities were identified [Calvert et al. 2004].

Age

How did the rates of pesticide-related illnesses differ by age of worker and industry during 1998–1999?

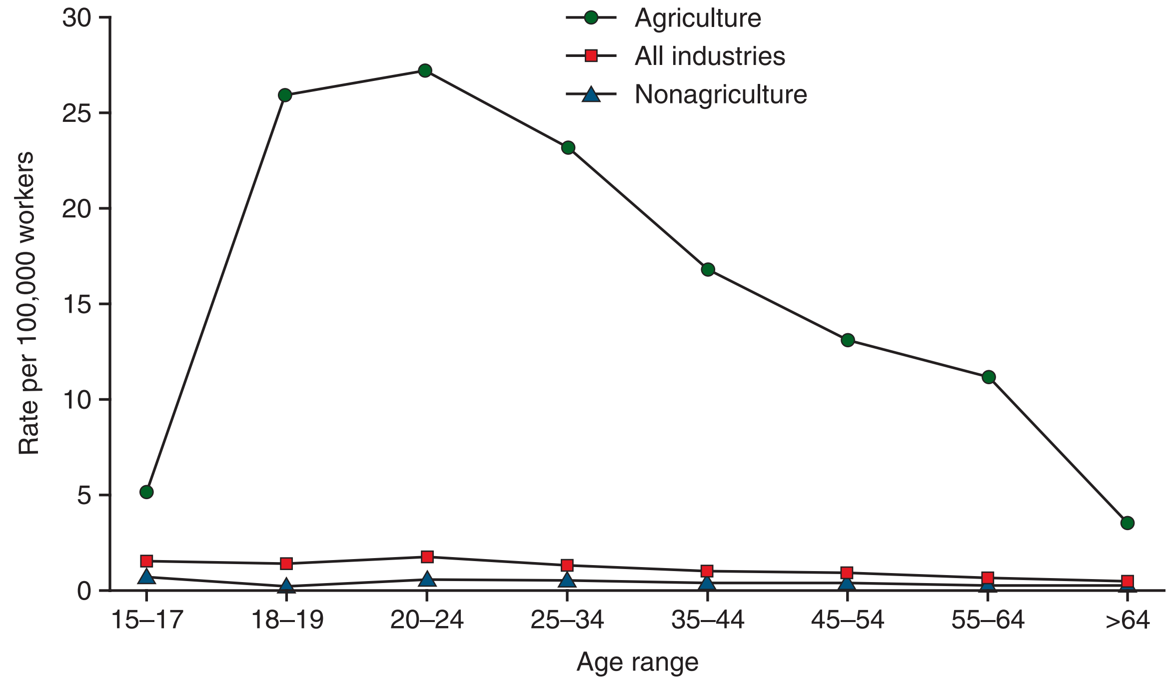


Figure 2–155. Incidence rates of pesticide-related illness by age and industry, 1998–1999. Among industry sectors, agriculture accounted for the highest incidence rates of pesticide-related illness, ranging from 5 to 27 cases per 100,000 full-time workers. Rates were highest among younger workers, peaking among those aged 20–24, and decreasing with increasing age. ***(Sources: NIOSH [2002d]; Calvert [2002].)***

Sex

How were pesticide-related illnesses distributed by sex of worker during 1998–1999?

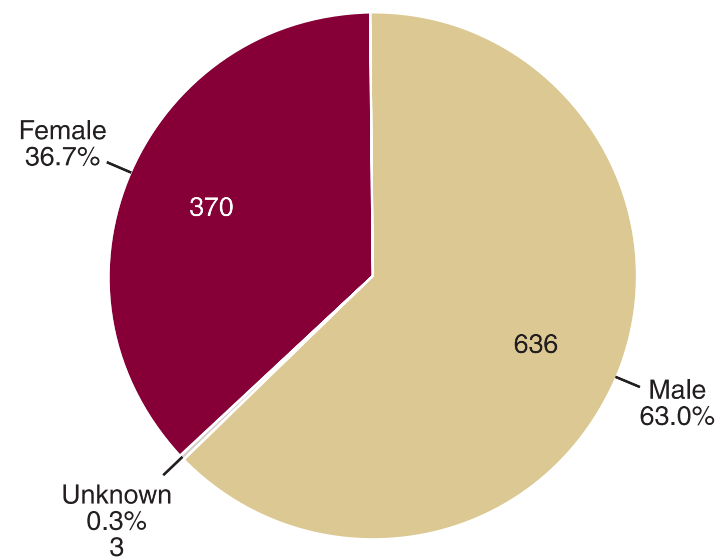
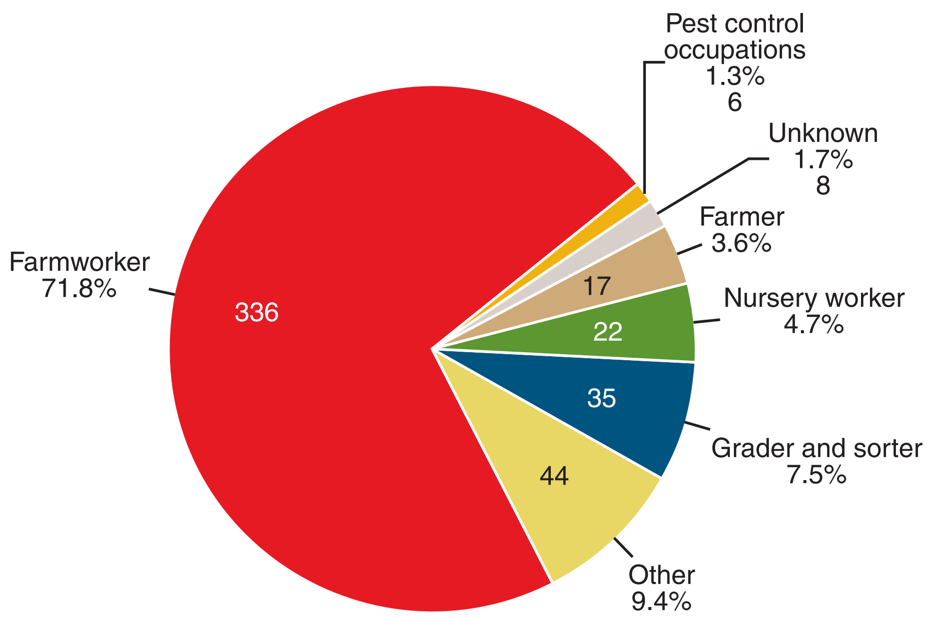


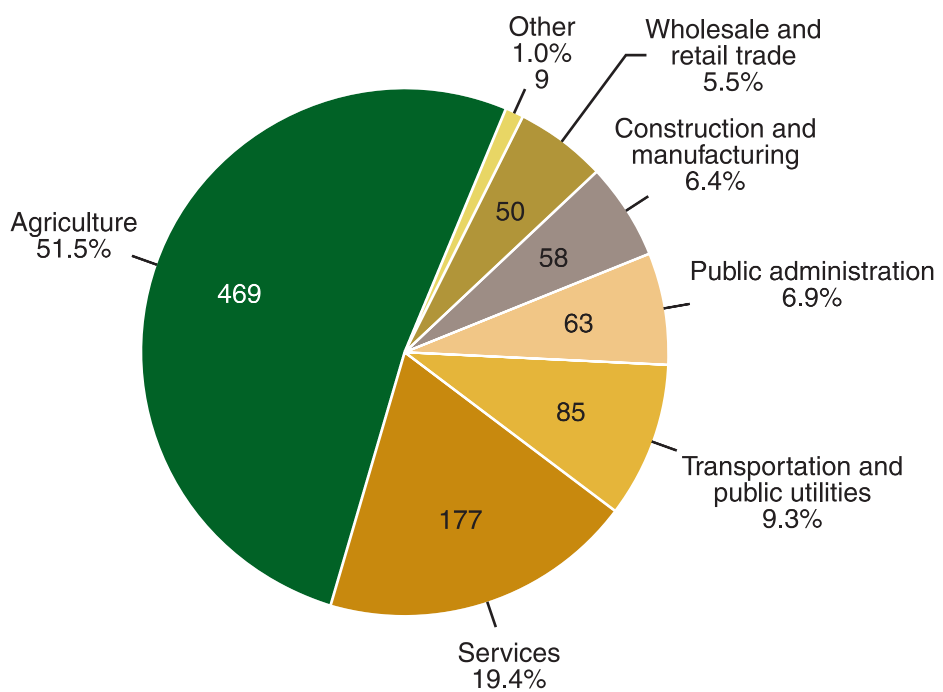
Figure 2–156. Distribution and number of pesticide-related illnesses by sex of worker, 1998–1999. Sex of worker was known for 1,006 of the 1,009 pesticide-related occupational illness cases during 1998–1999. Male workers accounted for 63% (636) of all cases and female workers accounted for 36.7% (370 cases). ***(Sources: NIOSH [2002d]; Calvert [2002].)***



Occupation

Which agricultural occupations accounted for the most pesticide-related illnesses during 1998–1999?

Figure 2–157. Distribution and number of pesticide-related illnesses among agricultural workers by occupation, 1998–1999. Farm workers reported by far the most pesticide-related illnesses (71.8% or 336 cases) during 1998–1999. Other occupations with notable pesticide-related illnesses included graders and sorters (7.5% or 35 cases) and nursery workers (4.7% or 22 cases). ***(Sources: NIOSH [2002d]; Calvert [2002].)***



Industry

Which industry sectors accounted for the most pesticide-related illnesses during 1998–1999?

Figure 2–158. Distribution and number of pesticide-related illnesses by industry, 1998–1999. Employer or industry data were available for 911 of the 1,009 pesticide-related illness cases during 1998–99. Most of these cases (51.5% or 469 cases) were from the agricultural sector. Services accounted for 19.4% (177 cases) and transportation, communication, and public utilities accounted for 9.3% (85) cases. ***(Sources: NIOSH [2002d]; Calvert [2002].)***

Agent or Exposure

Which classes of pesticides were responsible for reported cases of illness during 1998–1999?

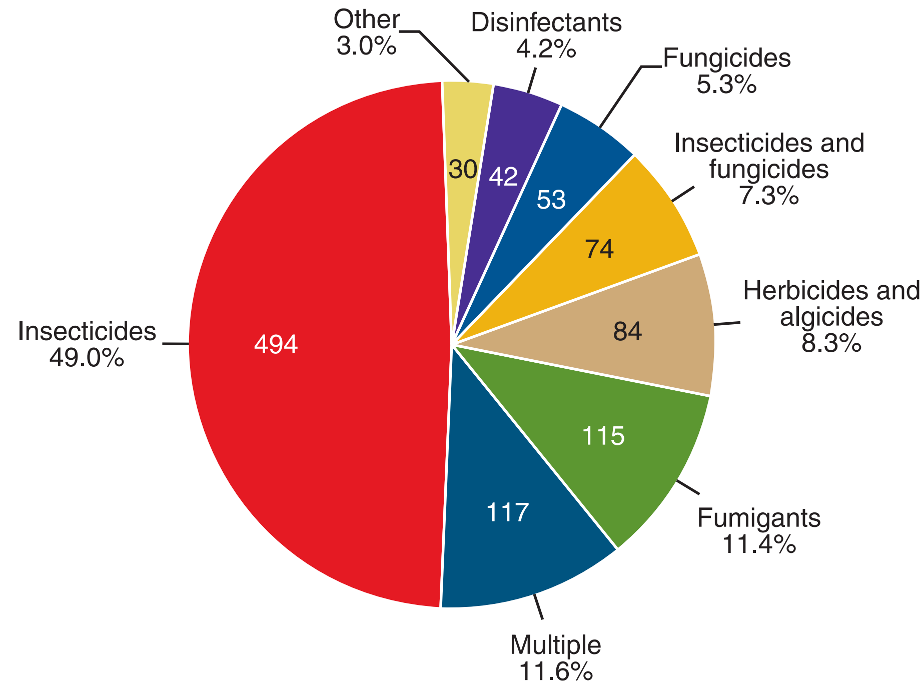


Figure 2–159. Distribution and number of pesticide-related illnesses by pesticide functional class, 1998–1999. Insecticides were responsible for 49% (494 cases) of the 1,009 reported occupational illnesses related to pesticides. *(Sources: NIOSH [2002d]; Calvert [2002].)*

Which chemical classes of insecticides were responsible for reported cases of illness during 1998–1999?

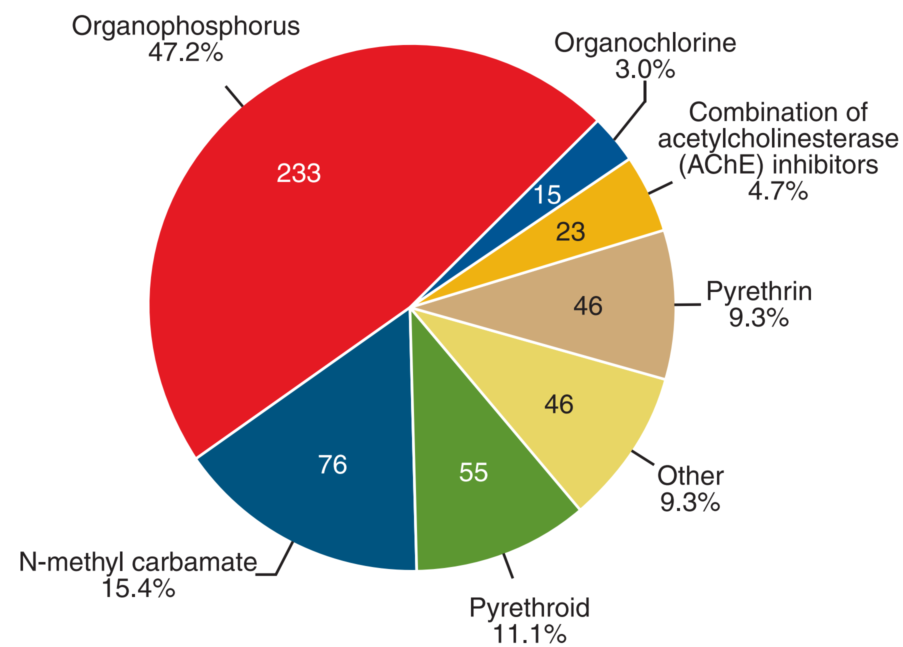


Figure 2–160. Distribution and number of pesticide-related illnesses by insecticide chemical class, 1998–1999. The following insecticide classes were most commonly responsible for pesticide-related illnesses during 1998–1999: organophosphorus (47.2% or 233 cases), N-methyl carbamate (15.4% or 76 cases), pyrethroid (11.1% or 55 cases), and pyrethrin (9.3% or 46 cases). *(Sources: NIOSH [2002d]; Calvert [2002].)*

Respiratory Diseases

Respiratory diseases are associated with a variety of distinct causes and account for a large number of occupational illnesses, injuries, and deaths. Since 1991, NIOSH has periodically compiled, summarized, and disseminated surveillance data on occupational respiratory diseases [NIOSH 1991, 1994, 1996, 1999], including asthma and other airways diseases, the pneumoconioses, and several other respiratory conditions. This section provides selected surveillance data for many of these diseases.

Asthma

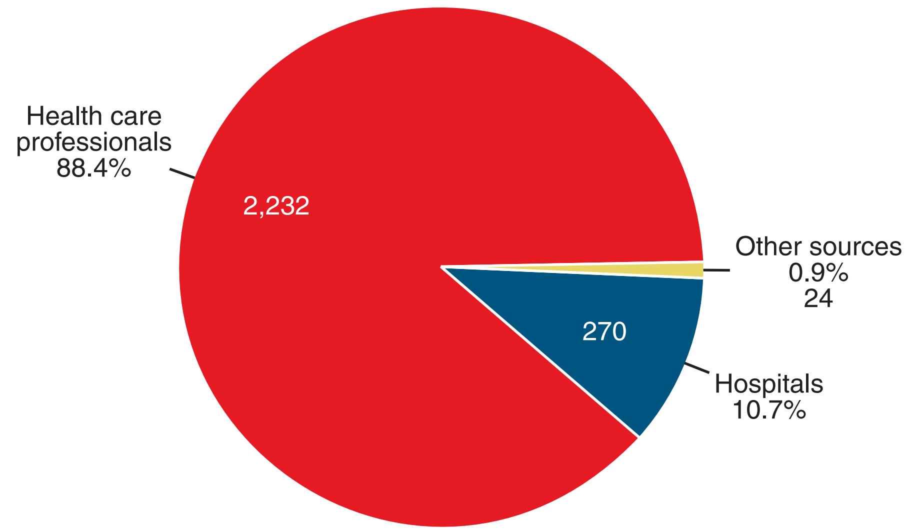
Work-related asthma (WRA) is the most common disease reported in the occupational respiratory disease surveillance systems in several developed countries. WRA is asthma that is caused or made worse by exposures in the workplace. However, most cases are either not recognized as work-related or not reported as such. Population-based estimates suggest that 15%–23% of new-onset asthma cases in adults are work related [American Thoracic Society 2004]. The SENSOR program has developed surveillance systems for WRA. These systems require the following to confirm a case of WRA: a health care professional's diagnosis of asthma (or a related diagnosis consistent with asthma) and an association between symptoms of asthma and work.

Four States (California, Massachusetts, Michigan, and New Jersey) maintained WRA surveillance programs during the 7-year period (1993–1999) represented by the SENSOR data included in this report. In all four States, case reports from health care professionals were the main source for identifying WRA cases (88.4% of the 2,526 cases) (Figure 2–161). By occupation, the highest percentage of cases occurred among operators, fabricators, and laborers (32.9%), followed by managerial and professional specialty (20.2%), and technical, sales, and administrative support jobs (19.2%) (Figure 2–162). Most cases were associated with the manufacturing (41.4%) and services (34.2%) industries (Figure 2–163). Agents most frequently associated with WRA were miscellaneous chemicals, cleaning materials, and mineral and inorganic dust (Figure 2–164).

Reporting Sources

Which sources did SENSOR States use most to identify cases of WRA during 1993–1999?

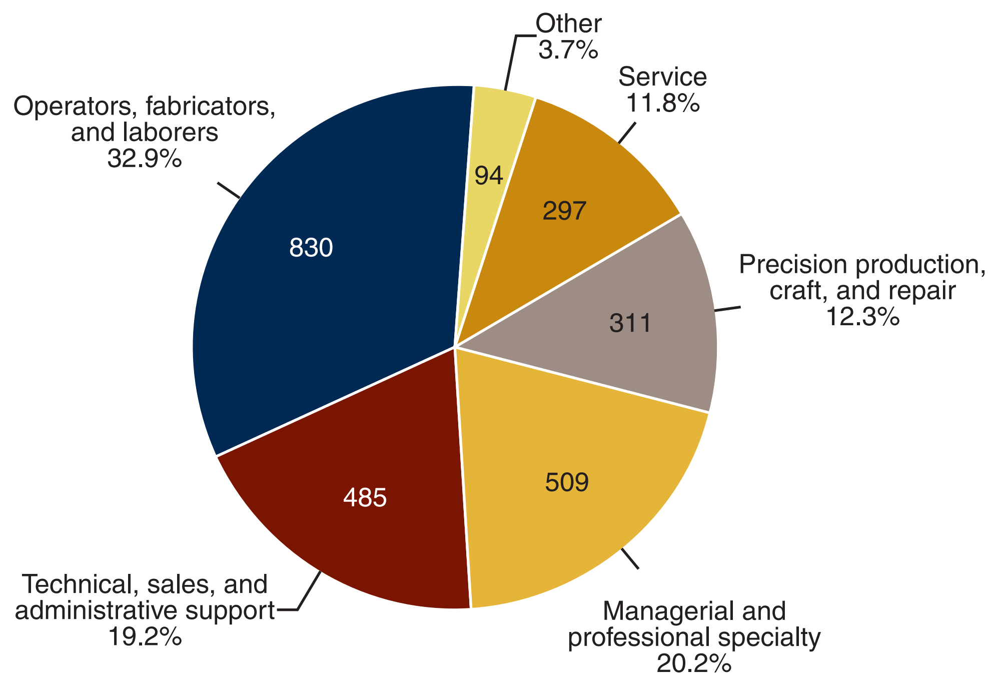
Figure 2–161. Distribution and number of WRA cases for all four SENSOR reporting States (California, Massachusetts, Michigan, New Jersey) by source of report, 1993–1999. Reports from health care professionals were the primary source for identifying cases of WRA during 1993–1999: 88.4% or 2,232 WRA cases were identified through physician reports. ***(Sources: Harrison and Flattery [2002b]; Tumpowsky and Davis [2002]; Rosenman et al. [2002a]; Valiante and Schill [2002a]; Filios [2002a].)***

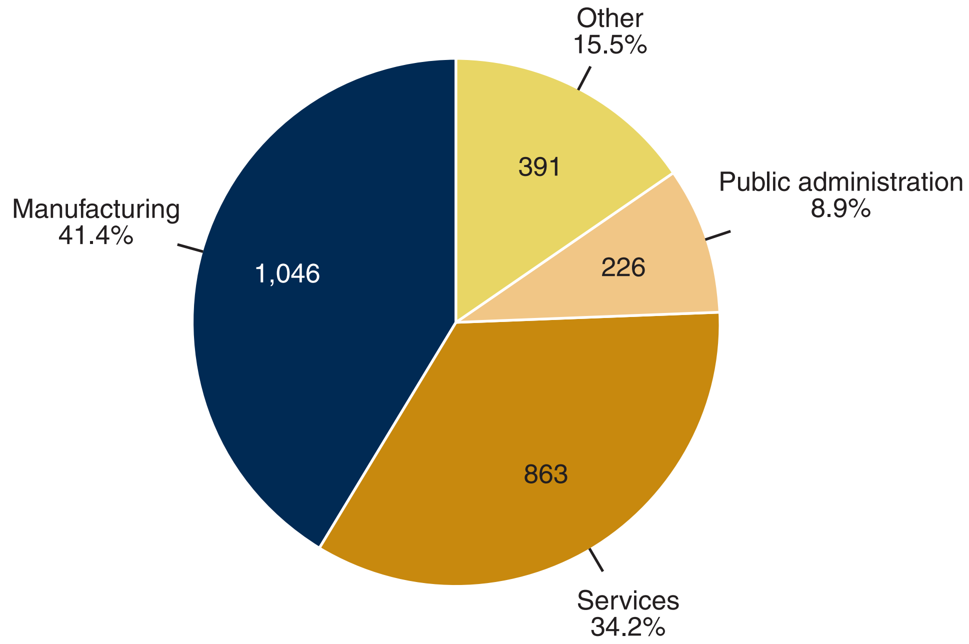


Occupation

How were WRA cases distributed by occupation in SENSOR States during 1993–1999?

Figure 2–162. Distribution and number of WRA cases for all four SENSOR reporting States (California, Massachusetts, Michigan, New Jersey) by occupation, 1993–1999. Operators, fabricators, and laborers accounted for the largest proportion of WRA cases (32.9%), followed by managerial and professional specialty occupations (20.2%). ***(Sources: Harrison and Flattery [2002b]; Tumpowsky and Davis [2002]; Rosenman et al. [2002a]; Valiante and Schill [2002a]; Filios [2002a].)***

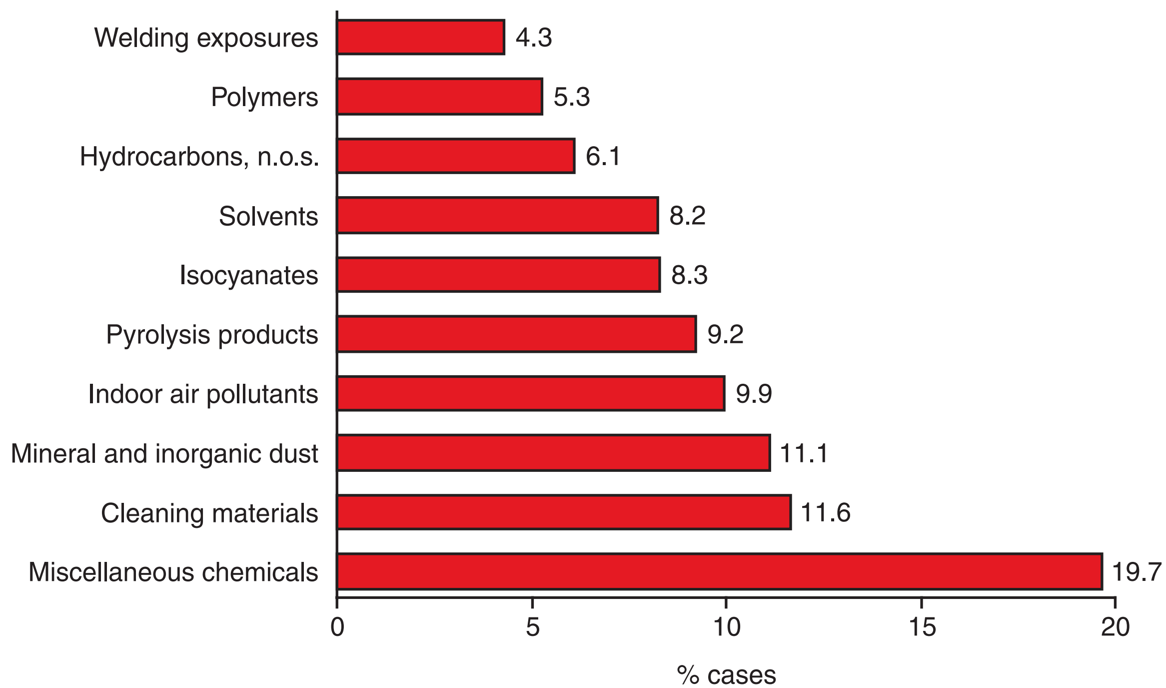




Industry

How were cases of WRA distributed by industry in SENSOR States during 1993–1999?

Figure 2–163. Distribution and number of WRA cases for all four SENSOR reporting States (California, Massachusetts, Michigan, New Jersey) by industry, 1993–1999. Manufacturing and services accounted for the largest proportions of WRA cases (41.4% and 34.2%, respectively). ***(Sources: Harrison and Flattery [2002b]; Tumpowsky and Davis [2002]; Rosenman et al. [2002a]; Valiante and Schill [2002a]; Filios [2002a].)***



Agent or Exposure

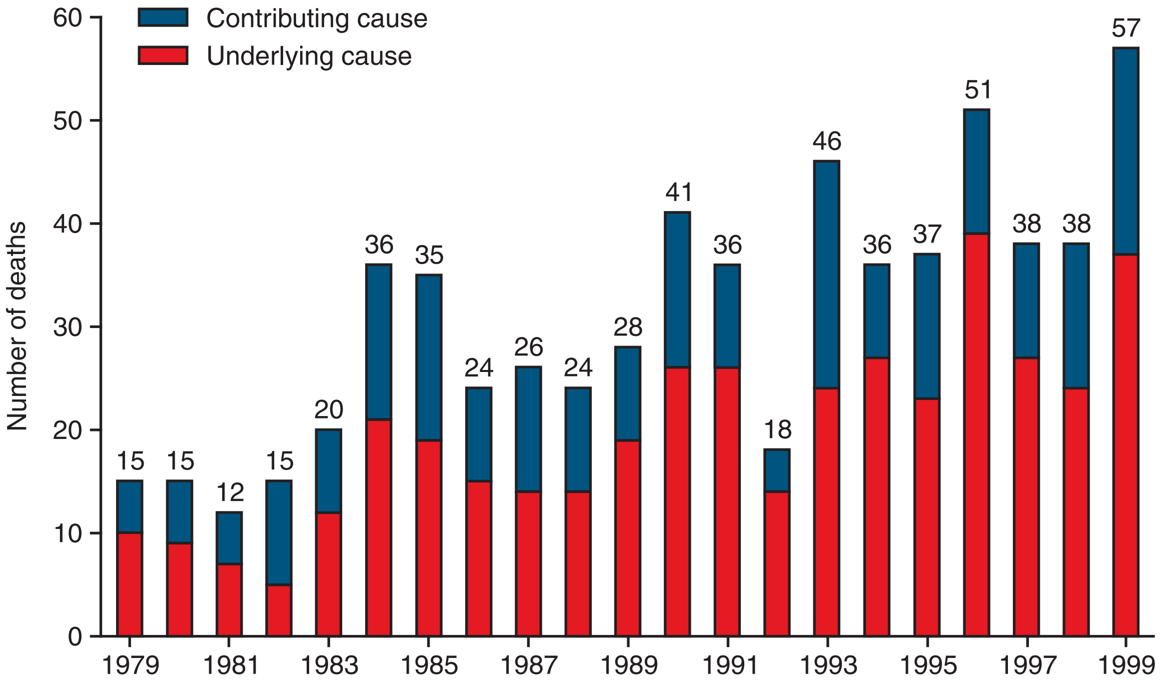
Which agents were most frequently associated with WRA during 1993–1999?

Figure 2–164. Distribution of agent categories most frequently associated with WRA cases for all four SENSOR reporting States (California, Massachusetts, Michigan, New Jersey), 1993–1999. During 1993–1999, the largest proportion of WRA cases was associated with miscellaneous chemicals (19.7%). This category of agents includes many exposures that are not easily classified (for example, perfumes, odors, and glues). ***(Sources: Harrison and Flattery [2002b]; Tumpowsky and Davis [2002]; Rosenman et al. [2002a]; Valiante and Schill [2002a]; Filios [2002a].)***

Hypersensitivity Pneumonitis

Hypersensitivity pneumonitis is a lung disease that is often related to occupation. This inflammation of the lungs is caused by repeated inhalation of foreign substances such as organic dust, fungus, or mold. Examples of this disease are farmers' lung, mushroom workers' lung, and bird fanciers' disease.

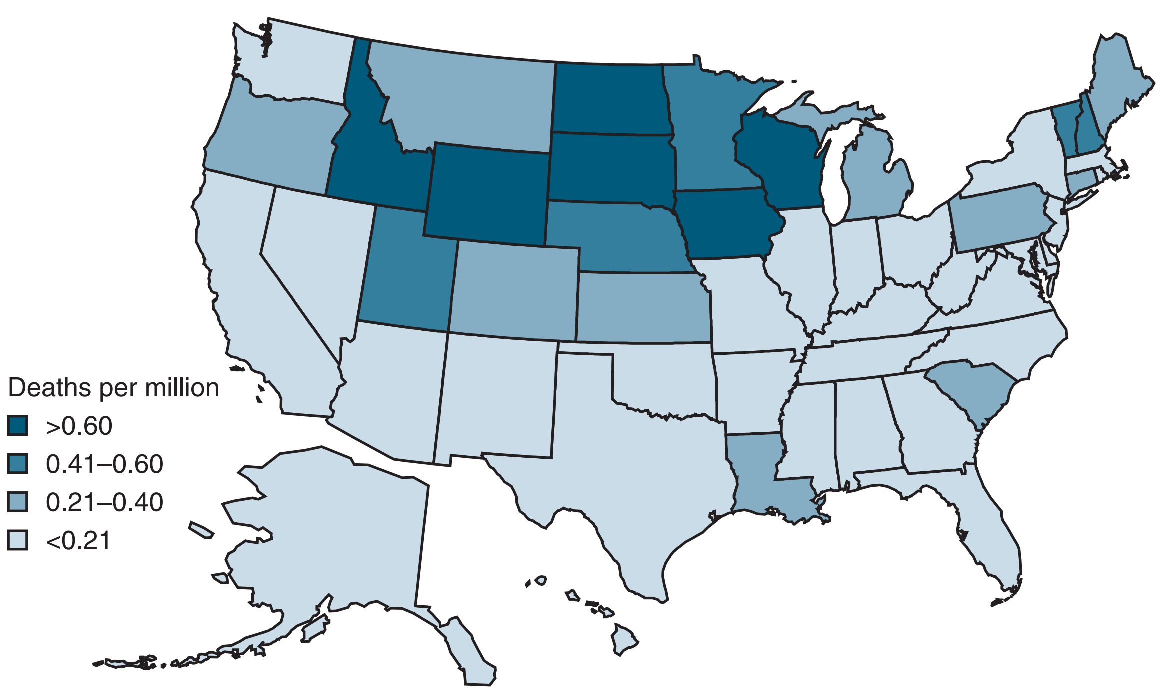
The annual number of deaths with hypersensitivity pneumonitis as an underlying or contributing cause generally increased from fewer than 20 per year before 1983 to 57 in 1999 (Figure 2–165). A geographic distribution of age-adjusted rates is presented in Figure 2–166. Hypersensitivity pneumonitis mortality rates for 1990–1999 were highest in the upper Midwest and northern Plains States, along with Vermont and Idaho. Nearly 29% of decedents during 1990–1999 were women, and 95.7% were white (Figure 2–167).



Magnitude and Trend

How did the pattern of mortality from hypersensitivity pneumonitis change during 1979–1999?

Figure 2–165. Number of deaths of U.S. residents aged 15 or older with hypersensitivity pneumonitis recorded as an underlying or contributing cause on the death certificate, 1979–1999. The annual number of hypersensitivity pneumonitis deaths generally increased during 1979–1999, from fewer than 15 per year in 1979 to 57 in 1999. Hypersensitivity pneumonitis was designated as the underlying cause of death in at least half of deaths associated with hypersensitivity pneumonitis for every year except 1982. ***(Source: NIOSH [2002e].)***



Rates among States

How did mortality rates for hypersensitivity pneumonitis differ by State?

Figure 2–166. Age-adjusted mortality rates for hypersensitivity pneumonitis in U.S. residents aged 15 and older by State, 1990–1999. States with higher hypersensitivity pneumonitis mortality rates during 1990–1999 were in the upper Midwest, the northern Plains and Mountain States, and New England. In the group of States with the highest mortality from hypersensitivity pneumonitis, rates ranged from three to five times the U.S. rate of 0.2 per million. ***(Source: NIOSH [2002e].)***

Sex and Race

How is hypersensitivity pneumonitis mortality distributed by sex and race?

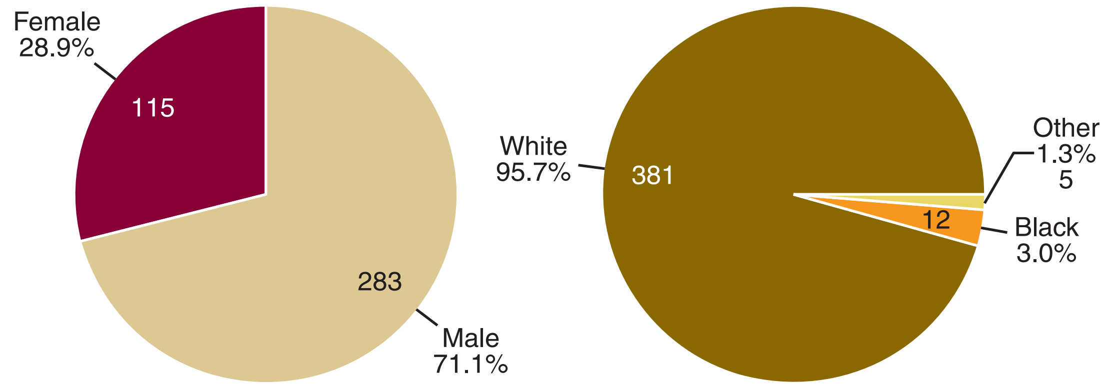


Figure 2–167. Distribution and number of hypersensitivity pneumonitis deaths in U.S. residents aged 15 or older by sex and race, 1990–1999. Nearly 29% of hypersensitivity pneumonitis deaths occurred in women during 1990–1999. White residents accounted for 95.7% of hypersensitivity pneumonitis deaths during this period. ***(Source: NIOSH [2002e].)***

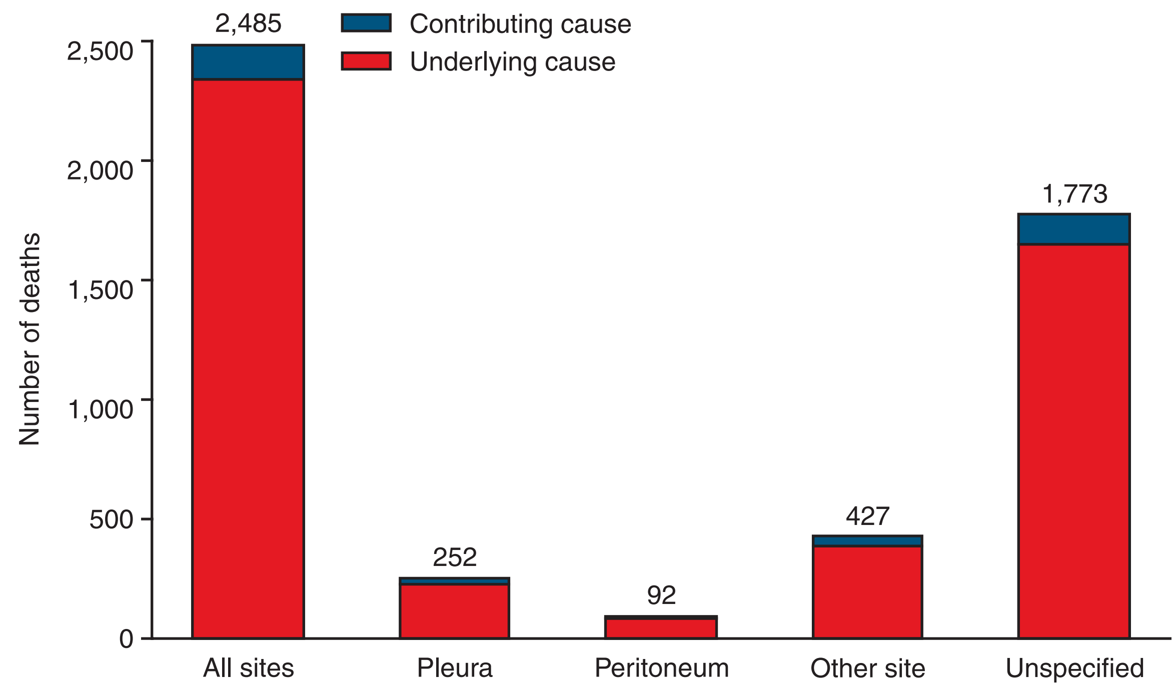
Mesothelioma

Asbestos exposure is by far the leading cause of malignant mesothelioma, a rare form of cancer found in the sac lining the chest (the pleura) or the abdomen (the peritoneum). In 1999, 2,485 deaths were recorded with malignant mesothelioma listed as an underlying or contributing cause. Of these, 1,773 deaths were classified as unspecified (Figure 2–168). The highest malignant mesothelioma mortality rates occurred in Alaska and Maine. Men accounted for 80.3% of the deaths from malignant mesothelioma, and white U.S. residents accounted for 94.8% of these deaths (Figure 2–170). Industrial and miscellaneous chemicals had the highest proportionate mortality ratio (PMR) for malignant mesothelioma among the industries. Occupations with the PMRs were plumbers, pipefitters, and steamfitters; electricians; and elementary school teachers (Figure 2–171).

Magnitude and Trend

How many and what type of malignant mesothelioma deaths occurred in 1999?

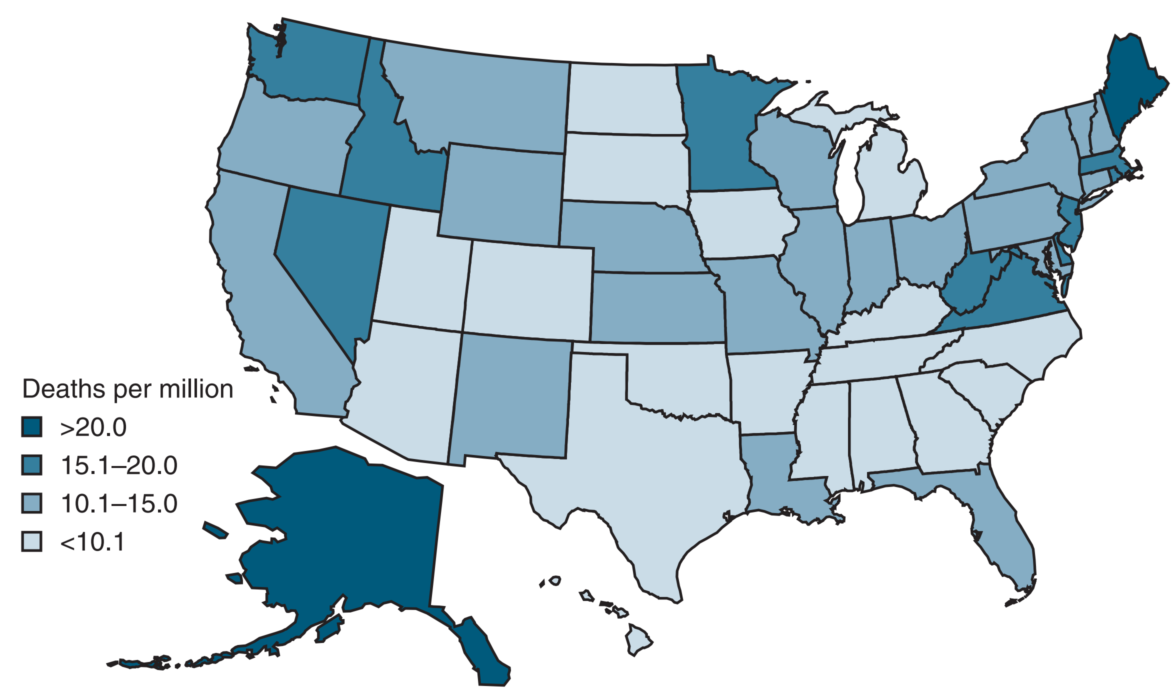
Figure 2–168. Number of U.S. residents aged 15 or older with malignant mesothelioma listed as an underlying or contributing cause on the death certificate by type of mesothelioma, 1999. Of the 2,485 malignant mesothelioma deaths in 1999, the highest proportion was classified as an unspecified type. In nearly 95% of all deaths, malignant mesothelioma was listed as the underlying cause. (*Note:* The total number of deaths by subtype exceeds the number for all sites because more than one subtype was listed for some decedents.) ***(Source: NIOSH [2002e].)***

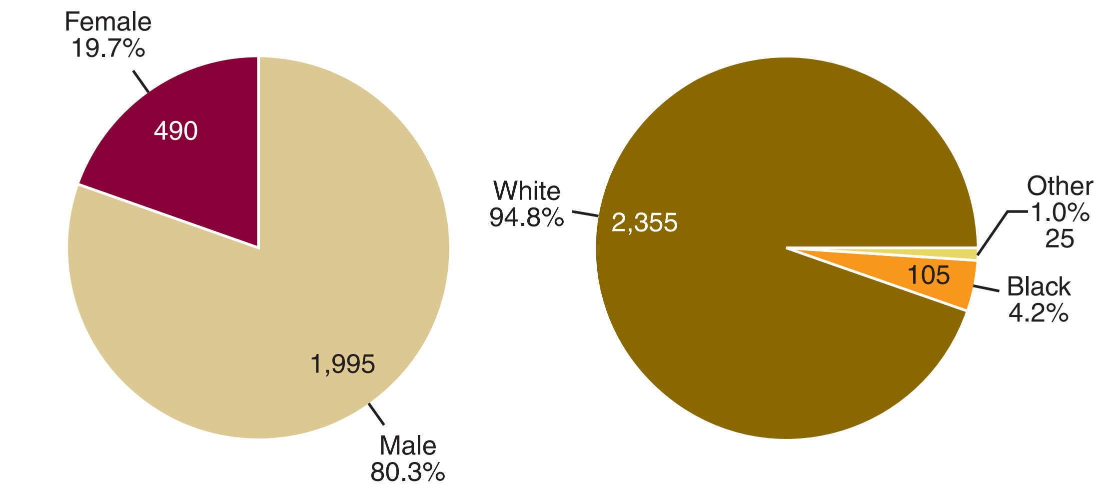


Rates among States

How did mortality rates for malignant mesothelioma differ by State in 1999?

Figure 2–169. Age-adjusted mortality rates for malignant mesothelioma in U.S. residents aged 15 or older by State, 1999. The highest malignant mesothelioma mortality rates occurred in Alaska and Maine in 1999. The rates for each of these States were more than twice the national rate of 11.7 per million. States in the next highest rate group were widely dispersed, with a concentration on the eastern seaboard and in the West. The rates in these States were nearly 1.5 to 2 times the U.S. rate. ***(Source: NIOSH [2002e].)***

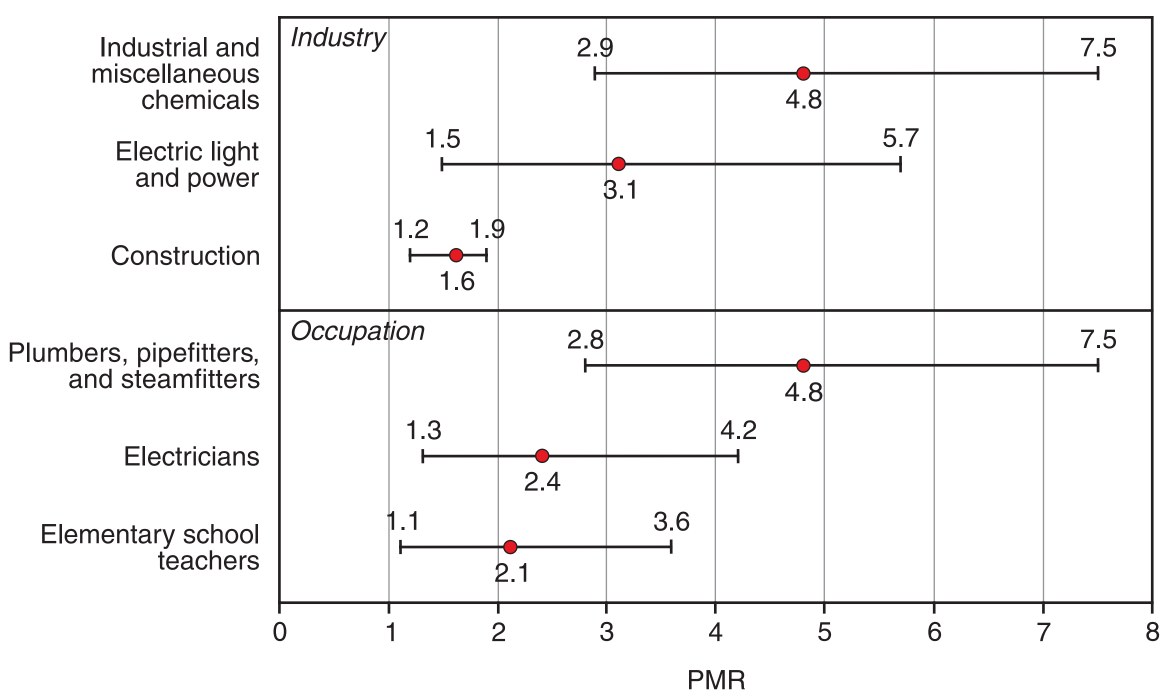




Sex and Race

How was malignant mesothelioma mortality distributed by sex of worker and race in 1999?

Figure 2–170. Distribution and number of malignant mesothelioma deaths in U.S. residents aged 15 and older by sex and race, 1999. More than 80% of malignant mesothelioma deaths occurred in men in 1999. White residents accounted for 94.8% of malignant mesothelioma deaths. ***(Source:** NIOSH [2002e]**.)***



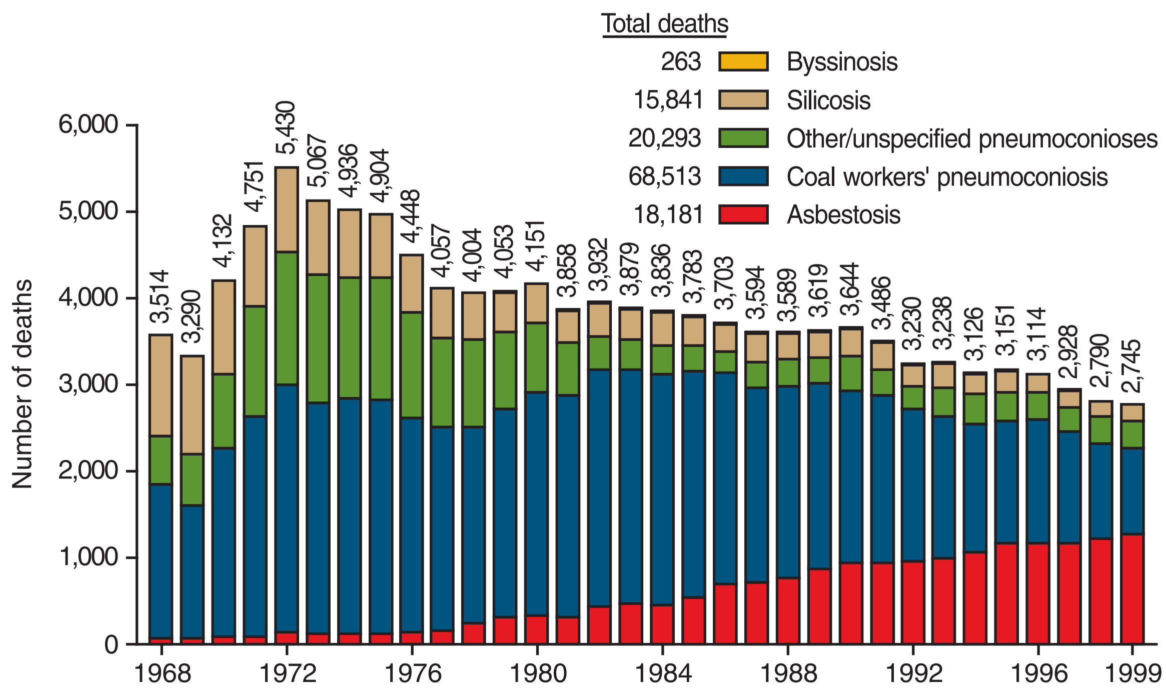
Occupation and Industry

Which industries and occupations were most frequently associated with malignant mesothelioma mortality in 1999?

Figure 2–171. PMRs and 95% confidence intervals for malignant mesothelioma in U.S. residents aged 15 or older by industry and occupation, 1999. Industrial and miscellaneous chemicals, electric light and power, and construction industries were associated with the highest significant malignant mesothelioma PMRs. Plumbers, pipefitters, steamfitters, and electricians (which are occupations associated with the construction industry) were highly associated with malignant mesothelioma mortality. Elementary school teachers also had a significant malignant mesothelioma PMR. (*Note:* This figure presents the highest significant PMRs based on 10 or more deaths.) ***(Source:** NIOSH [2002e]**.)***

Pneumoconioses

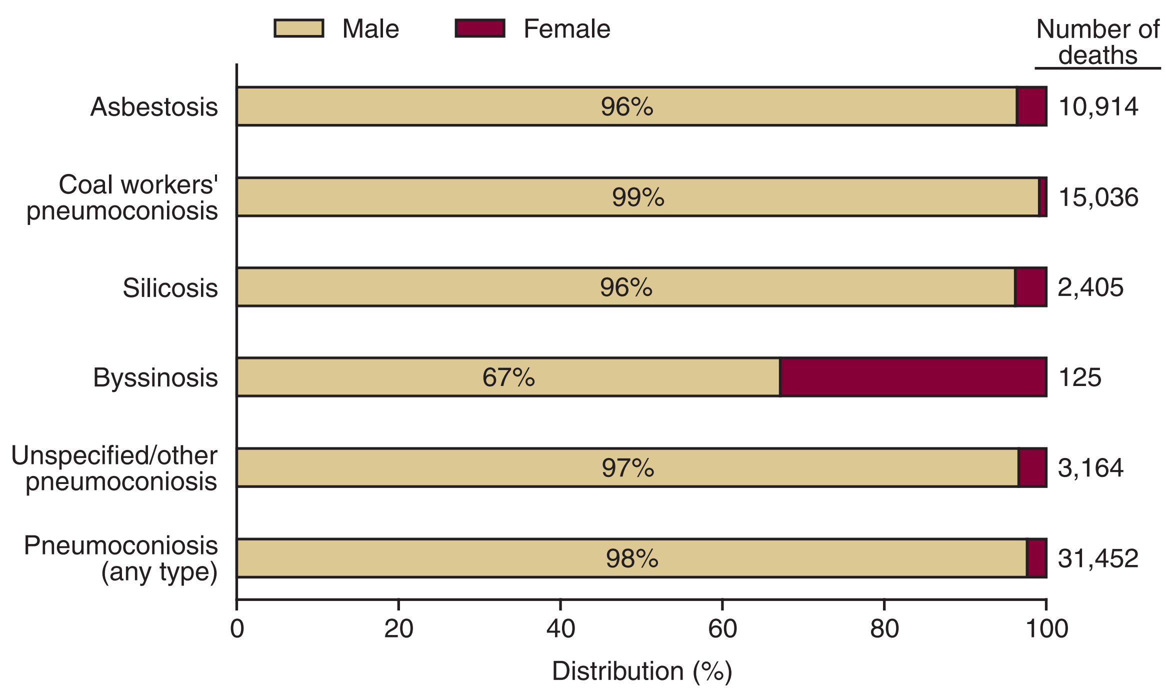
The pneumoconioses make up a class of respiratory diseases attributed solely to occupational exposures. They include the major fibrotic lung diseases such as asbestosis, coal workers' pneumoconiosis, and silicosis as well as rarer interstitial diseases such as siderosis and berylliosis. For this report, byssinosis is also included in this category, though it differs substantially in its pathology and clinical manifestations. During 1968–1999, pneumoconiosis was an underlying or contributing cause of 121,982 deaths in the United States. The number of pneumoconiosis deaths declined from more than 5,400 in 1972 to 2,745 deaths in 1999 (Figure 2–172). Coal workers' pneumoconiosis (CWP) accounted for the largest number of pneumoconiosis deaths during this 30-year period. However, asbestosis deaths outnumbered CWP deaths during 1998 and 1999, displacing the latter as the most frequent type of pneumoconiosis death. Men accounted for 98% of all pneumoconiosis deaths between 1990 and 1999 but for only 67% of byssinosis deaths during this period (Figure 2–173). White residents accounted for 94% of pneumoconiosis decedents but for only 85% of silicosis decedents; 14% of silicosis decedents were black (Figure 2–174).



Magnitude and Trend

How did the pattern of pneumoconiosis mortality change during 1968–1999?

Figure 2–172. Number of deaths of U.S. residents aged 15 or older with pneumoconiosis recorded as an underlying or contributing cause on the death certificate, 1968–1999. During 1968–1999, deaths from asbestosis increased over time, whereas deaths from CWP decreased. Deaths from all pneumoconioses are shown at the top of each stacked bar. The bars slightly overstate the numbers because a small fraction of deaths was associated with more than one type of pneumoconiosis. (*Note:* Byssinosis data were not available before 1979. Also note that the sum of deaths for various types of pneumoconiosis (N=123,091) exceeds the total number of pneumoconiosis deaths (N=121,982) because some decedents had more than one type of pneumoconiosis recorded on their death certificates.) ***(Source: NIOSH [2002f].)***



Sex

How did deaths from pneumoconiosis differ by sex of worker?

Figure 2–173. Distribution of pneumoconiosis deaths in U.S. residents aged 15 or older by sex, 1990–1999. Men accounted for more than 98% of the 31,452 decedents with any type of pneumoconiosis during 1990–1999. However, an unusually large proportion of byssinosis decedents (33%) were female. (*Note:* The sum of deaths for various types of pneumoconiosis exceeds the total number of pneumoconiosis deaths because some decedents had more than one type of pneumoconiosis.) ***(Source: NIOSH [2002f].)***

Race/Ethnicity

How did deaths from pneumoconiosis differ by race?

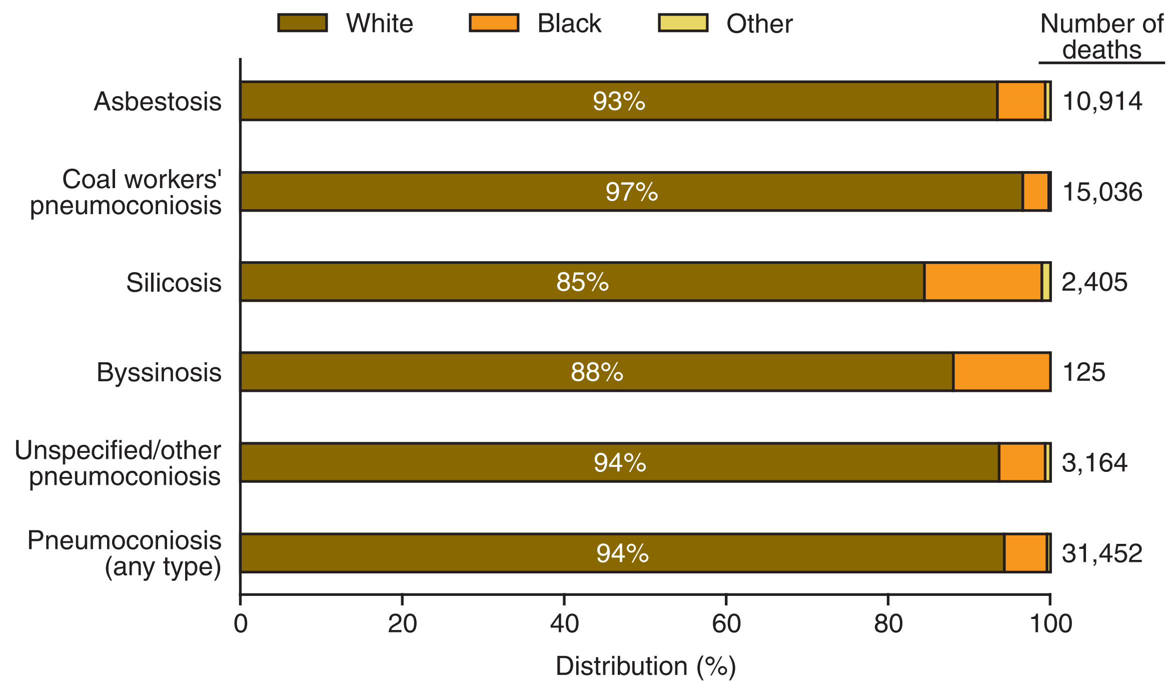


Figure 2–174. Distribution of pneumoconiosis deaths in U.S. residents aged 15 or older by race, 1990–1999. During 1990–1999, decedents with pneumoconiosis were predominantly white. Less than 4% of CWP deaths occurred among nonwhite residents. By contrast, 15% of silicosis decedents were nonwhite. (*Note:* The sum of deaths for various types of pneumoconiosis exceeds the total number of pneumoconiosis deaths because some decedents had more than one type of pneumoconiosis.) ***(Source: NIOSH [2002f].)***

Asbestosis

Asbestosis is a chronic, disabling, fatal lung disease caused by inhaling asbestos fibers. The number of deaths due to asbestosis each year increased from 77 in 1968 to 1,265 in 1999 (Figure 2–175). West Virginia and Delaware had the highest asbestosis mortality rates during 1990–1999 (Figure 2–176). Miscellaneous nonmetallic mineral and stone products had the highest asbestosis PMR among industries, and insulation workers and boilermakers had the highest asbestosis PMRs among occupations (Figure 2–177).

Magnitude and Trend

How did the pattern of asbestosis mortality change during 1968–1999?

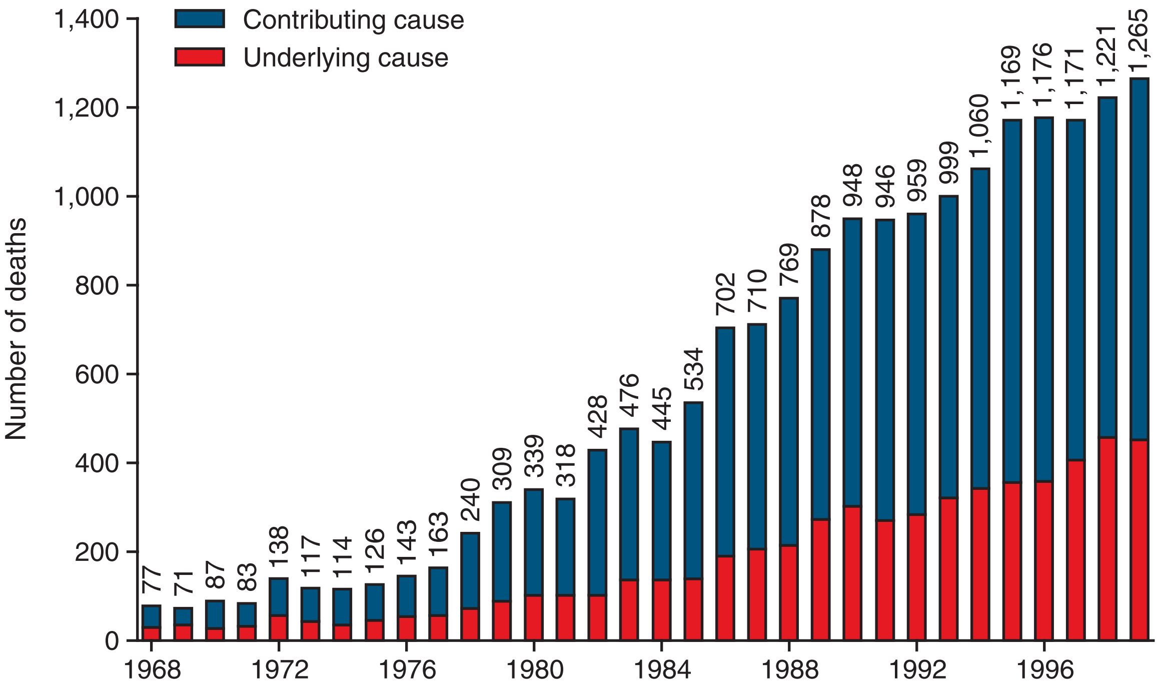


Figure 2–175. Number of deaths of U.S. residents aged 15 or older with asbestosis recorded as an underlying or contributing cause on the death certificate, 1968–1999. The number of asbestosis deaths increased from 77 in 1968 to 1,265 in 1999. During this period, asbestosis was listed each year as the underlying cause in nearly a third of all asbestosis deaths. ***(Source: NIOSH [2002f].)***

Rates among States

How did asbestosis mortality rates differ by State during 1990–1999?

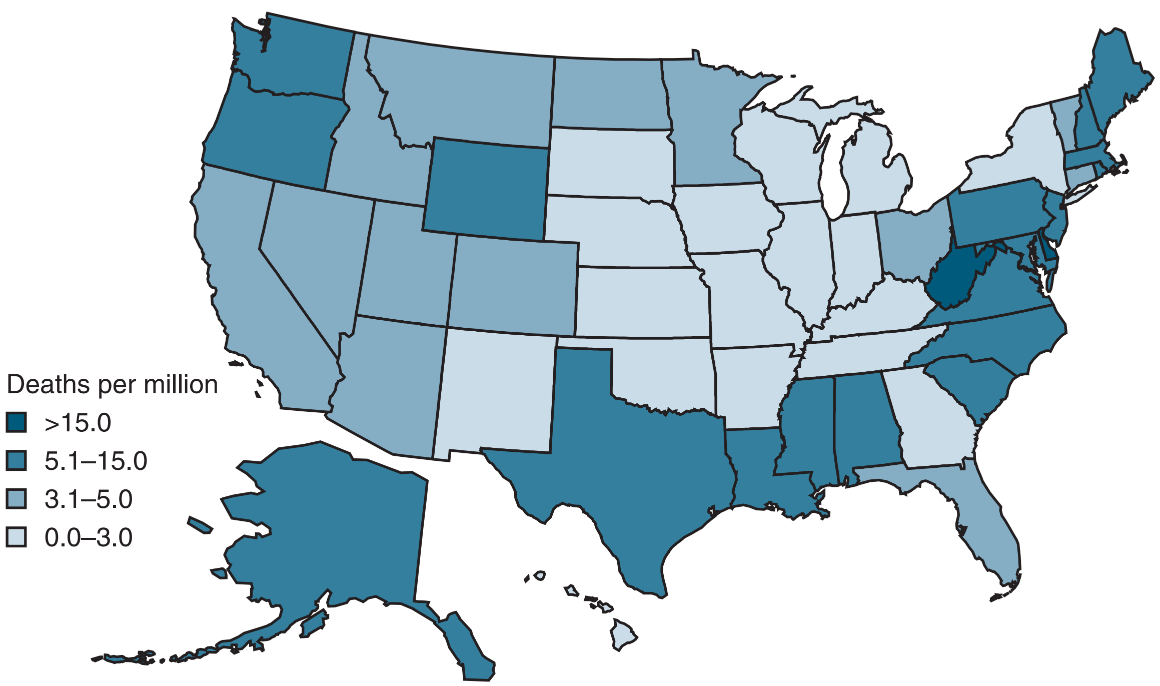
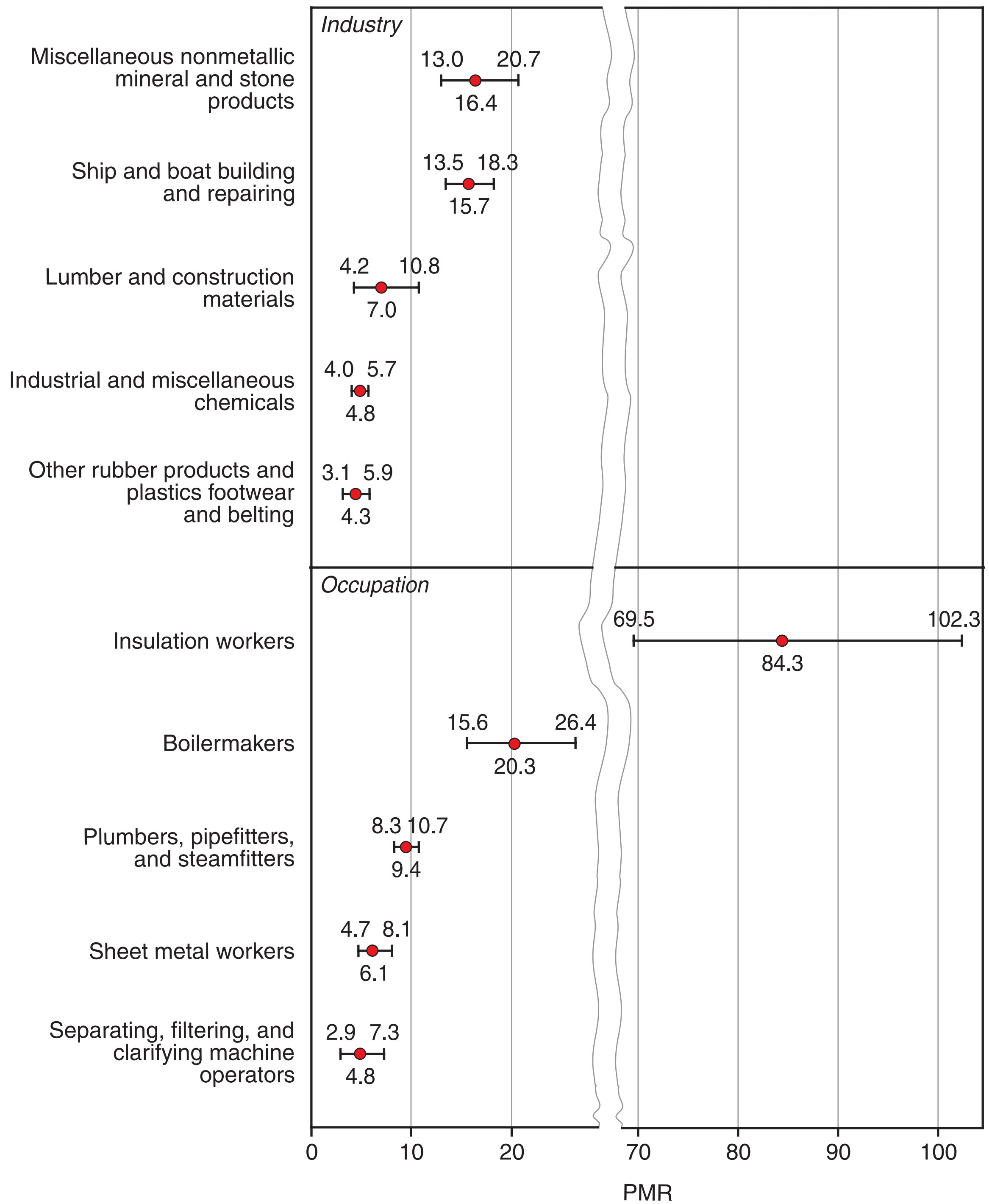


Figure 2–176. Age-adjusted mortality rates for asbestosis in U.S. residents aged 15 or older by State, 1990–1999. Delaware and West Virginia had the highest asbestosis mortality rates during 1990–1999. States in the second highest mortality rate category were predominantly coastal States. All States in these two groupings had asbestosis mortality rates above the U.S. rate of 5.4 per million. ***(Source: NIOSH [2002f].)***



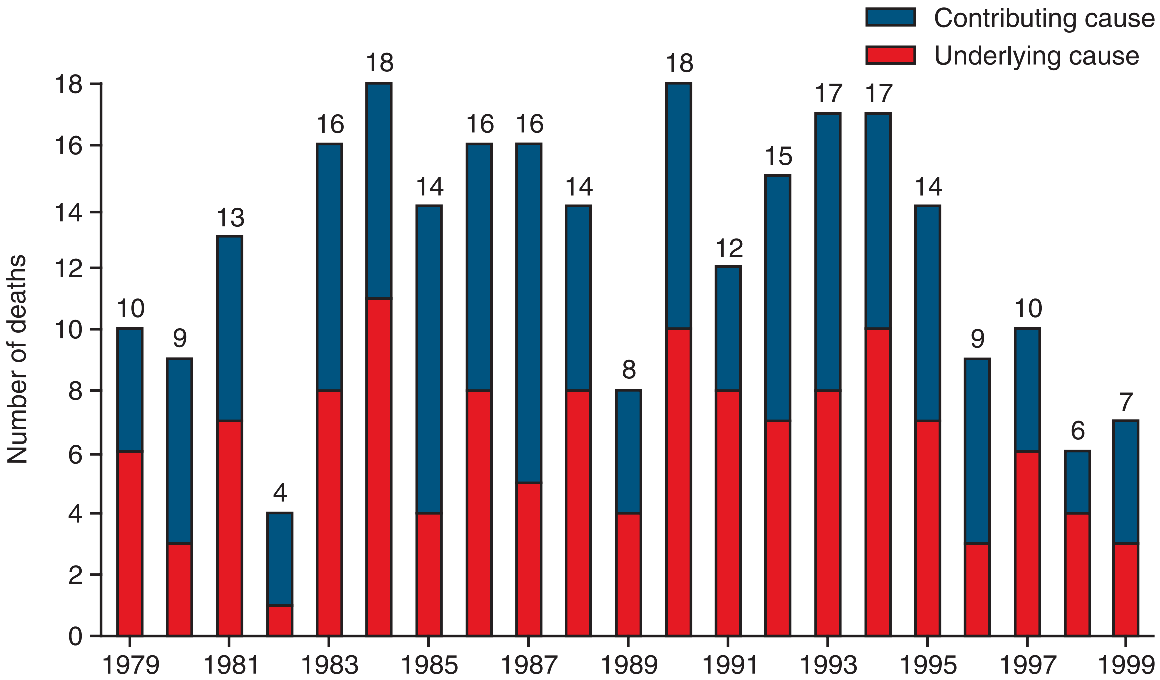
Occupation and Industry

Which industries and occupations were associated with asbestosis mortality during 1990–1999?

Figure 2–177. PMRs and 95% confidence intervals for asbestosis in U.S. residents aged 15 or older by industry and occupation, adjusted for age, race, and sex, 1990–1999. Miscellaneous nonmetallic mineral and stone products and ship and boat building and repairing had the highest significant asbestosis PMRs among industries. Among occupations, insulation workers and boilermakers had the highest asbestosis PMRs. (*Note:* The figure presents the highest significant PMRs based on 10 or more deaths.) ***(Source: NIOSH [2002f].)***

Byssinosis

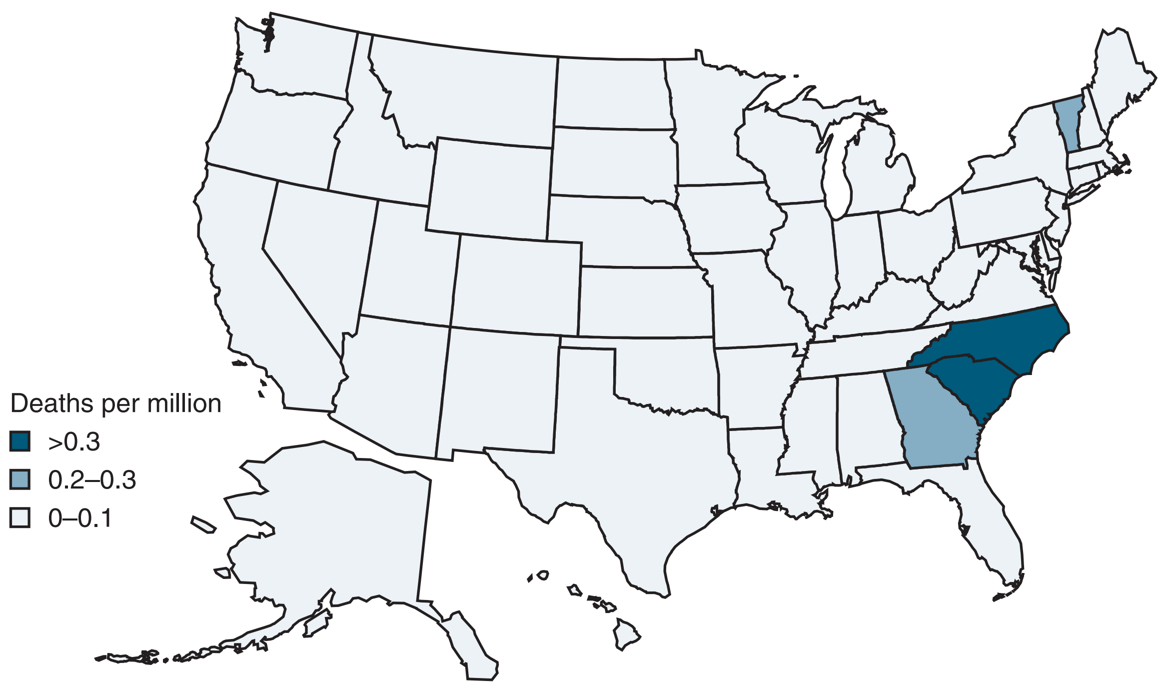
Byssinosis, also known as brown lung disease, is a chronic condition that involves small airways obstruction. Common causes of byssinosis are exposures to airborne dusts from hemp, flax, and cotton processing. Byssinosis deaths constitute the smallest proportion of all pneumoconiosis deaths. Fewer than 20 byssinosis deaths occurred annually between 1979 and 1999 (Figure 2–178). Byssinosis deaths are concentrated in the textile-producing States. During the 1990s, more than 50% of byssinosis deaths occurred in Georgia and the Carolinas (Figure 2–179). Yarn, thread, and fabric mills had the highest PMR for byssinosis among industries, and miscellaneous textile machine operators had the highest PMR among occupations (Figure 2–180).



Magnitude and Trend

How did the pattern of byssinosis mortality change during 1979–1999?

Figure 2–178. Number of deaths of U.S. residents aged 15 or older with byssinosis recorded as an underlying or contributing cause on the death certificate, 1979–1999. The number of byssinosis deaths was fewer than 20 for each year between 1979 and 1999. During this period, byssinosis was listed as the underlying cause in 50% of the byssinosis deaths. ***(Source: NIOSH [2002f].)***



Rates among States

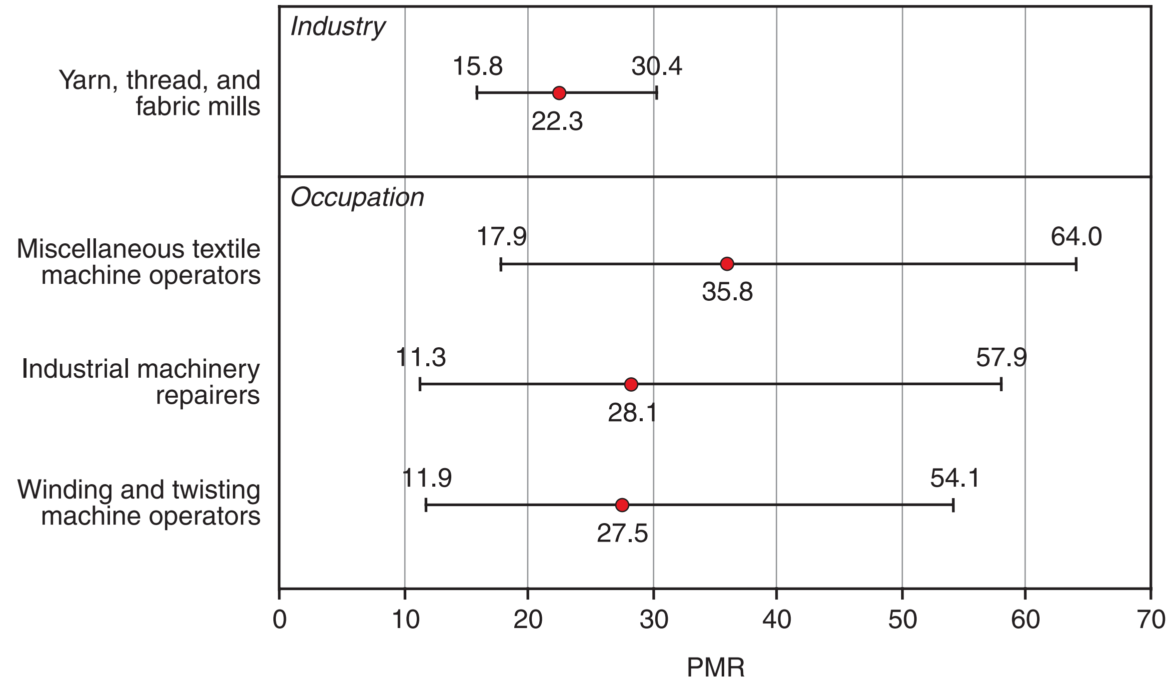
How did the rates of byssinosis mortality differ by State during 1990–1999?

Figure 2–179. Age-adjusted mortality rates for byssinosis in U.S. residents aged 15 or older by State, 1990–1999. States with the highest byssinosis mortality rates during 1990–1999 were located predominantly in the Southeast in the textile-producing States. During this period, more than half of byssinosis decedents were residents of North Carolina, South Carolina, and Georgia. ***(Source: NIOSH [2002f].)***

Occupation and Industry

Which industries and occupations were associated with byssinosis mortality during 1990–1999?

Figure 2–180. PMRs and 95% confidence intervals for byssinosis in U.S. residents aged 15 or older by industry and occupation, adjusted for age, race, and sex, 1990–1999. Significant byssinosis PMRs were associated with a single industry—yarn, thread, and fabric mills. Among occupations, elevated byssinosis PMRs were associated with miscellaneous textile machine operators, industrial machine repairers, and winding and twisting machine operators. (*Note:* The figure presents the highest significant PMRs based on five or more deaths.) ***(Source: NIOSH [2002f].)***



Coal Workers' Pneumoconiosis (CWP)

CWP is a chronic, disabling, and sometimes fatal dust disease of the lungs caused by inhaling coal mine dust. The prevalence of CWP reported here is based on data for underground coal miners who participated in the U.S. National Coal Workers' X-Ray Surveillance Program (CWXSP). In the CWXSP, CWP is defined as agreement between two Readers (one of whom must be a B Reader*) that small pneumoconiotic opacities are present at a category of 1/0 or higher, using the International Labour Office (ILO) International Classification of Radiographs of Pneumoconioses.

Among miners in this program with 25 or more years of underground coal mining, the prevalence of CWP category 1/0 or greater was 34% during 1973–1978; but it declined to 4% during 1996–1999 (Figure 2–181). Among miners with the same number of years of underground coal mining, the prevalence of a more severe CWP category (2/1 or greater) declined from 10.5% during 1970–1973 to less than 1% during 1996–1999 (Figure 2–182). During 1970–1999, decreases in CWP prevalence occurred in all categories of tenure in underground coal mining (Figures 2–181 and 2–182).

Deaths from CWP declined significantly, from a high of 2,870 in 1972 to 1,003 in 1999 (Figure 2–183). West Virginia had the highest age-adjusted mortality rate—nearly 20 times the rate of 7.56 per million for the entire United States (Figure 2–184). Coal mining and metal mining had the highest PMRs for CWP among industries, and mining machine operators had the highest PMR among the occupations (Figure 2–185).

*See *Reader* in Glossary.

Magnitude and Trend

What was the prevalence of CWP category 1/0 or greater among underground coal miners participating in the CWXSP during 1970–1999?

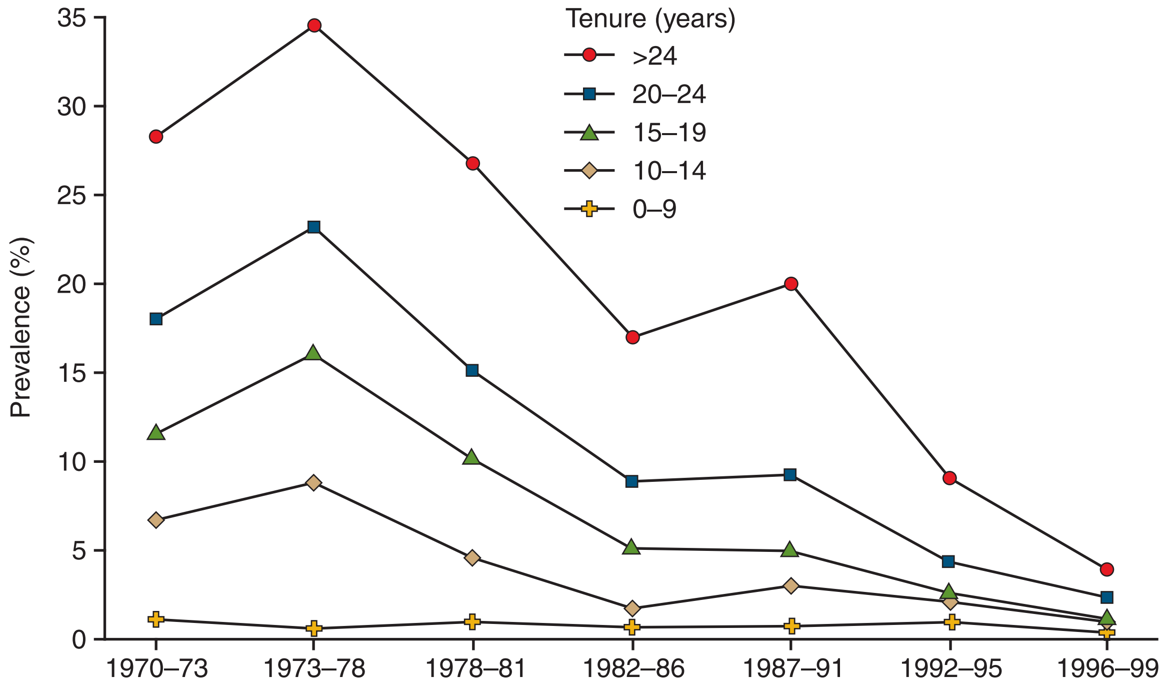


Figure 2–181. Prevalence of CWXSP-examined miners with CWP category 1/0 or greater by tenure in underground coal mining, 1970–1999. During 1970–1999, the prevalence of CWP category 1/0 or greater decreased among all tenure groups toward the prevalence of the baseline tenure group (0–9 years in underground coal mining). ***(Source: NIOSH [2002g].)***

What was the prevalence of CWP category 2/1 or greater among underground coal miners participating in the CWXSP during 1970–1999?

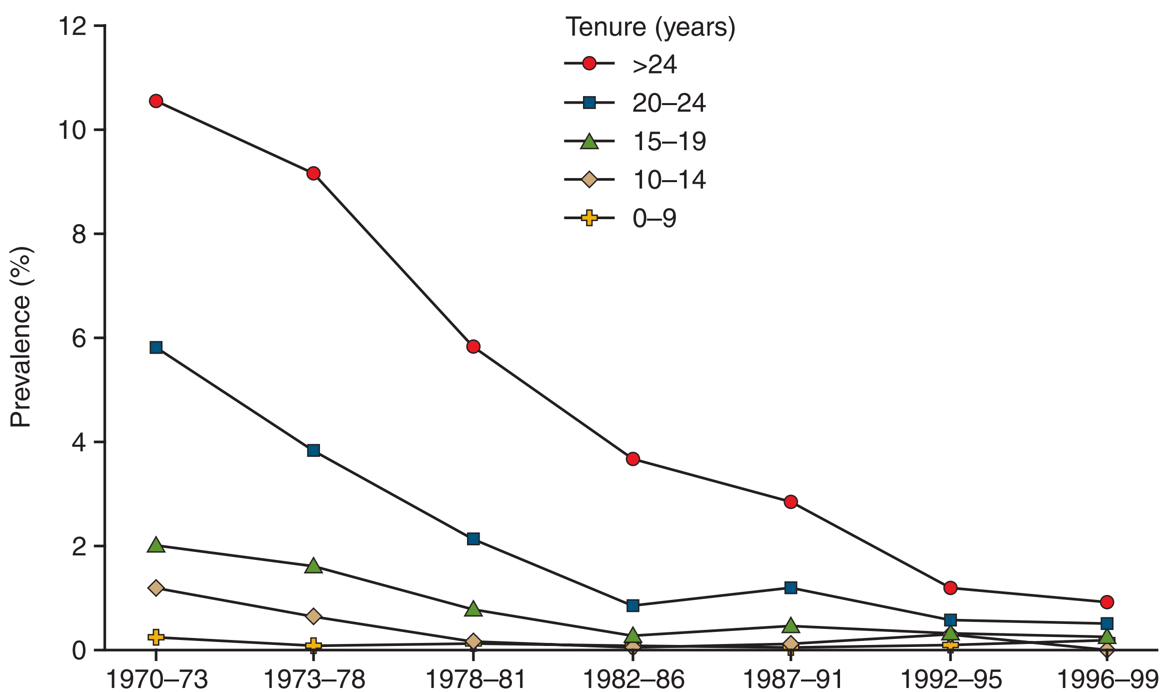
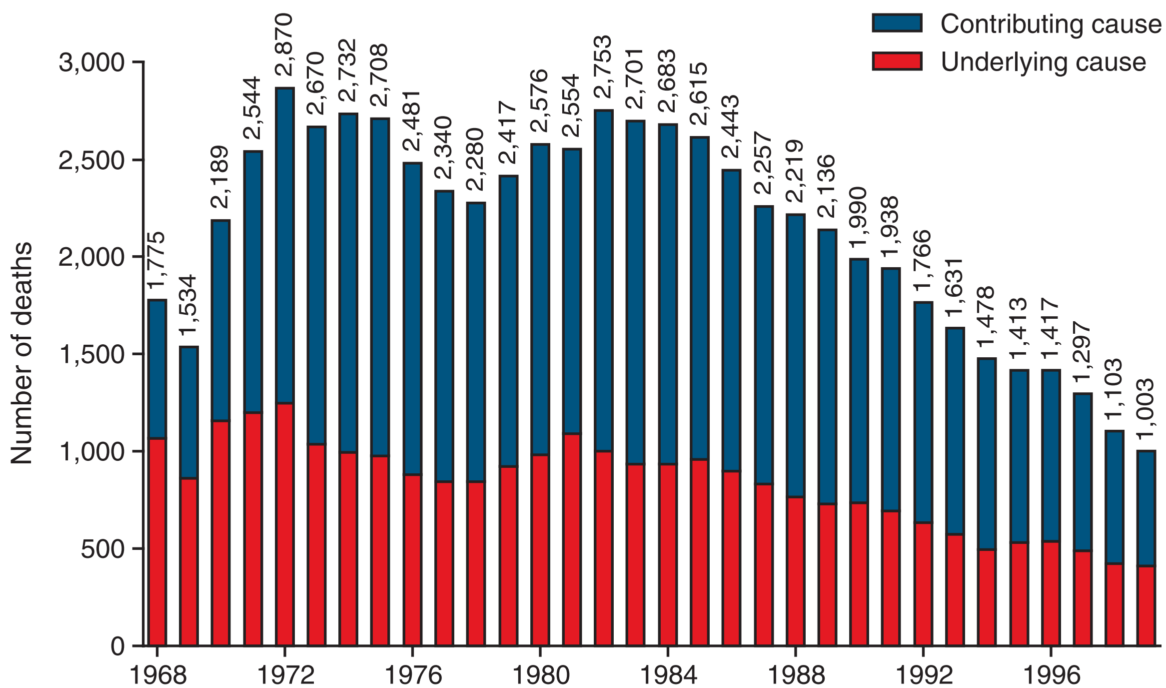
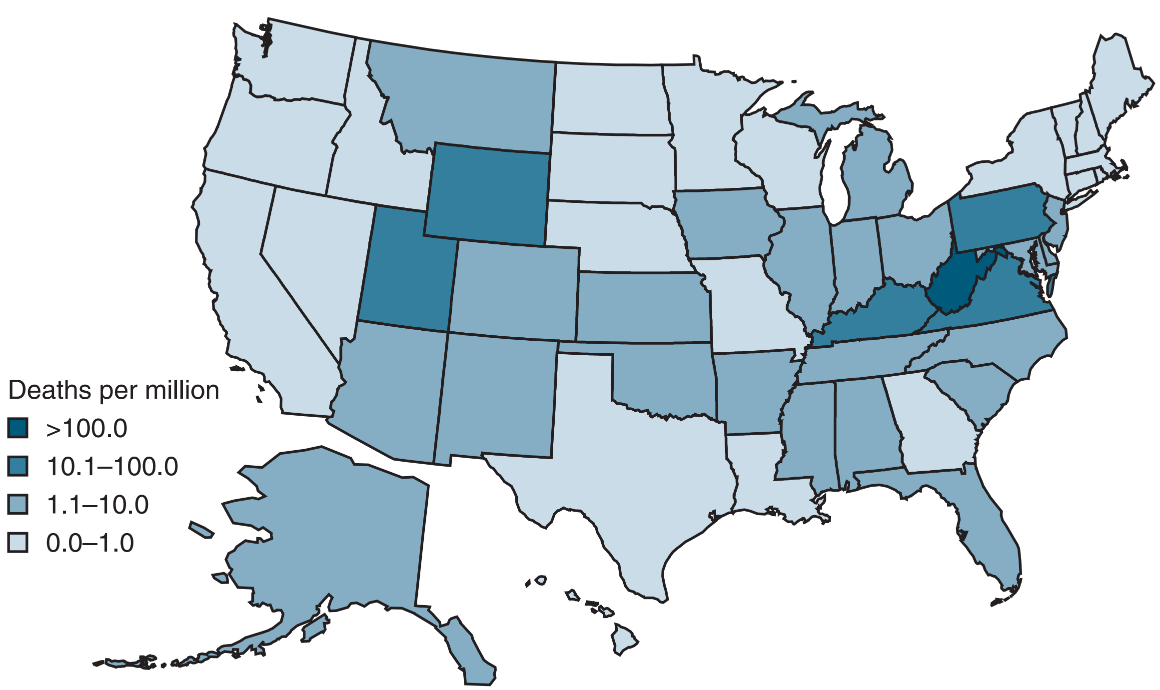


Figure 2–182. Prevalence of CWXSP-examined miners with CWP category 2/1 or greater by tenure in underground coal mining, 1970–1999. During 1970–1999, the prevalence of CWP category 2/1 or greater decreased among all tenure groups toward the prevalence of the baseline tenure group (0–9 years in underground coal mining). ***(Source: NIOSH [2002g].)***



How did the pattern of CWP mortality change during 1968–1999?

Figure 2–183. Number of deaths of U.S. residents aged 15 or older with CWP recorded as an underlying or contributing cause on the death certificate, 1968–1999. The number of CWP deaths experienced a long-term decline during 1968–1999, from more than 2,500 deaths per year in the early 1970s and 1980s to fewer than 1,500 in the late 1990s. Although the annual number of deaths declined steadily after 1982, the proportion of deaths with CWP listed as the underlying cause on the death certificate remained fairly constant, hovering around 37% from 1980 to 1999. ***(Source: NIOSH [2002f].)***



Rates among States

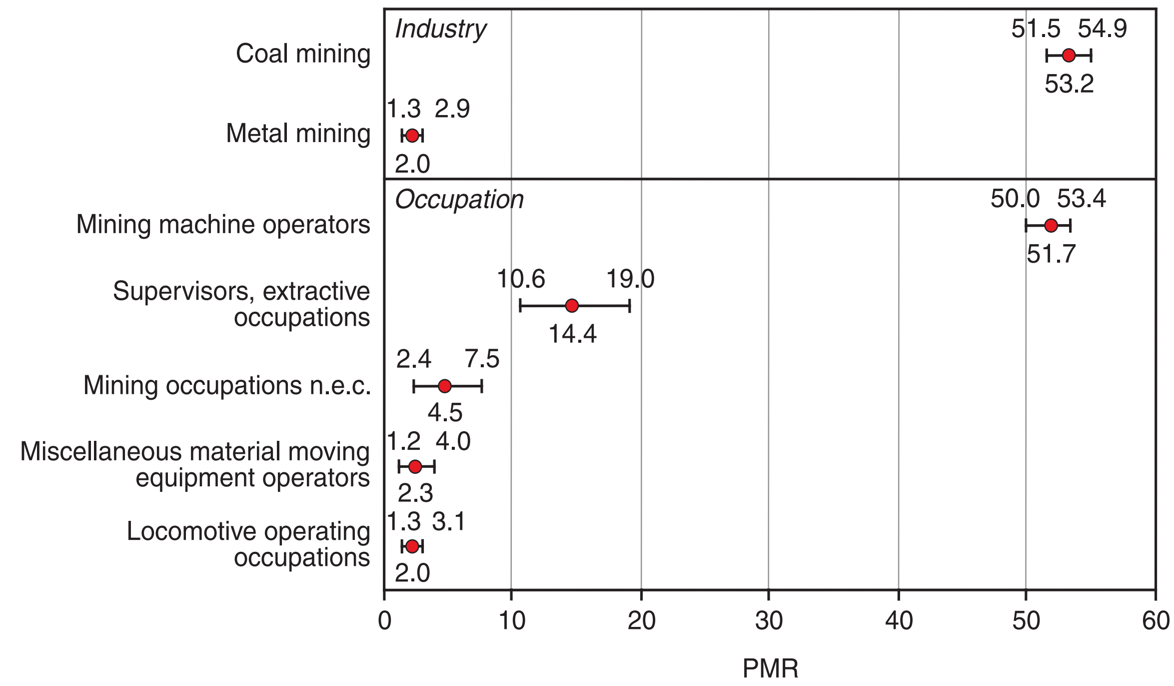
How did CWP mortality rates differ by State during 1990–1999?

Figure 2–184. Age-adjusted mortality rates for CWP in U.S. residents aged 15 or older by State, 1990–1999. West Virginia had the highest CWP mortality rate—nearly 20 times the rate of 7.56 per million for the entire United States. The second highest rate category included the Appalachian and western coal mining regions. ***(Source: NIOSH [2002f].)***

Occupation and Industry

Which industries and occupations were associated with CWP mortality during 1990–1999?

Figure 2–185. PMRs and 95% confidence intervals for CWP in U.S. residents aged 15 or older by industry and occupation, adjusted for age, race, and sex, 1990–1999. Among industries, coal mining and metal mining were associated with elevated CWP mortality during 1990–1999. Among occupations, the three highest significant PMRs were associated with mining. (*Note:* This figure presents the highest significant PMRs based on 10 or more deaths.) ***(Source: NIOSH [2002f].)***



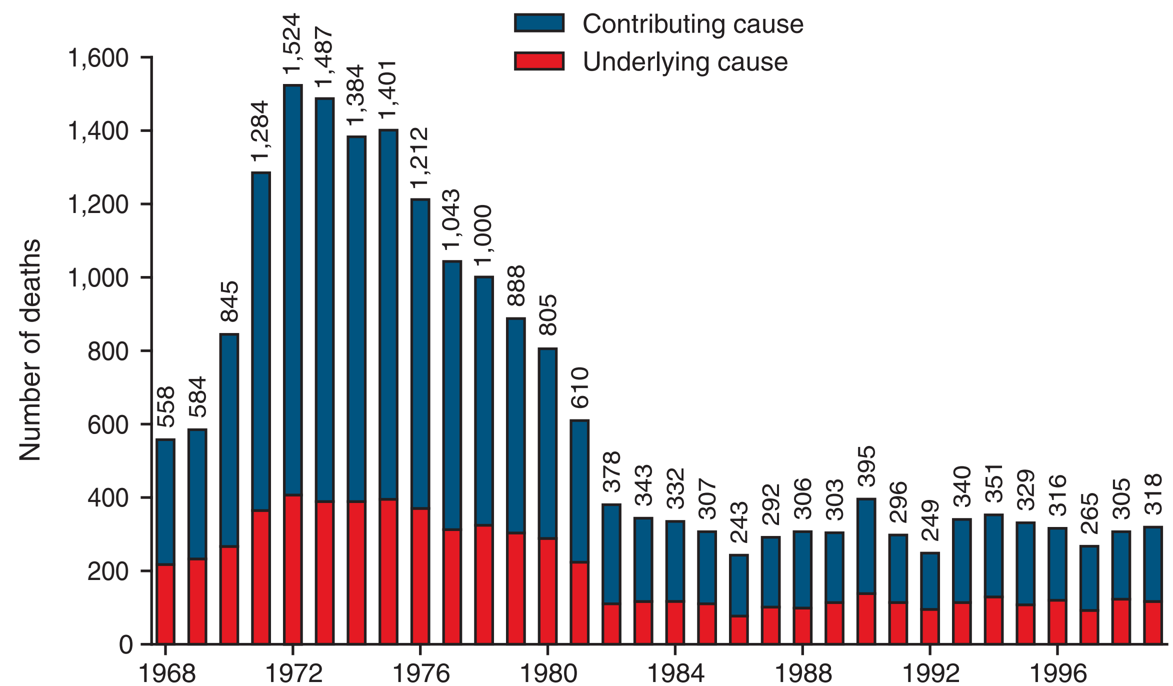
Pneumoconiosis, Other or Unspecified

This disease category includes pneumoconiosis caused by inhaling other inorganic dusts or unknown agents. Examples include aluminosis, bauxite fibrosis, berylliosis, graphite fibrosis, and others. The number of deaths recorded with unspecified/other pneumoconiosis as an underlying or contributing cause declined sharply after 1972 and ranged between 243 and 395 deaths per year between 1982 and 1999 (Figure 2–186). West Virginia had the highest age-adjusted mortality rate—nearly 20 times the rate of 1.59 per million for the entire United States during 1990–1999 (Figure 2–187). Among industries, coal mining and metal mining had the highest PMRs for unspecified/other pneumoconiosis; and among occupations, mining machine operators had the highest PMR (Figure 2–188).

Magnitude and Trend

How did the pattern of mortality from unspecified/other pneumoconiosis change during 1968–1999?

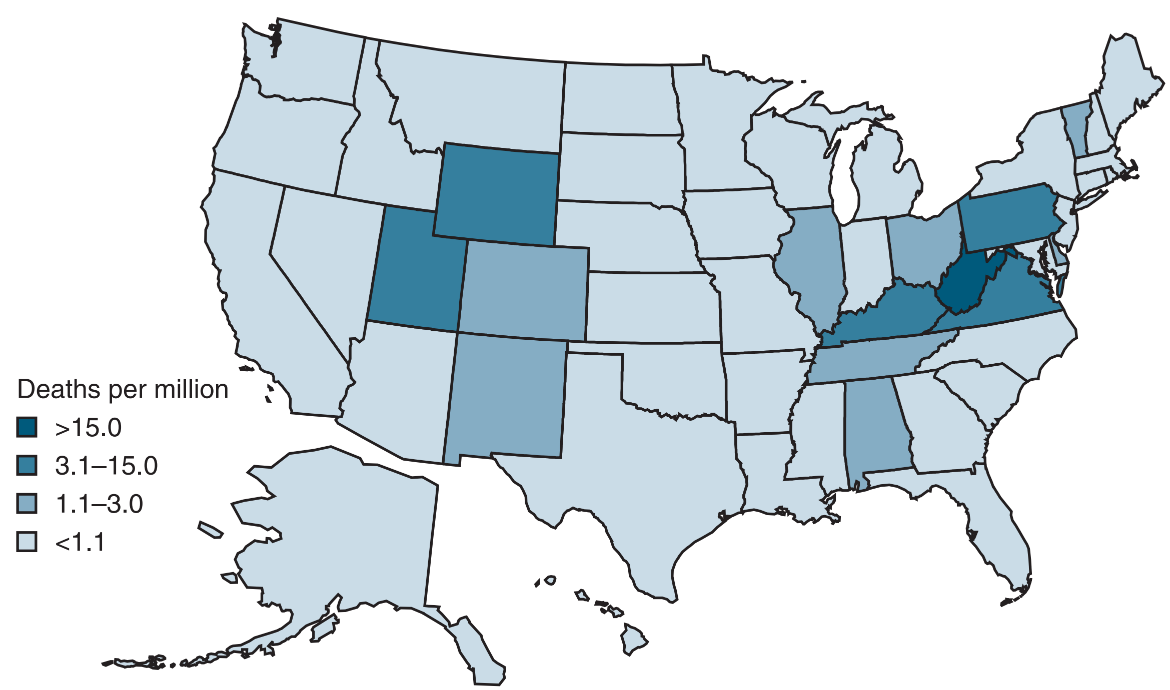
Figure 2–186. Number of deaths of U.S. residents aged 15 or older with unspecified/other pneumoconiosis recorded as an underlying or contributing cause on the death certificate, 1968–1999. The number of unspecified/other pneumoconiosis deaths declined sharply from a high of 1,524 in 1972 to fewer than 400 per year in 1983 and thereafter. The proportion of these deaths in which unspecified/other pneumoconiosis was listed as the underlying cause hovered around 34%. ***(Source:* NIOSH [2002f].)**

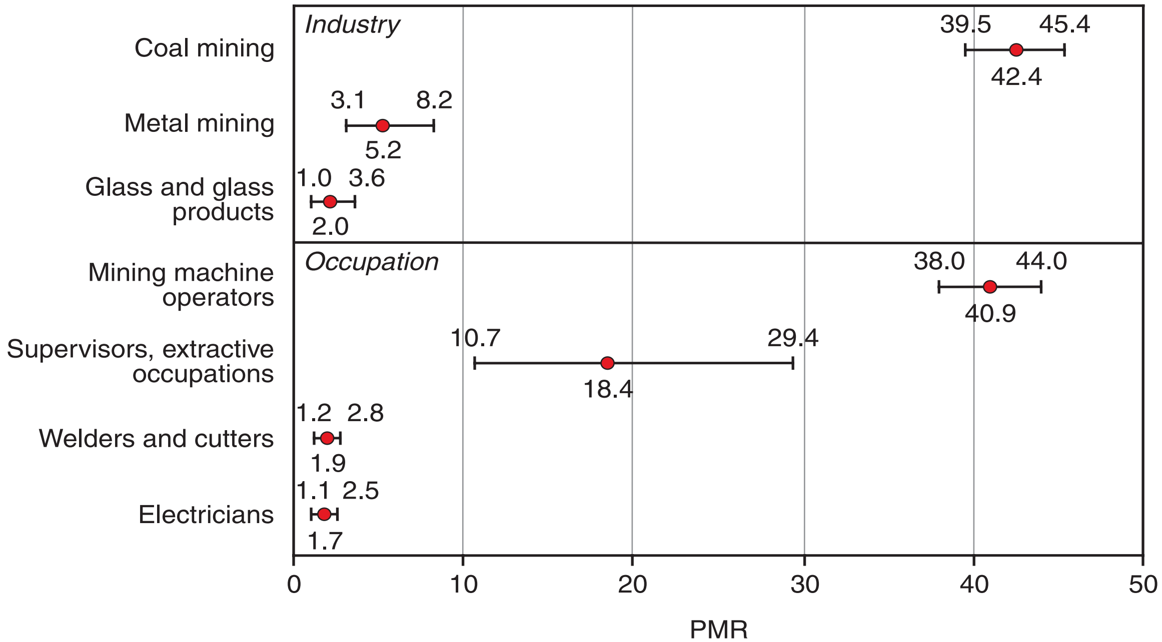


Rates among States

How did the mortality rates for unspecified/other pneumoconiosis differ by State during 1990–1999?

Figure 2–187. Age-adjusted mortality rates for unspecified/other pneumoconiosis in U.S. residents aged 15 or older by State, 1990–1999. During 1990–1999, West Virginia had the highest mortality rates for unspecified/other pneumoconiosis—more than 20 times the U.S. rate of 1.59 per million. High rates were observed among other Appalachian and Western mining States, ranging from two to nine times the U.S. rate. ***(Source:* NIOSH [2002f].)**





Occupation and Industry

Which industries and occupations were associated with unspecified/other pneumoconiosis mortality during 1990–1999?

Figure 2–188. PMRs and 95% confidence intervals for unspecified/other pneumoconiosis in U.S. residents aged 15 or older by industry and occupation, adjusted for age, race, and sex, 1990–1999. Coal and metal mining industries were associated with elevated mortality from unspecified/other pneumoconiosis (as these industries were also associated with high CWP mortality). In addition, the glass and glass products industry had a significantly high PMR. Among occupations, mining machine operators and supervisors, extractive occupations were associated with the highest PMRs, followed by welders and cutters and electricians. (*Note:* This figure presents the highest significant PMRs based on 10 or more deaths.) ***(Source: NIOSH [2002f].)***

Silicosis

Silicosis is a chronic, disabling, and sometimes fatal dust disease of the lungs caused by inhaling silica particles. Data on the prevalence of silicosis are available through the SENSOR program. For surveillance purposes, a silicosis case must have a history of occupational exposure to airborne silica dust and one or both of the following: (1) a chest radiograph (or other imaging technique) interpreted as consistent with silicosis and (2) pathologic findings characteristic of silicosis.

During 1993–1997, three States (Michigan, New Jersey, and Ohio) conducted surveillance for silicosis through the SENSOR program. Together these States identified 576 cases of silicosis, mostly through hospital reports (74.8%), reports by health care professionals (15.6%), workers' compensation (6.4%), and death certificates (1.7%) (Figure 2–189). Most cases (67.4%) occurred among operators, fabricators, and laborers (Figure 2–190) in the manufacturing industry (85.8%) (Figure 2–191).

The number of deaths due to silicosis declined sharply during 1968–1999, from more than 1,157 deaths in 1968 to 187 deaths in 1999 (Figure 2–192). Metal mining had the highest PMR among industries, and miscellaneous metal and plastic processing machine operators had the highest PMR among occupations (Figure 2–194).

Silicosis Prevalence

Source of reports

What sources did SENSOR States use to identify silicosis cases during 1993–1997?

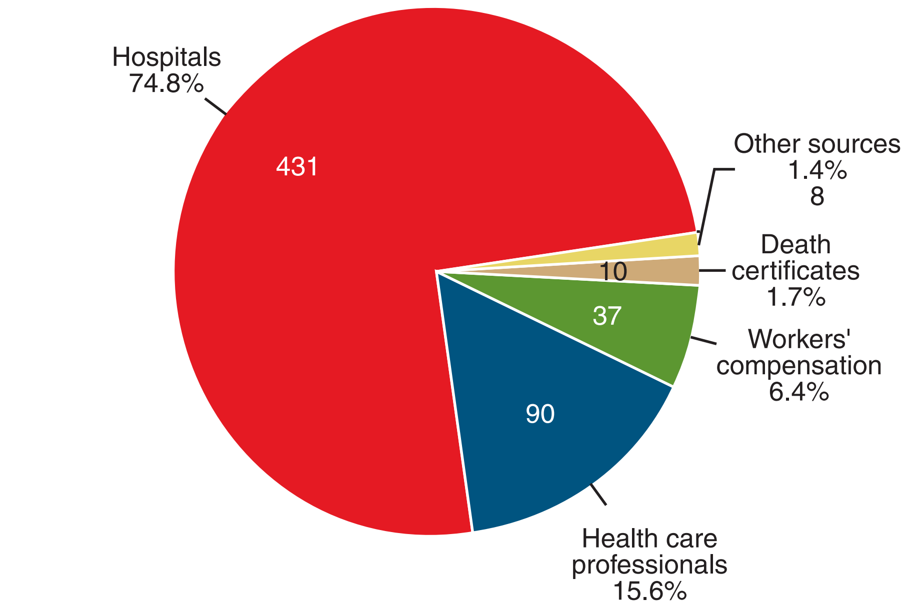


Figure 2–189. Distribution and number of silicosis cases for all three reporting SENSOR States (Michigan, New Jersey, Ohio) by source of report, 1993–1997. During 1993–1997, hospitals were the largest source of reports (74.8%) for identifying the largest proportion of confirmed cases of silicosis (74.8%), followed by health care professionals (15.6%). ***(Sources:** Rosenman et al. [2002b]; Socie and Migliozzi [2002]; Valiante and Schill [2002b]; Filios [2002b].)*

Occupation

In which occupations did SENSOR States find silicosis cases during 1993–1997?

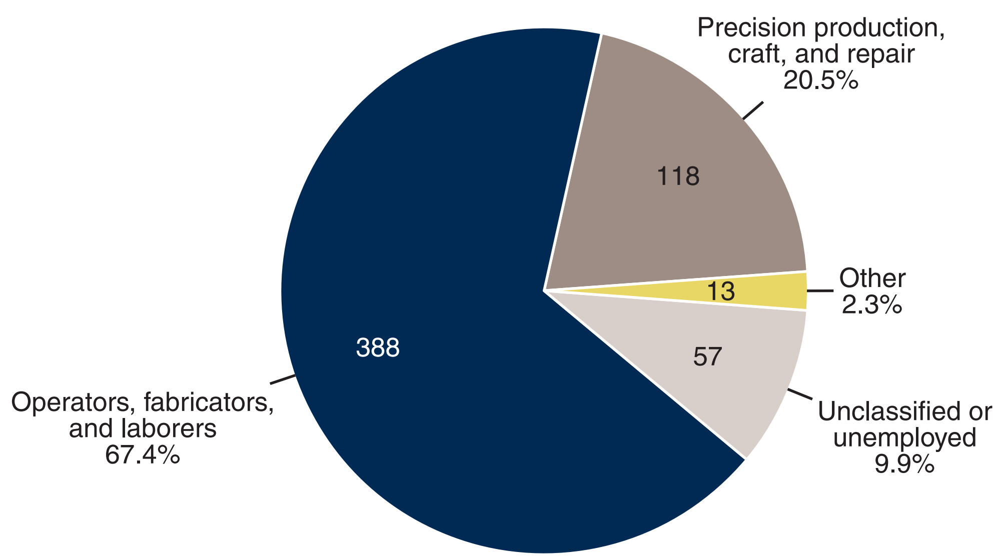
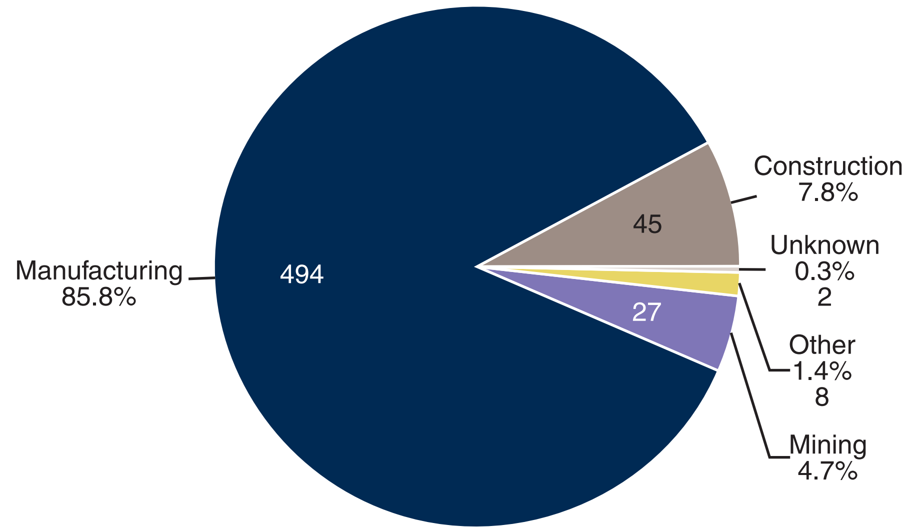


Figure 2–190. Distribution and number of silicosis cases for all three reporting SENSOR States (Michigan, New Jersey, Ohio) by occupation, 1993–1997. The largest proportion of silicosis cases (67.4%) occurred among operators, fabricators, and laborers during 1993–1997. ***(Sources:** Rosenman et al. [2002b]; Socie and Migliozzi [2002]; Valiante and Schill [2002b]; Filios [2002b].)*

Industry

In which industries did SENSOR States find silicosis cases during 1993–1997?

Figure 2–191. Distribution and number of silicosis cases for all three reporting SENSOR States (Michigan, New Jersey, Ohio) by industry, 1993–1997. The largest proportion of silicosis cases occurred in manufacturing (85.8%), followed by construction (7.8%). ***(Sources: Rosenman et al. [2002b]; Socie and Migliozzi [2002]; Valiante and Schill [2002b]; Filios [2002b].)***

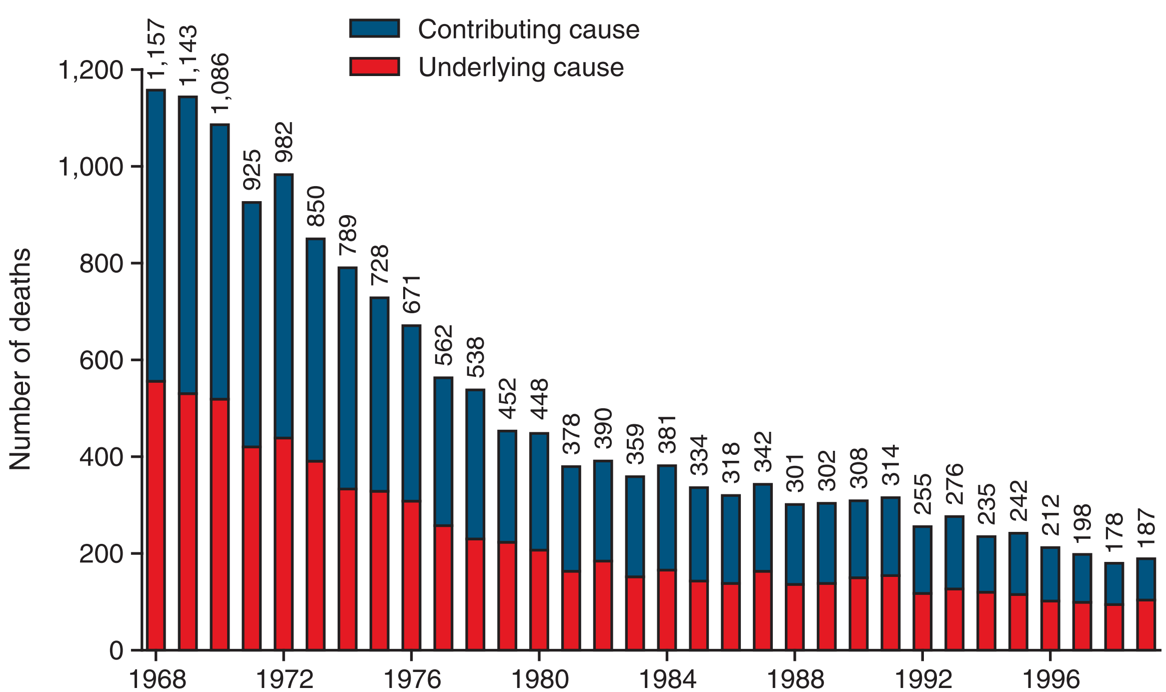


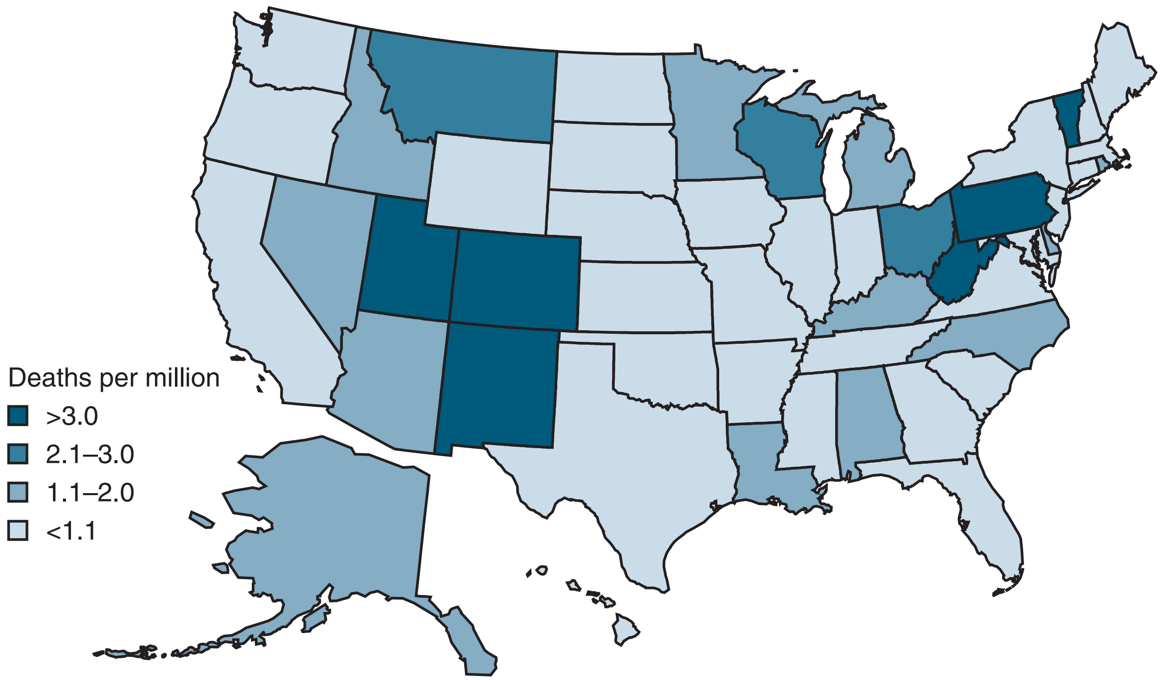
Silicosis Mortality

Magnitude and trend

How did the pattern of silicosis mortality change during 1968–1999?

Figure 2–192. Number of deaths of U.S. residents aged 15 or older with silicosis recorded as an underlying or contributing cause on the death certificate, 1968–1999. The number of silicosis deaths declined sharply from 1,157 deaths in 1968 to 187 deaths in 1990. Silicosis was listed as the underlying cause of death in nearly half of all silicosis deaths from 1990 to 1999. ***(Source: NIOSH [2002f].)***





Rates among States

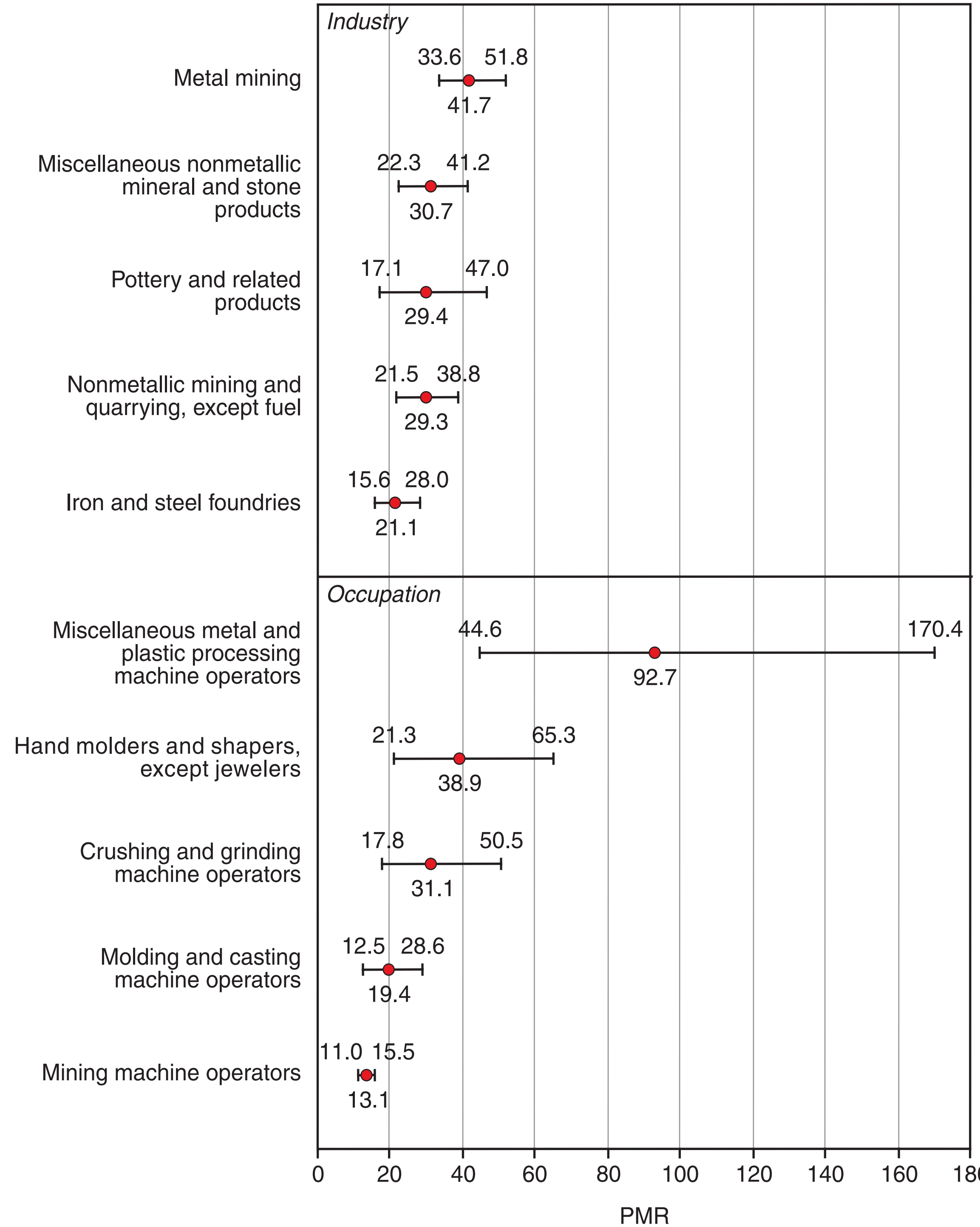
How did silicosis mortality rates differ by State during 1990–1997?

Figure 2–193. Age-adjusted mortality rates for silicosis in U.S. residents aged 15 or older by State, 1990–1997. States with the highest silicosis mortality rates during 1990–1999 were regionally dispersed: West Virginia, Pennsylvania, and Vermont make up the eastern cluster; and Colorado, New Mexico, and Utah constitute the western cluster. Mortality rates for each of these States were at least three times the rate of 1.21 per million for the entire United States. ***(Source: NIOSH [2002f].)***

Occupation and industry

Which industries and occupations were associated with silicosis mortality during 1990–1999?

Figure 2–194. PMRs and 95% confidence intervals for silicosis in U.S. residents aged 15 or older by industry and occupation, adjusted for age, race, and sex, 1990–1999. During 1990–1999, metal mining was associated with the highest significant silicosis PMR among industries. Among occupations, miscellaneous metal and plastic processing machine operators had the highest silicosis PMR. (*Note:* This figure presents the highest significant PMRs based on 10 or more deaths.) ***(Source: NIOSH [2002f].)***



Dust Diseases of the Lungs

BLS defines dust diseases of the lungs (pneumoconioses) to include silicosis, asbestosis and other asbestos-related diseases, CWP, byssinosis, siderosis, and other pneumoconioses. During 1972–2001, the number of BLS-estimated dust diseases of the lungs ranged from a low of approximately 1,000 cases in 1975 to a high of 3,500 cases in 1996; BLS reported 1,300 cases in 2001 (Figure 2–195). Rates varied during 1984–2001 from a high of 0.5 per 10,000 full-time workers in 1986 and in 1987 to a low of 0.1 in 2001. The overall trend during this period was downward (Figure 2–196). Within reporting States in 2001, the number of cases ranged from fewer than 50 to 200 (Figure 2–197). Rates varied by State in 2001, from a low of 0.1 per 10,000 full-time workers in most States to a high of 3.8 per 10,000 full-time workers in West Virginia; the U.S. rate was 0.1 per 10,000 full-time workers (Figure 2–198).

Magnitude and Trend

How did the number of cases of occupational dust diseases of the lungs change during 1972–2001?

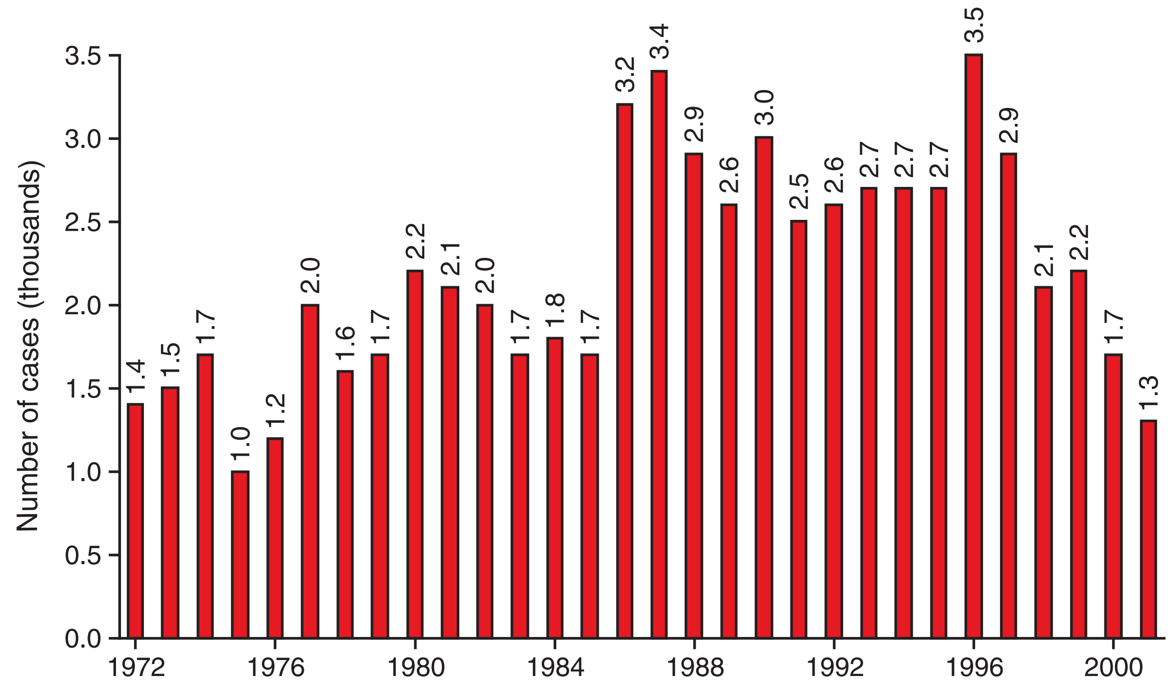


Figure 2–195. Number of cases of dust diseases of the lungs in private industry, 1972–2001. During 1972–2001, the number of BLS-estimated dust diseases of the lungs ranged from a low of approximately 1,000 cases in 1975 to a high of 3,500 cases in 1996. BLS reported 1,300 cases in 2001. ***(Source: BLS [2002].)***

How did the rates of occupational dust diseases of the lungs change during 1984–2001?

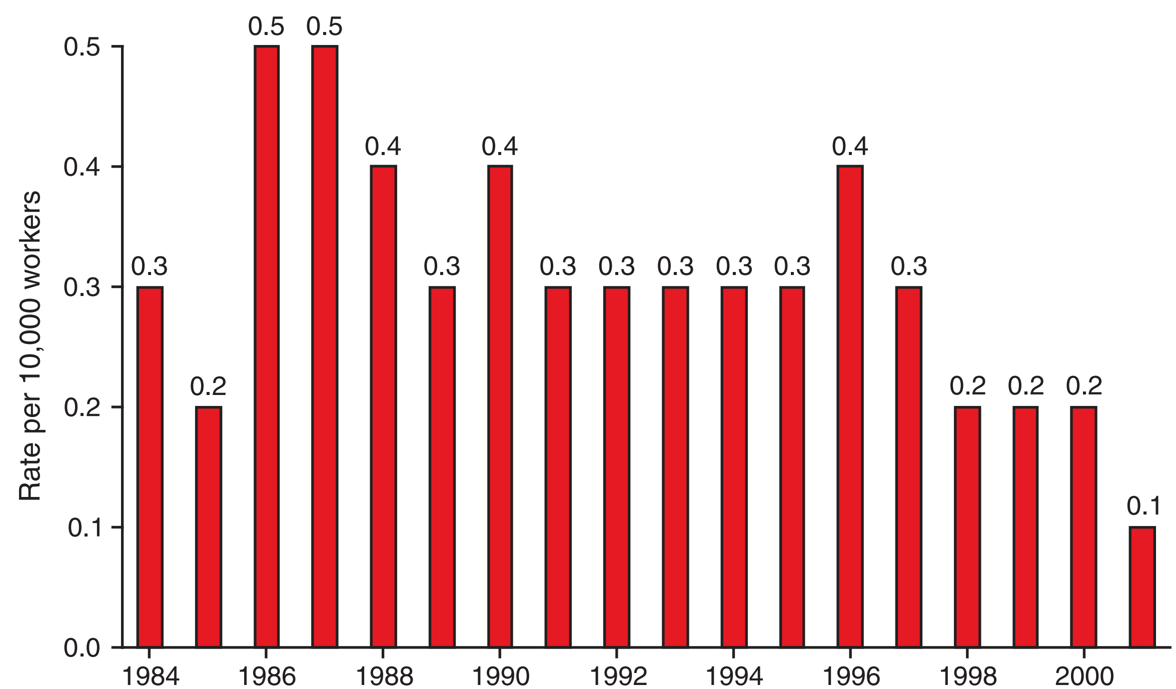


Figure 2–196. Incidence rates of dust diseases of the lungs in private industry, 1984–2001. During 1984–2001, BLS reported incidence rates of dust diseases of the lungs ranging from a high of 0.5 per 10,000 full-time workers in 1986 and in 1987 to a low of 0.1 in 2001. The overall trend during this period was downward. Dust diseases of the lungs are the least prevalent of the illness conditions, accounting for approximately 1% of all reported illness cases. ***(Source: BLS [2002].)***

Numbers and Rates among States

How did the number of occupational dust diseases of the lungs differ by State in 2001?

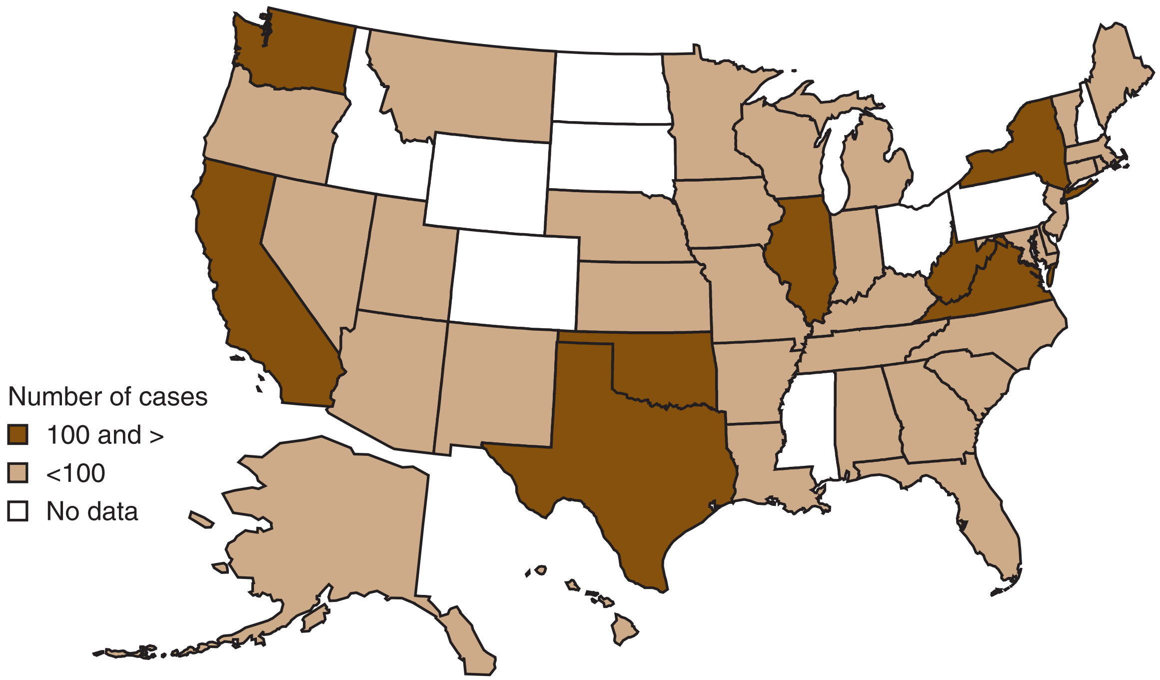


Figure 2–197. Number of cases of dust diseases of the lungs in private industry by State, 2001. The number of dust diseases of the lungs within reporting States ranged from fewer than 50 cases to 200 in 2001. BLS reported 1,300 cases of dust diseases of the lung in 2001. Eight States (California, Illinois, New York, Oklahoma, Texas, Virginia, Washington, and West Virginia) reported 100 or more cases. ***(Source: BLS [2002].)***

How did the rates of occupational dust diseases of the lungs differ by State in 2001?

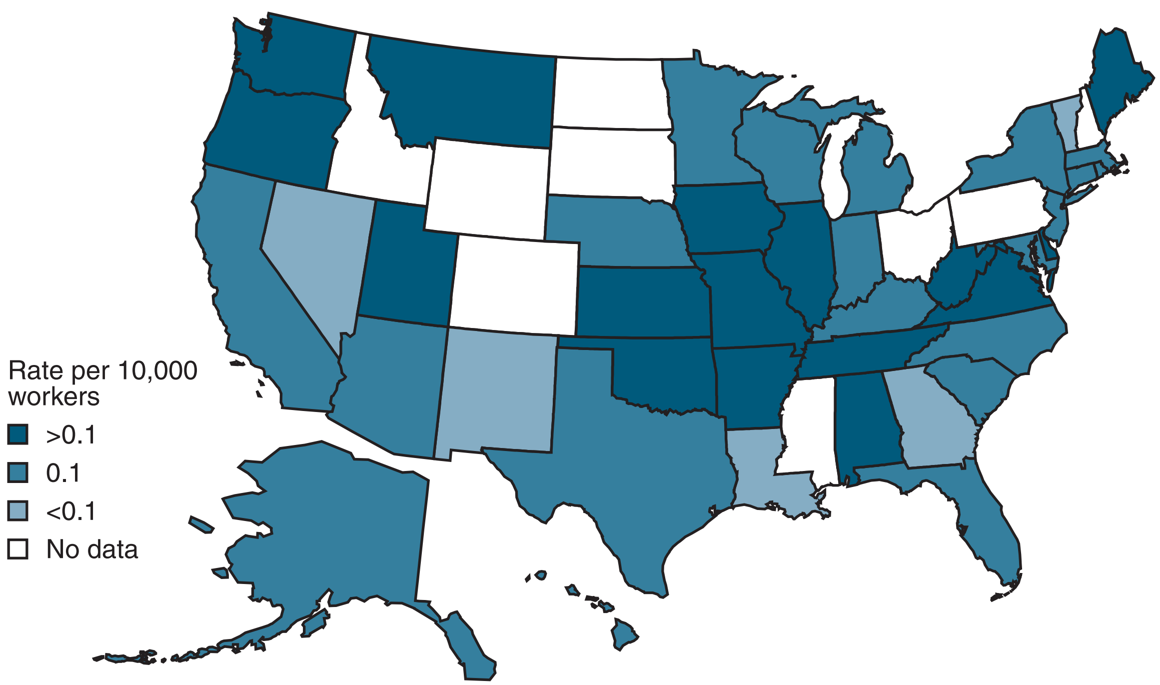
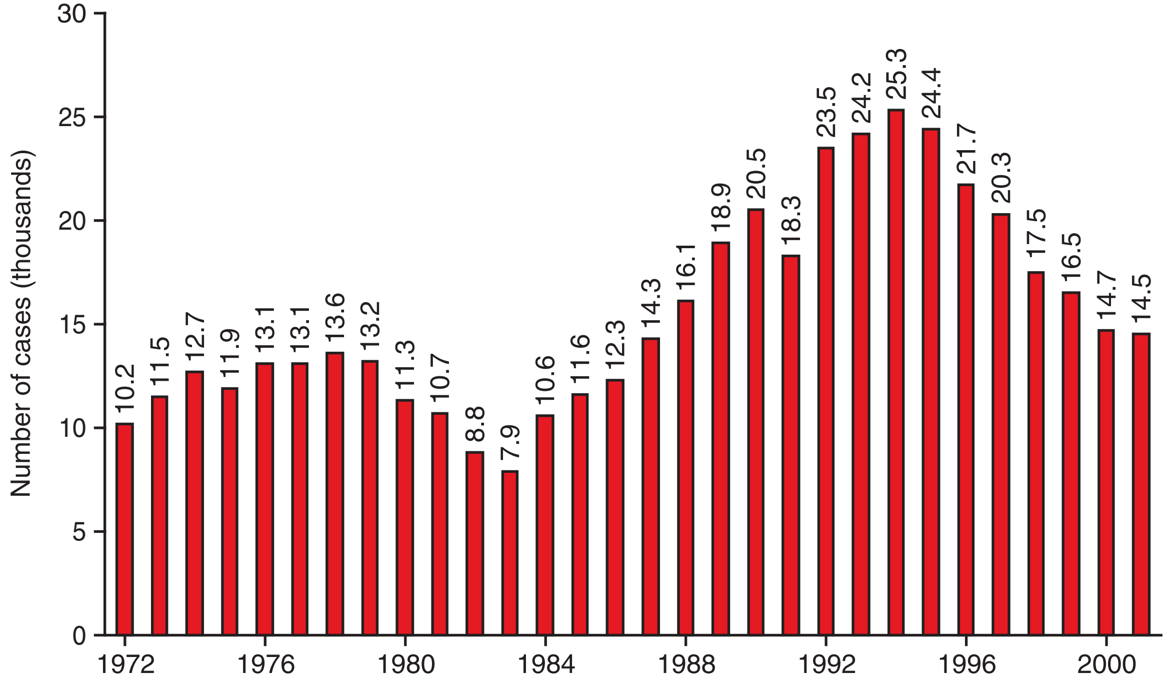


Figure 2–198. Incidence rates for dust diseases of the lungs in private industry by State, 2001. Rates for occupational dust diseases of the lungs varied by State in 2001, from a low of 0.1 per 10,000 full-time workers in most States to a high of 3.8 per 10,000 full-time workers in West Virginia. The U.S. rate was 0.1 per 10,000 full-time workers. Lower rates were reported for States in the South, the Southwest, and the West. ***(Source: BLS [2002].)***

Respiratory Conditions Due to Toxic Agents

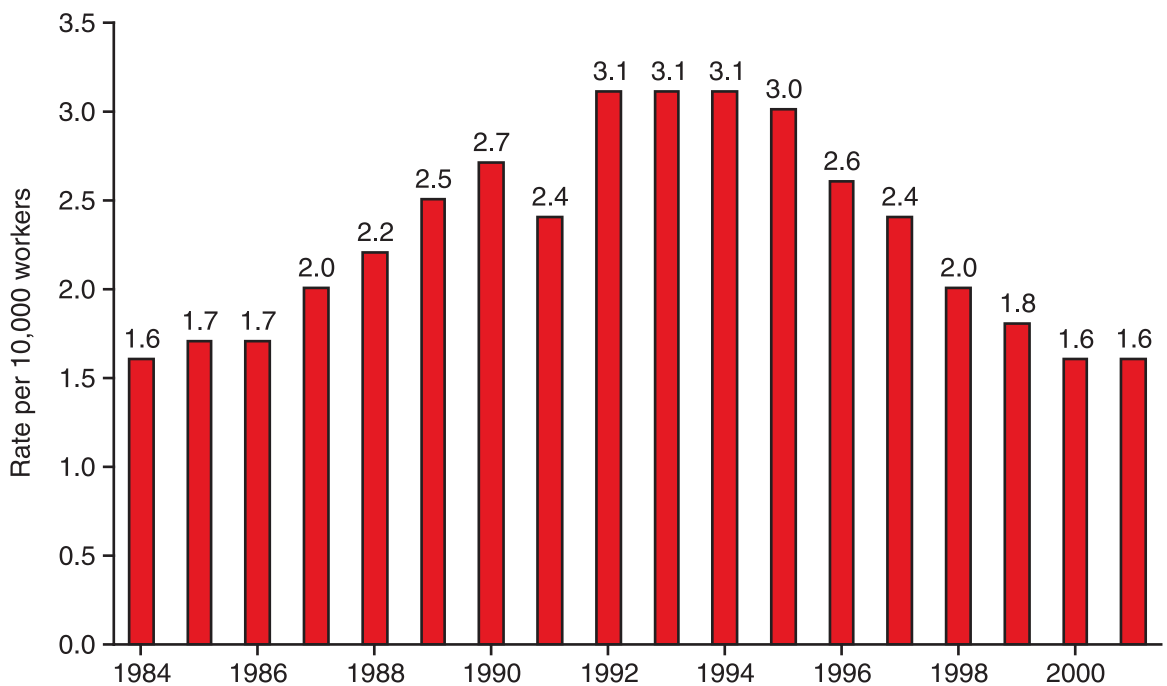
Respiratory conditions due to toxic agents include pneumonitis, pharyngitis, farmer's lung, and rhinitis or acute congestion due to chemicals. During 1972–2001, the number of BLS-estimated cases of respiratory conditions due to toxic agents ranged from a low of approximately 7,900 cases in 1983 to a high of 25,300 cases in 1994 (Figure 2–199). Rates varied from a high of 3.1 per 10,000 full-time workers (reported for 1992–1994) to a low of 1.6 (reported for 1984 and 2000–2001) (Figure 2–200). Within reporting States in 2001, the number of cases ranged from fewer than 50 to 1,400 (Figure 2–201). Rates of occupational respiratory conditions due to toxic agents varied by State in 2001 from a low of 0.7 per 10,000 full-time workers in Louisiana to a high of 5.0 in Maine; the U.S. rate was 1.6 per 10,000 full-time workers (Figure 2–202).



Magnitude and Trend

How did the number of occupational respiratory conditions due to toxic agents change during 1972–2001?

Figure 2–199. Number of cases of respiratory conditions due to toxic agents in private industry, 1972–2001. During 1972–2001, the number of BLS-estimated cases of occupational respiratory conditions due to toxic agents ranged from a low of approximately 7,900 cases in 1983 to a high of 25,300 cases in 1994. BLS reported 14,500 cases in 2001. ***(Source: BLS [2002].)***



How did the rates of occupational respiratory conditions due to toxic agents change during 1984–2001?

Figure 2–200. Incidence rates of respiratory conditions due to toxic agents in private industry, 1984–2001. During 1984–2001, BLS reported relatively low rates of respiratory conditions due to toxic agents. The highest rate (3.1 per 10,000 full-time workers) was reported for 1992–1994, and the lowest rate (1.6) was reported for 1984 and 2000–2001. Respiratory conditions due to toxic agents accounted for approximately 4%–5% of all reported illness cases. ***(Source: BLS [2002].)***

Numbers and Rates among States

How did the number of occupational respiratory conditions due to toxic agents differ by State in 2001?

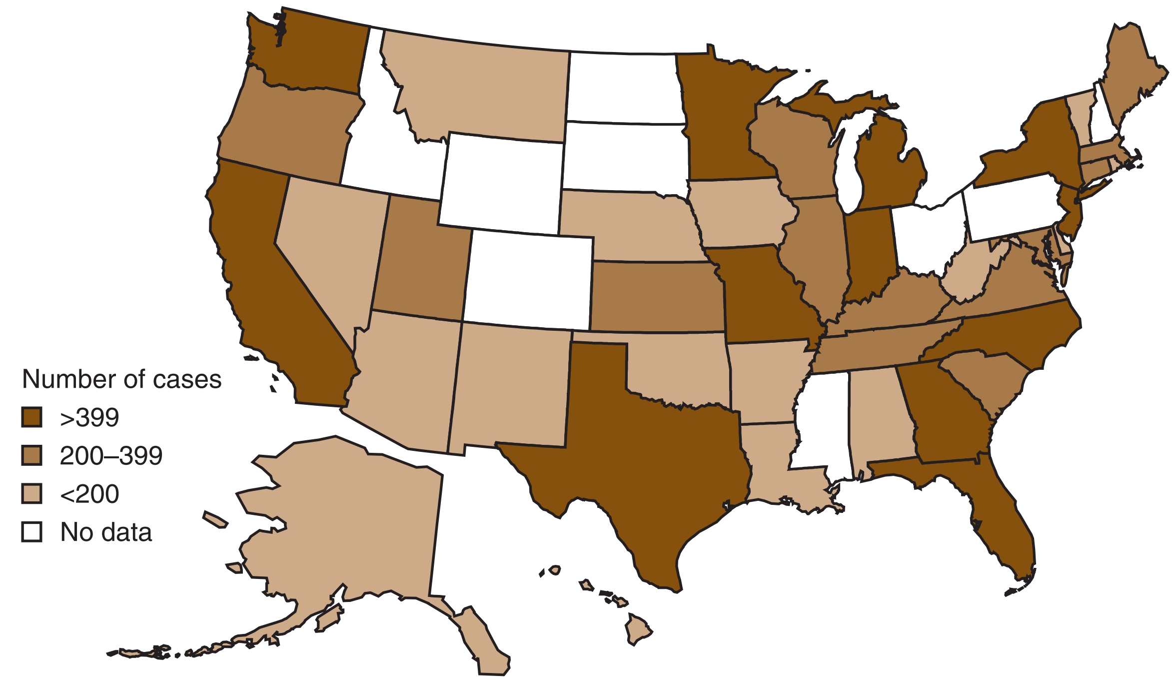


Figure 2–201. Number of respiratory conditions due to toxic agents in private industry by State, 2001. The number of respiratory conditions due to toxic agents within reporting States in 2001 ranged from fewer than 50 cases to 1,400. BLS reported 14,500 cases in 2001. States with the highest numbers of these conditions included California (1,400), Michigan (900), Texas (700), North Carolina (700), and New York (700). ***(Source: BLS [2002].)***

How did the rates of occupational respiratory conditions due to toxic agents differ by State in 2001?

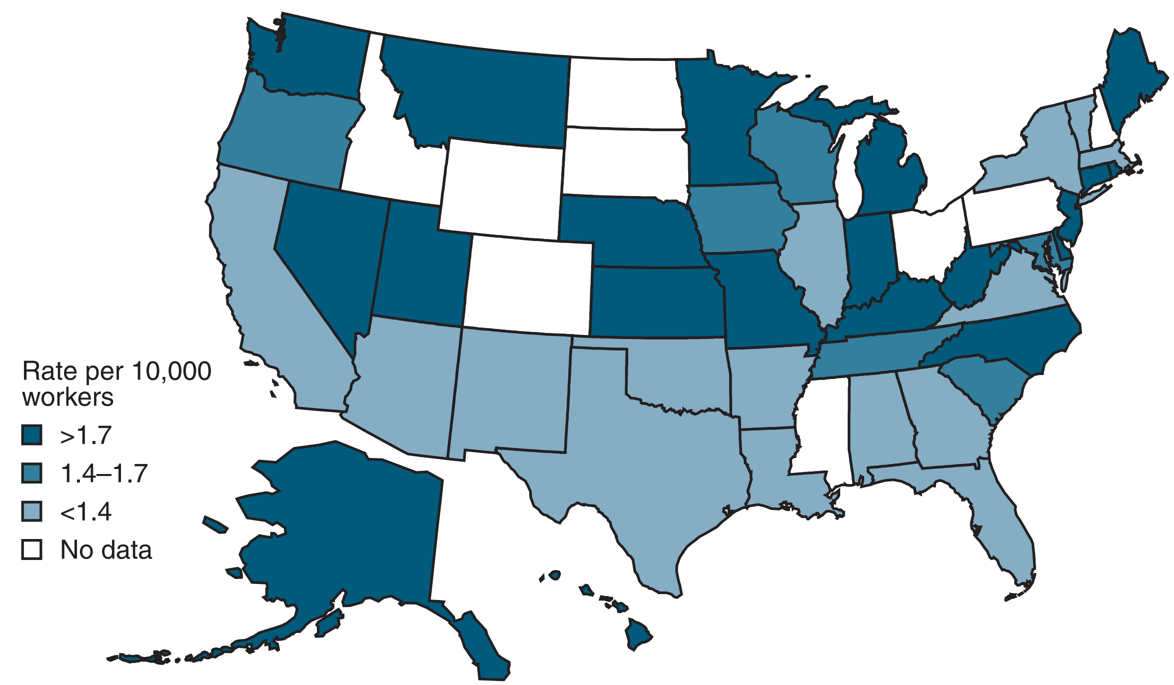


Figure 2–202. Incidence rates for respiratory conditions due to toxic agents in private industry by State, 2001. In 2001, incidence rates of occupational respiratory conditions due to toxic agents varied by State from a low of 0.7 per 10,000 full-time workers in Louisiana to a high of 5.0 in Maine. The U.S. rate was 1.6 per 10,000 full-time workers. Lower rates were reported for Southern, Southwestern, and Western States. ***(Source: BLS [2002].)***

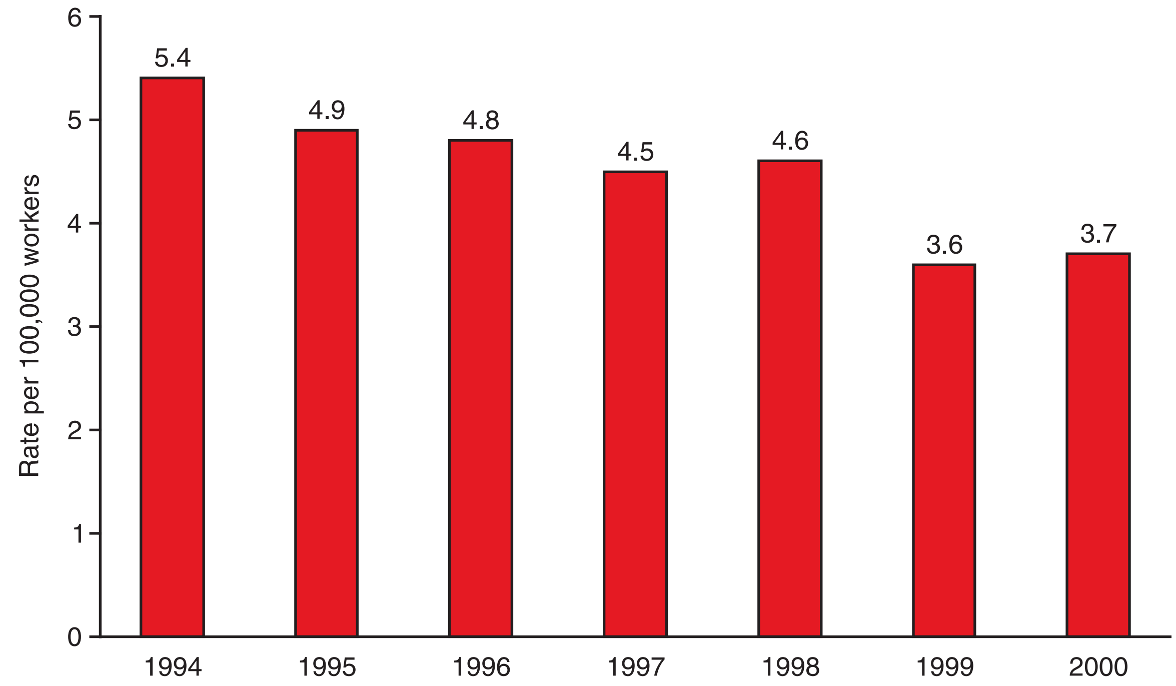
Tuberculosis (TB)

TB is a disease caused by *Mycobacterium tuberculosis*. This bacterium can attack any part of the body, but it usually attacks the lungs. Data for TB incidence among health care workers come from CDC's National Center for HIV, STD, and TB Prevention (NCHSTP). The NCHSTP maintains ongoing surveillance through the National Tuberculosis Surveillance System. In 2000, CDC reported 16,377 cases of TB; 15,242 of these cases included information about occupation.

Magnitude and Trend

What was the trend of TB incidence in health care workers during 1994–2000?

Figure 2–203. Incidence rates of TB in health care workers, 1994–2000. The TB incidence rate in health care workers declined from 5.4 per 100,000 workers in 1994 to 3.7 in 2000. (*Note:* The TB incidence rate for each year was computed using the number of health care workers as the denominator. This number was obtained from the U.S. Census Bureau's *Current Population Survey* for each year.) ***(Source: CDC [2002c].)***



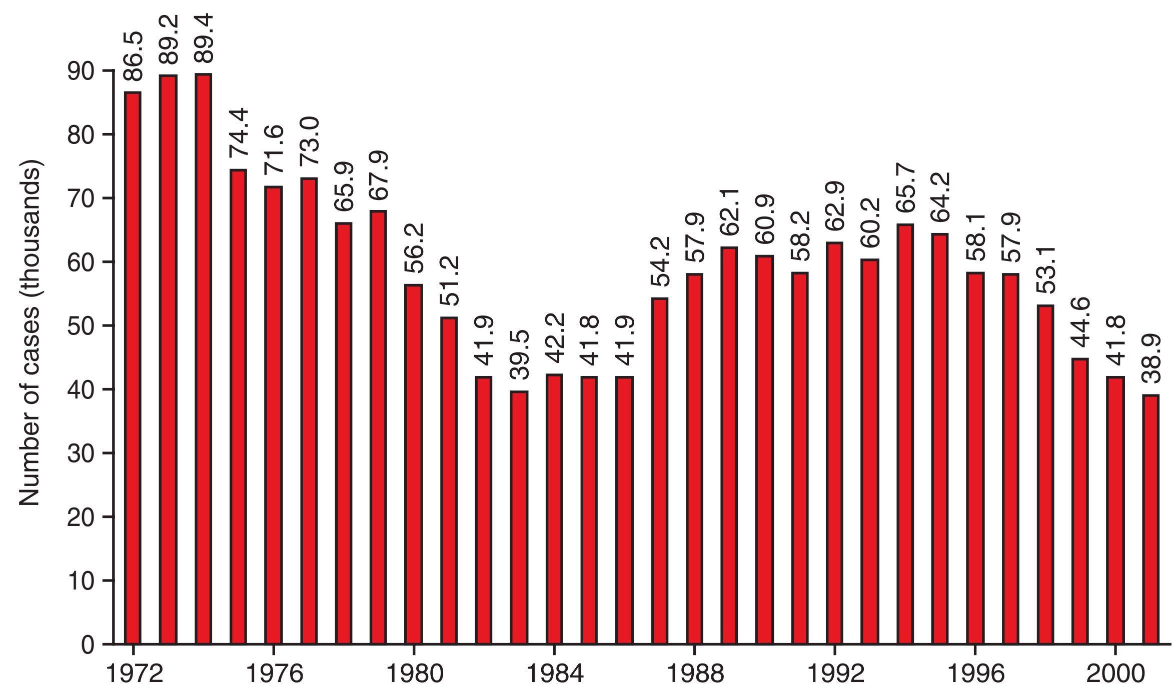
Skin Diseases and Disorders

Occupational skin diseases and disorders include contact dermatitis, eczema, or rash caused by primary irritants and sensitizers or poisonous plants; oil acne; chrome ulcers; and chemical burns or inflammations. During 1972–2001, the number of skin diseases and disorders ranged from a peak of 89,400 cases in 1974 to a low of 38,900 in 2001 (Figure 2–204). Rates varied from a high of 8.2 cases per 10,000 full-time workers in 1992 to 4.3 in 2001—the lowest rate ever reported by BLS (Figure 2–205). Within reporting States in 2001, the number of cases ranged from fewer than 50 to 3,700 (Figure 2–206). Rates of skin diseases and disorders varied by State in 2001 from a low of 1.2 cases per 10,000 full-time workers in New Mexico to a high of 9.8 in Kansas; the U.S. rate was 4.3 cases per 10,000 full-time workers (Figure 2–207).

Magnitude and Trend

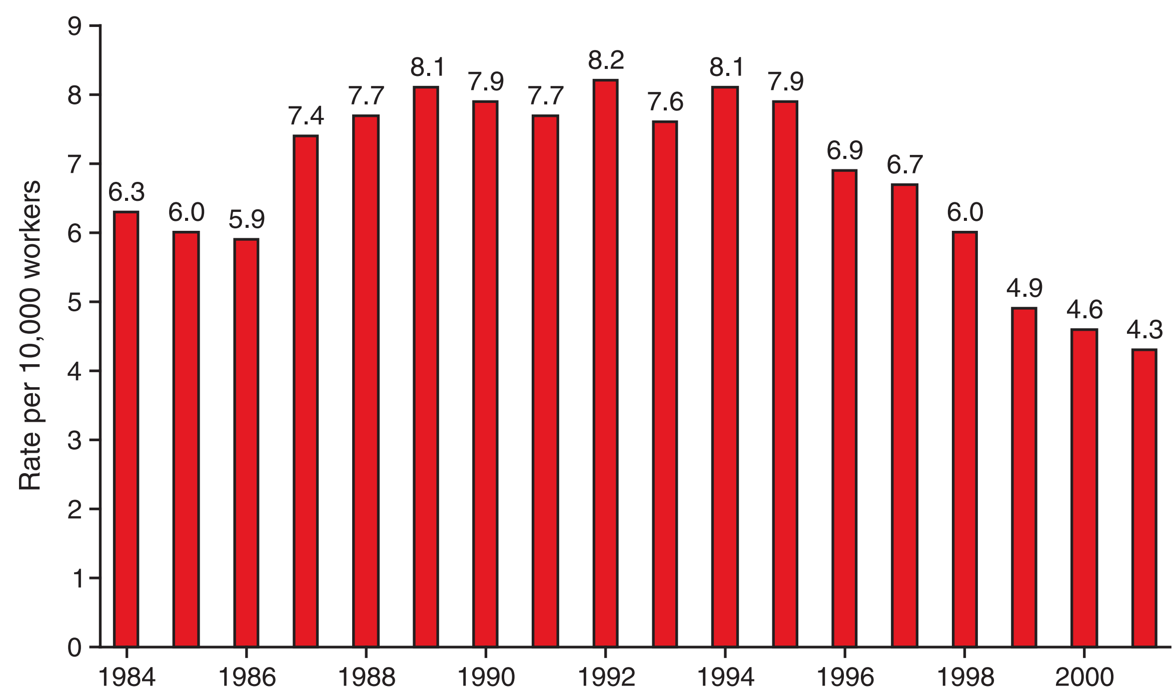
How did the number of occupational skin diseases and disorders change during 1972–2001?

Figure 2–204. Number of skin diseases and disorders in private industry, 1972–2001. The number of skin diseases and disorders peaked at 89,400 cases in 1974 then declined steadily to a low of 39,500 in 1983. Cases increased to 65,700 in 1994 then declined steadily to 38,900 in 2001. ***(Source: BLS [2002].)***

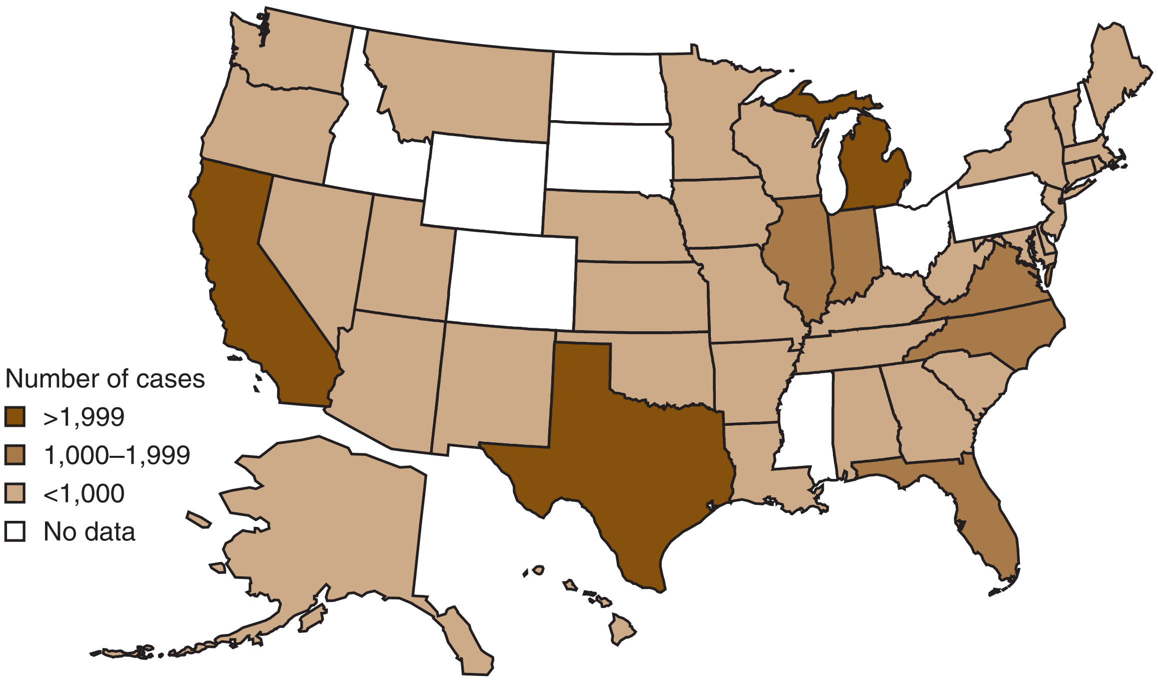


How did rates of occupational skin diseases and disorders change during 1984–2001?

Figure 2–205. Incidence rates of skin diseases and disorders in private industry, 1984–2001. Rates of skin diseases and disorders increased from 6.3 cases per 10,000 full-time workers in 1984 to 8.2 in 1992. Rates remained elevated through 1995 then declined to 4.3 cases per 10,000 full-time workers in 2001—the lowest rate ever reported by BLS. ***(Source: BLS [2002].)***

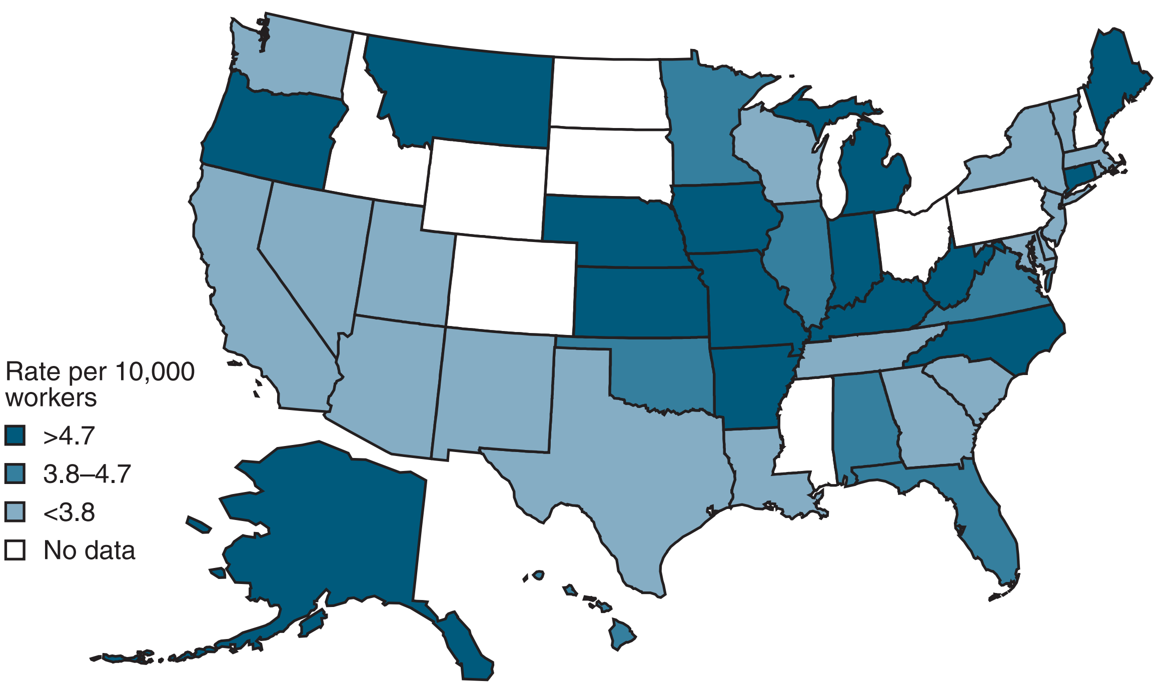


Numbers and Rates among States



How did the number of occupational skin diseases and disorders differ by State in 2001?

Figure 2–206. Number of skin diseases and disorders in private industry by State, 2001. The number of occupational skin diseases and disorders within reporting States ranged from fewer than 50 cases to 3,700 in 2001. BLS reported 38,900 cases in 2001. States with the highest numbers included California (3,700), Michigan (2,800), Texas (2,000), and Florida (1,900). *(Source: BLS [2002].)*



How did the rates of occupational skin diseases and disorders differ by State in 2001?

Figure 2–207. Incidence rates for skin diseases and disorders in private industry by State, 2001. In 2001, rates of occupational skin diseases and disorders varied by State from a low of 1.2 cases per 10,000 full-time workers in New Mexico to a high of 9.8 in Kansas. The U.S. rate was 4.3 cases per 10,000 full-time workers. Lower rates were reported for the West, the Southwest, and the Mid-Atlantic States. *(Source: BLS [2002].)*

Dermatitis

Dermatitis is an inflammation of the skin resulting from contact with allergens or irritants. Dermatitis may also be caused by reaction to something ingested. Several forms of dermatitis exist, including atopic dermatitis, contact dermatitis, allergic dermatitis, and irritant dermatitis. These disorders tend to be less severe (Figure 2–213) than the average nonfatal injury or illness case. They involve a median of 3 days away from work compared with 6 days for the average nonfatal injury or illness case [BLS 2003a].

BLS reported 4,714 dermatitis cases involving days away from work in 2001 (Figure 2–208). Rates declined 58.3% during 1992–2001, from 1.2 per 10,000 full-time workers in 1992 to 0.5 cases in 2001 (Figure 2–209). In 2001, most cases involved workers who were aged 25–54 (72.8%) (Figure 2–210), male (Figure 2–211), and white, non-Hispanic (64.5%) (Figure 2–212). Two occupational groups accounted for 56% of all dermatitis cases in 2001: operators, fabricators, and laborers (28.4% or 1,334 cases) and service workers (27.6% or 1,298 cases) (Figure 2–214). Dermatitis incidence rates exceeding the private-sector rate of 0.5 per 10,000 full-time workers were reported in 2001 for agriculture, forestry, and fishing (1.3 per 10,000 full-time workers), manufacturing (0.7), transportation and public utilities (0.7), and services (0.6) (Figure 2–215). Agriculture had consistently higher incidence rates than other industry sectors during 1992–2001 and experienced a 78% rate reduction over this period (Figure 2–216).

Magnitude and Trend

How did the number of occupational dermatitis cases change during 1992–2001?

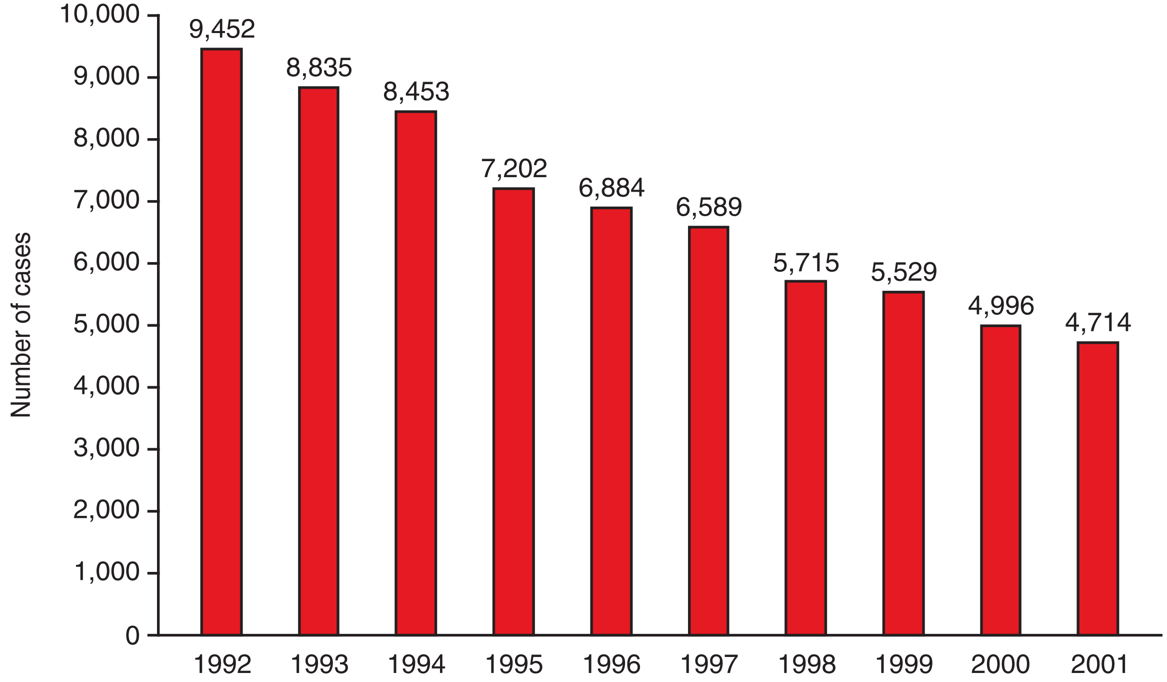


Figure 2–208. Number of dermatitis cases involving days away from work in private industry, 1992–2001. The annual number of dermatitis cases involving days away from work declined significantly (50.1%) during 1992–2001, from 9,452 cases in 1992 to 4,714 cases in 2001. ***(Sources: BLS [2003a,b].)***

How did the annual rate of occupational dermatitis cases change during 1992–2001?

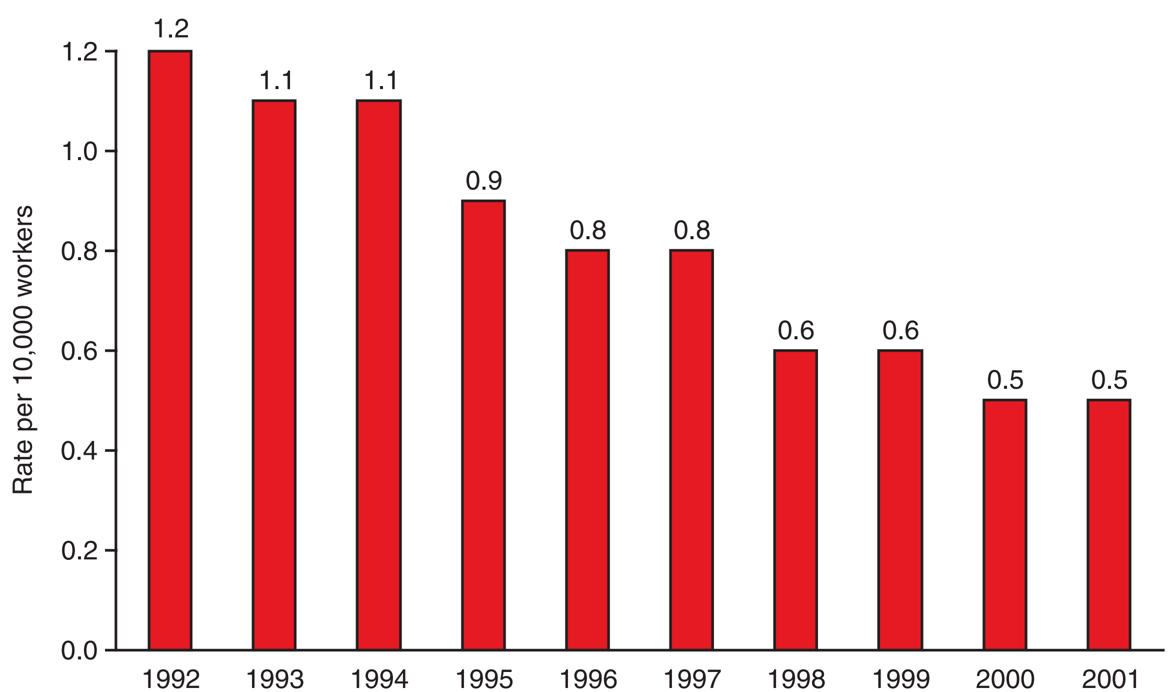


Figure 2–209. Annual rates of dermatitis cases involving days away from work in private industry, 1992–2001. The annual rate of private-sector dermatitis cases involving days away from work declined 58.3% during 1992–2001, from 1.2 per 10,000 full-time workers in 1992 to 0.5 in 2001. ***(Sources: BLS [2003a,b].)***

Age

How did the number of dermatitis cases differ by age of worker in 2001?

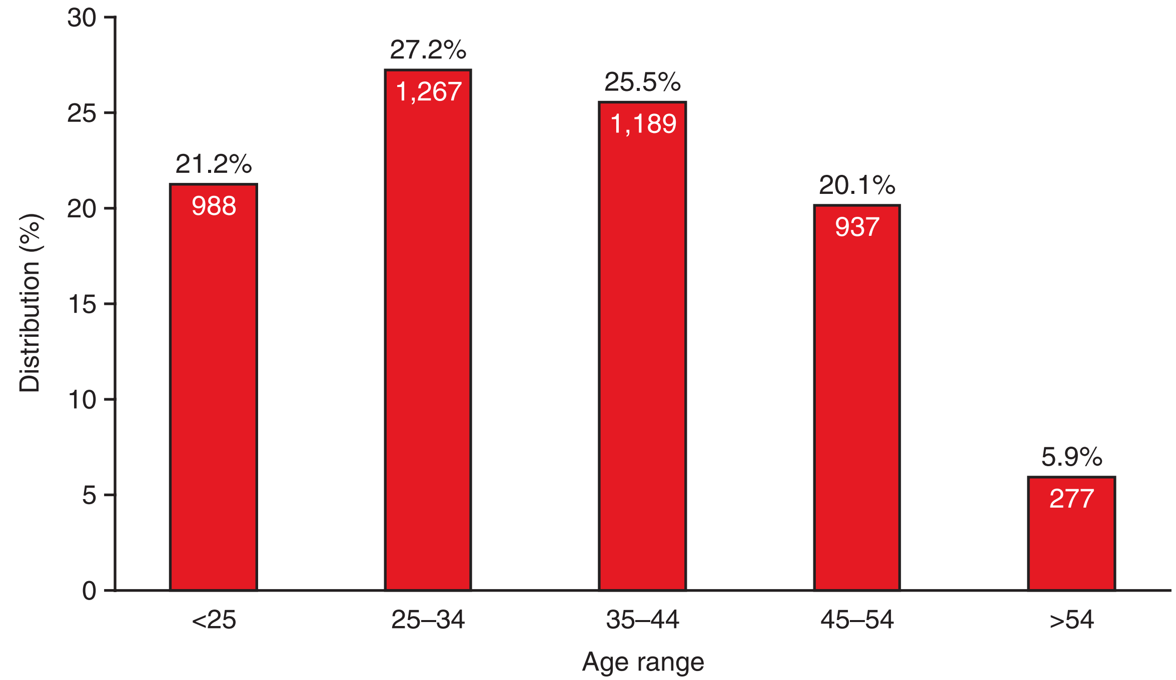


Figure 2–210. Distribution and number of dermatitis cases involving days away from work in private industry by age, 2001. Age data are available for 4,658 of the 4,714 BLS-estimated dermatitis cases involving days away from work. Workers aged 25–34 accounted for 1,267 cases or 27.2%, and workers aged 35–44 accounted for 1,189 cases or 25.5%. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003d].)***

Sex

How did the distribution of dermatitis cases differ by sex of worker during 1992–2001?

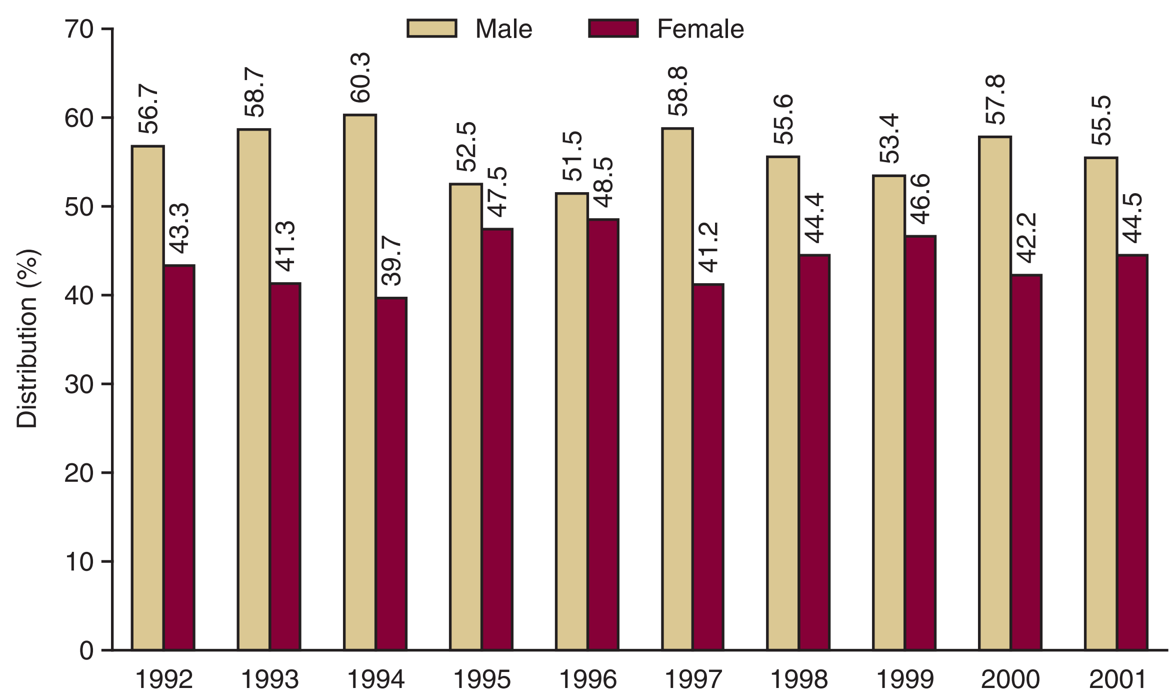
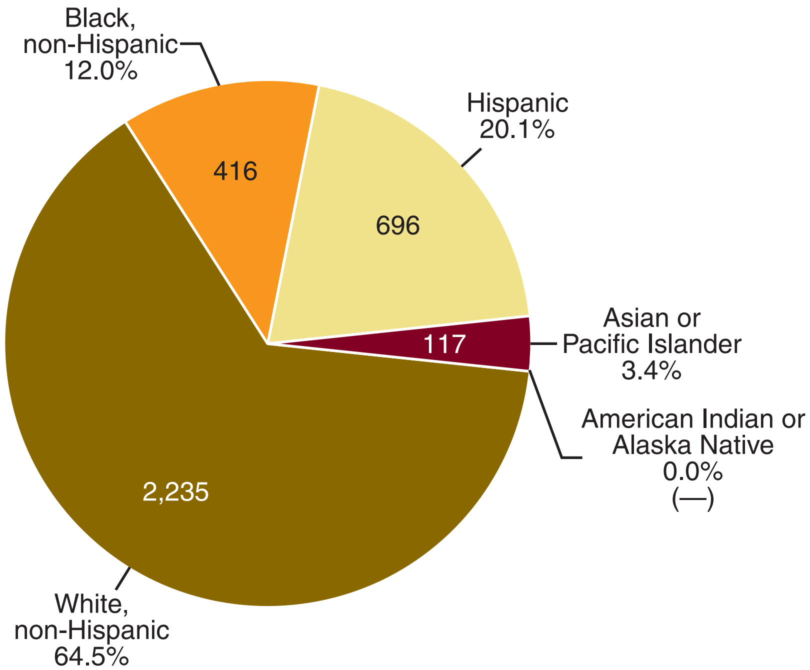


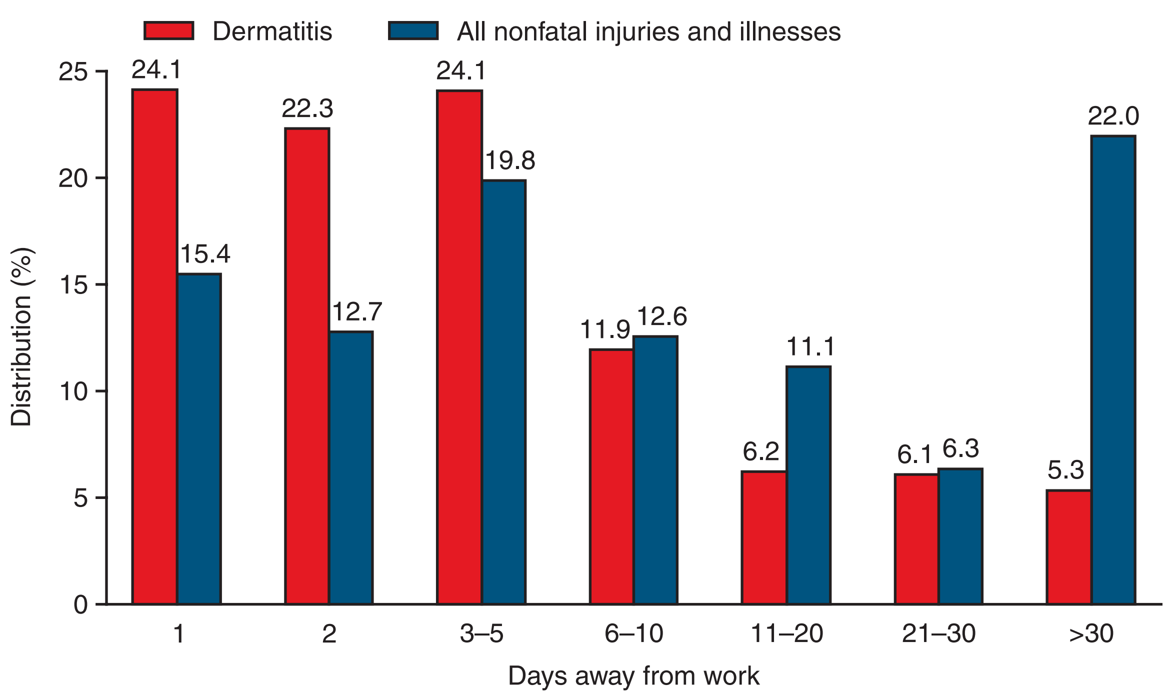
Figure 2–211. Distribution of dermatitis cases involving days away from work in private industry by sex, 1992–2001. Male workers accounted for the greatest proportions of dermatitis cases, ranging from 53.4% to 60.3% during 1992–2001. In 2001, male workers accounted for 55.5% of dermatitis cases. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003d].***



Race/Ethnicity

How did dermatitis cases differ by race/ethnicity in 2001?

Figure 2–212. Distribution and number of dermatitis cases involving days away from work in private industry by race/ethnicity, 2001. Race/ethnicity data are available for 3,464 of the 4,714 BLS-estimated dermatitis cases involving days away from work in 2001. White, non-Hispanic workers accounted for 64.5% of the cases, and Hispanic workers accounted for 20.1%. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003d].)***



Severity

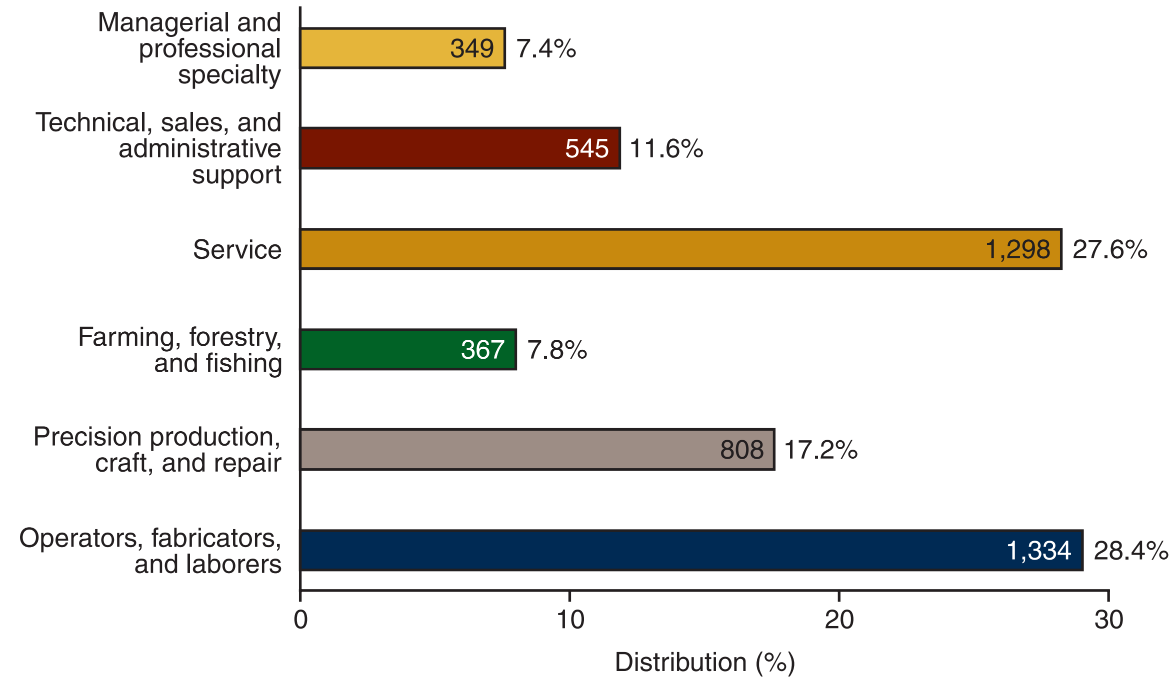
How did dermatitis cases compare with all nonfatal injury and illness cases when measured by days away from work in 2001?

Figure 2–213. Distribution of dermatitis cases and all nonfatal injury and illness cases involving days away from work in private industry by days away from work, 2001. Higher percentages of short-term work loss (1, 2, and 3–5 days) were reported for dermatitis cases in 2001. The median number of days away from work was 3 for dermatitis cases, whereas it was 6 days for all nonfatal injuries and illnesses. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003d].***

Occupation

How were dermatitis cases distributed by occupation in 2001?

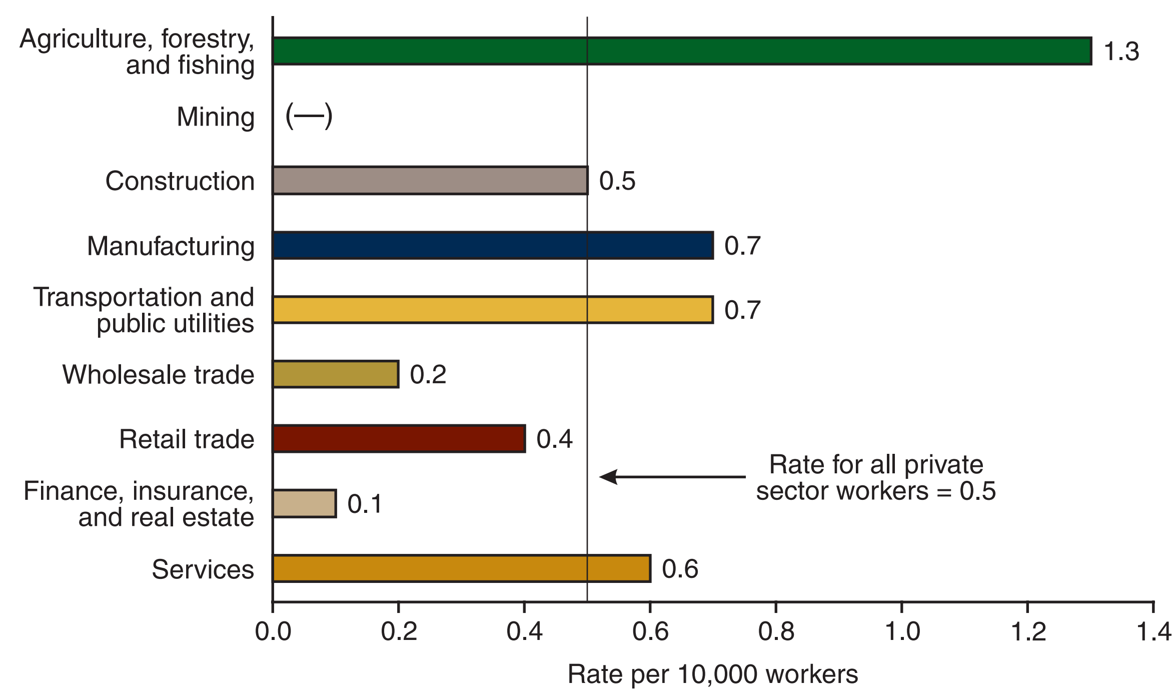
Figure 2–214. Distribution and number of dermatitis cases involving days away from work in private industry by occupation, 2001. Operators, fabricators, and laborers along with service workers constituted more than half (56.0%) of the 4,701 dermatitis cases reported in 2001. ***(Sources: BLS [2003a,b]; Booth-Jones et al. [2003d].)***

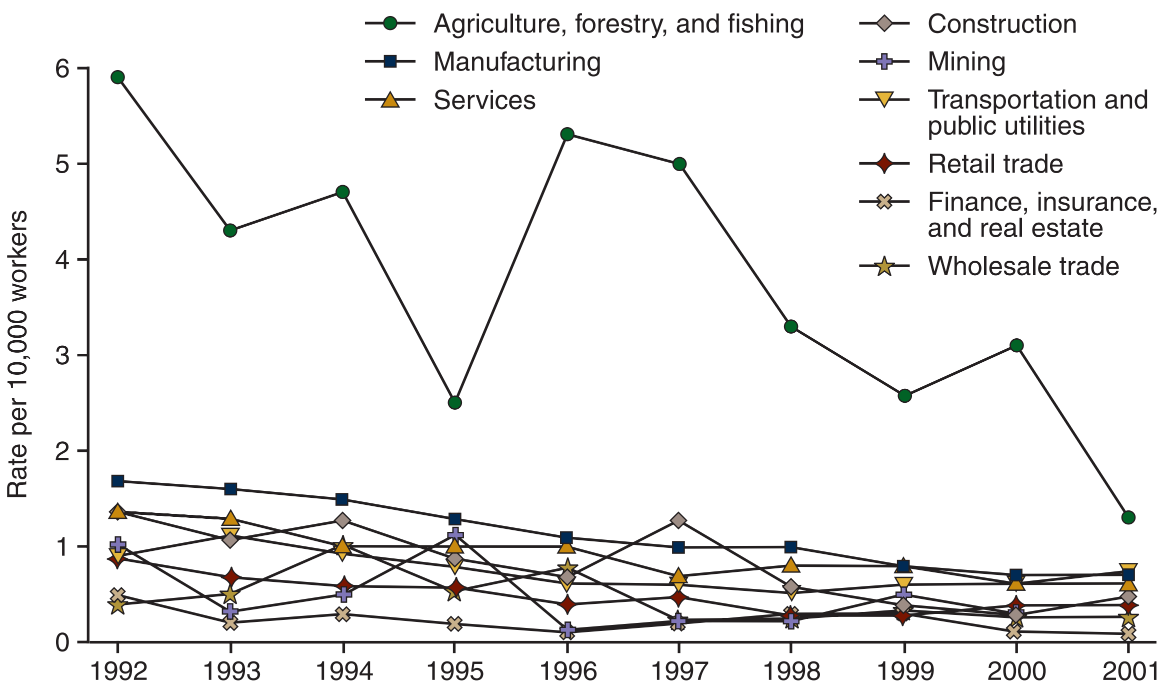


Industry

How did the rate of dermatitis cases differ by private industry sector in 2001?

Figure 2–215. Incidence rate of dermatitis cases by private industry sector, 2001. For dermatitis cases, private industry reported an incidence rate of 0.5 per 10,000 full-time workers in 2001. Higher rates were reported for agriculture, forestry, and fishing (1.3), manufacturing (0.7), transportation and public utilities (0.7), and services (0.6). (*Note:* A dash in parentheses indicates that no data were reported or that data do not meet BLS publication criteria.) ***(Source: BLS [2003a].)***





How did the rates of dermatitis cases change by major private industry sector during 1992–2001?

Figure 2–216. Annual rates of dermatitis cases involving days away from work by private industry sector, 1992–2001. The annual rate for dermatitis cases in the private sector declined 58.3% during 1992–2001, and rates declined for each industry sector. Agriculture had consistently higher rates of dermatitis cases than other industry sectors and experienced a 78% rate reduction during this 10-year period. ***(Sources: BLS [2003a,b].)***

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Chapter 3 • Focus on Agriculture

More than 3.1 million workers were employed in the agriculture, forestry, and fishing industry during 2001 (Table 1–4 in Chapter 1). Compared with all industries, agriculture employed proportionately more workers aged 16–19 (7.2% versus 5.1% for all industries) and workers aged 55 and older (22.9% versus 13.6% for all industries) [BLS 2001b]. In 2001, agricultural workers were predominately male (72.4%) (Table 1–4 in Chapter 1) and white (94.4%) (BLS [2001a]).

Advances in science and technology have greatly improved the safety of agricultural production in recent years. Nevertheless, fatal occupational injury rates in the agricultural sector, though decreasing, averaged more than four times the rate for the private sector during 1992–2002 (Figure 3–2) and were disproportionately high for older workers (Figure 3–3). Rates for nonfatal occupational injuries also declined, from 11.7 per 100 full-time workers in 1981 to 7.0 in 2001 (Figure 3–14). Although important strides have been made in reducing the risk of all occupational injuries, agricultural production remains one of the most hazardous industrial sectors.

Fatal Agricultural Injuries

This section provides data for answering basic questions about fatal injuries among workers and youths exposed to agricultural hazards. The agriculture industry as discussed in this section includes the following types of operations: farming, agricultural services, forestry, commercial fishing, and commercial hunting. On-farm deaths among youths in this section include both occupational and nonoccupational fatalities, and they exclude those involving motor vehicles and intentional causes.

Data for the figures come from three sources: (1) the Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) Surveillance System, which is a multisource census of fatal occupational injuries occurring in the United States; (2) the National Institute for Occupational Safety and Health (NIOSH) National Traumatic Occupational Fatalities (NTOF) Surveillance System, which is a census of fatal occupational injuries for persons aged 16 or older as identified by death certificates in the United States; and (3) the National Center for Health Statistics (NCHS) Vital Statistics Mortality Surveillance System, which is a census of all death certificates filed in the United States.

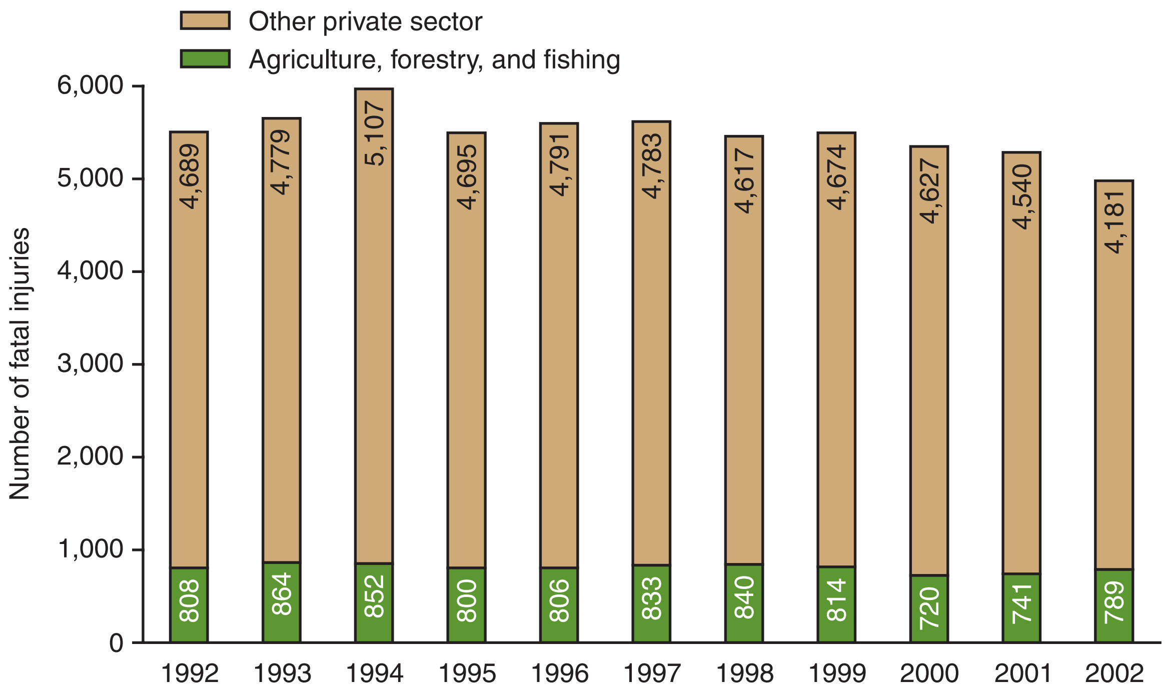
Fatal injuries constitute a significant burden on the agricultural sector, as indicated by the annual average of 806 fatal occupational injuries that occurred during 1992–2002 (Figure 3–1). Fatal occupational injury rates for this period ranged 26.5 per 100,000 employed workers in 1993 to 21.3 in 2000 (Figure 3–2). Rates by age ranged from 13.7 per 100,000 for the youngest agricultural workers to 62.0 for the oldest group (Figure 3–3). Most cases of fatal occupational injuries in agriculture involved white workers

(93%) (Figure 3–4). Non-Hispanic workers accounted for higher rates than Hispanic workers (20.2 versus 15.8 fatalities per 100,000 employed workers) (Figure 3–5). Farm tractors were the leading source of fatal occupational injuries in agriculture during 1992–2001, but trucks and fishing boats were also major sources (Figure 3–6). Leading causes listed on death certificates included machinery, motor vehicles, and falls (Figure 3–7). The highest number of fatal occupational injuries in agriculture, forestry, and fishing occurred in California, followed by Texas, Florida, Kentucky, Pennsylvania, and Tennessee (Figure 3–8). Surveys confirm that the farming environment presents risks to youths living or working on farms. During 1982–1996, an annual average of 145 on-farm deaths occurred among youths under age 20 (Figure 3–10). The major causes of unintentional on-farm deaths among youths were machinery, drowning, and firearms (Figure 3–11). Texas reported the highest number of on-farm deaths among youths under age 20, and Pennsylvania, Iowa, Missouri, and Wisconsin reported the next highest numbers (Figure 3–12).

Magnitude and Trend

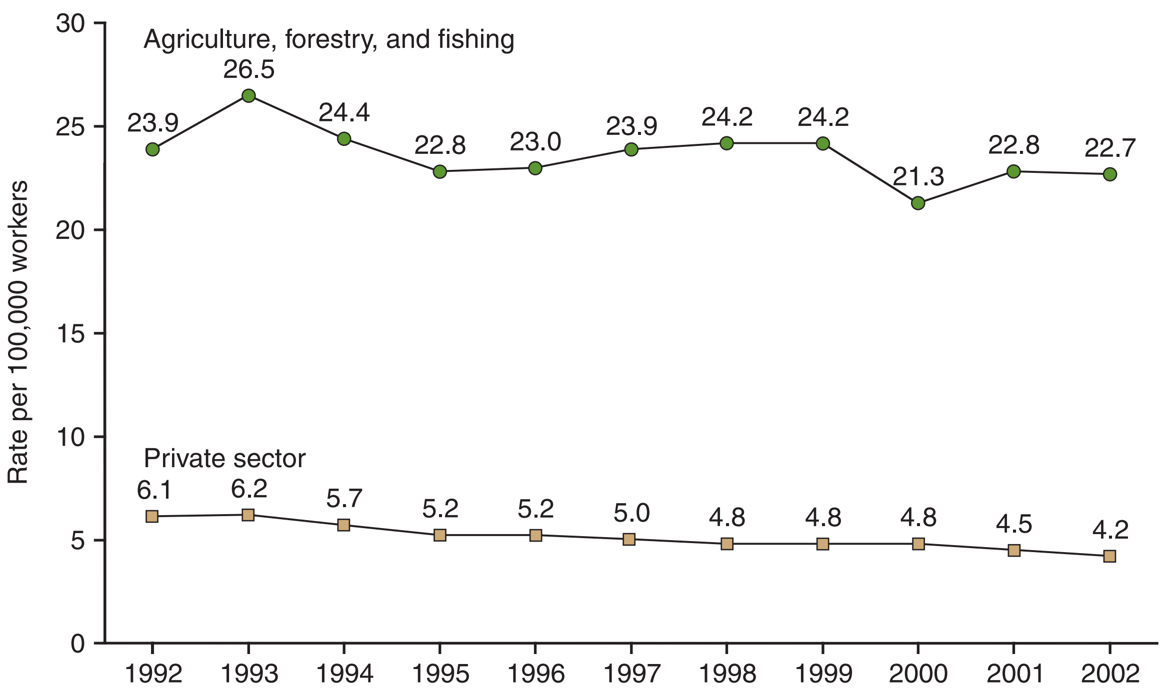
How did the number of fatal occupational injuries in agriculture, forestry, and fishing compare with the number in the private sector during 1992–2002?

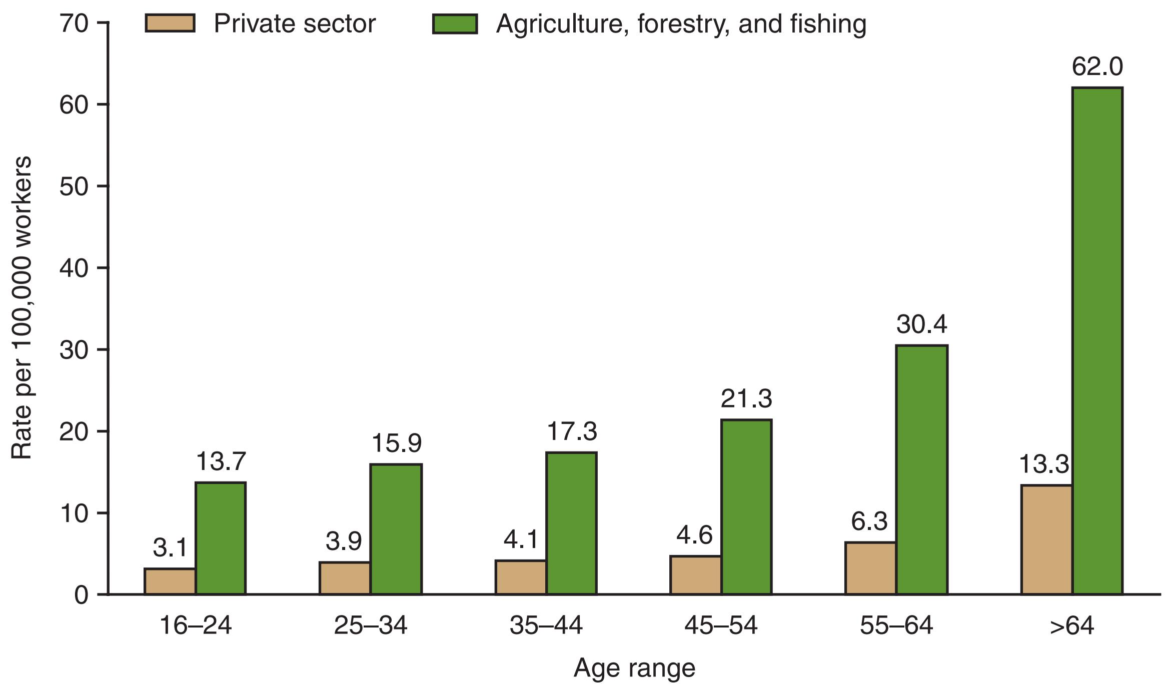
Figure 3–1. Fatal occupational injuries in agriculture, forestry, and fishing and the private sector, 1992–2002. Fatal occupational injuries in agriculture, forestry, and fishing industry ranged from 864 (16.2% of the total) in 1993 to 720 (13.5%) in 2000. ***(Sources: BLS [2003]; Myers [2003].)***



How did the annual rates of fatal occupational injury in agriculture, forestry, and fishing compare with the rates in the private sector during 1992–2002?

Figure 3–2. Annual rates of fatal occupational injury in the agriculture, forestry, and fishing industry and the private sector, 1992–2002. Annual rates of fatal occupational injury in agriculture, forestry, and fishing ranged from 26.5 per 100,000 employed workers in 1993 to 21.3 in 2000. The rates during 1992–2002 were 3.9 to 5.4 times the private-sector rates. Both agriculture, forestry, and fishing and the private sector show declining rates of fatal occupational injuries since 1993. ***(Sources: BLS [2003]; Myers [2003].)***

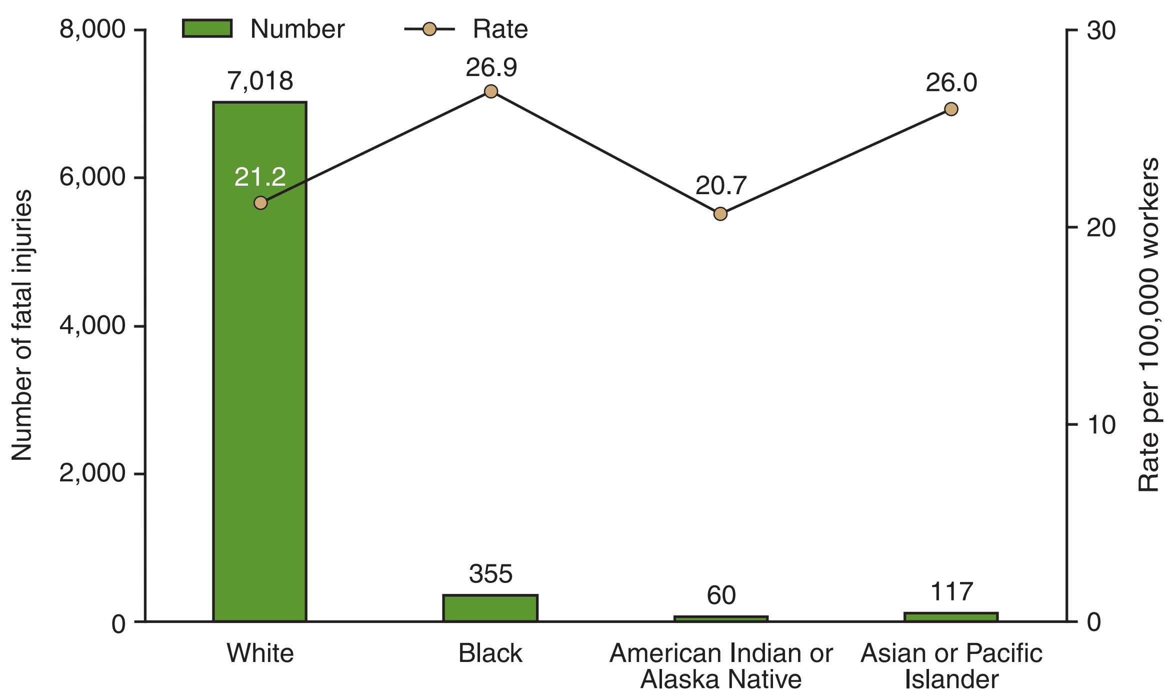




Age

How did fatal occupational injury rates in agriculture, forestry, and fishing compare with the private sector by age of worker during 1992–2001?

Figure 3–3. Fatal occupational injury rates in the agriculture, forestry, and fishing industry and the private sector by age, 1992–2001. (Fatality data exclude New York City.) During 1992–2001, fatal occupational injury rates in agriculture, forestry, and fishing were higher in every age group than in the private sector. The rates in agriculture ranged from 13.7 per 100,000 for workers aged 16–24 to 62.0 for workers older than 64. These differences increase with age. The greatest differences were noted for workers aged 55 or older. ***(Sources: BLS [2002a]; Myers [2003].)***



Race/Ethnicity

How did the number and rate of fatal occupational injuries differ by race in agriculture, forestry, and fishing during 1992–2001?

Figure 3–4. Number and rate of fatal occupational injuries by race in the agriculture, forestry, and fishing industry, 1992–2001. (Fatality data exclude New York City.) White workers accounted for the highest number of fatal occupational injuries (7,018) in agriculture, forestry, and fishing during 1992–2001. The highest rate was observed among black workers (26.9 fatalities per 100,000 employed workers). American Indians or Alaska Natives had the lowest number (60) and rate (20.7 per 100,000) of fatal occupational injuries. ***(Sources: BLS [2002a,b]; Myers [2003].)***

How did fatal occupational injury rates differ between Hispanic and non-Hispanic workers in agriculture, forestry, and fishing during 1992–2001?

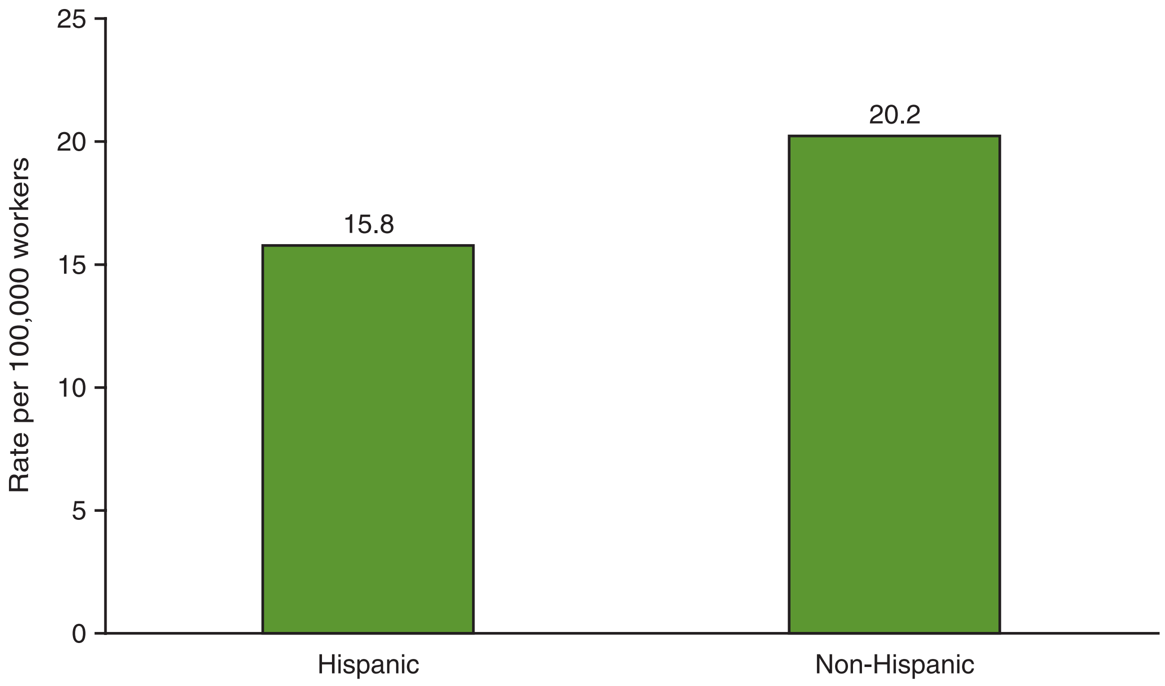


Figure 3–5. Fatal occupational injury rates among Hispanic and non-Hispanic workers in the agriculture, forestry, and fishing industry, 1992–2001. (Fatality data exclude New York City.) During 1992–2001 in the agriculture, forestry, and fishing industry, non-Hispanic workers accounted for a higher rate of fatal occupational injuries than Hispanic workers (20.2 compared with 15.8 fatal injuries per 100,000 employed workers). *(Sources: BLS [2002a,b]; Myers [2003].)*

Sources and Causes of Death

What were the leading sources of fatal occupational injuries in agriculture, forestry, and fishing during 1992–2001?

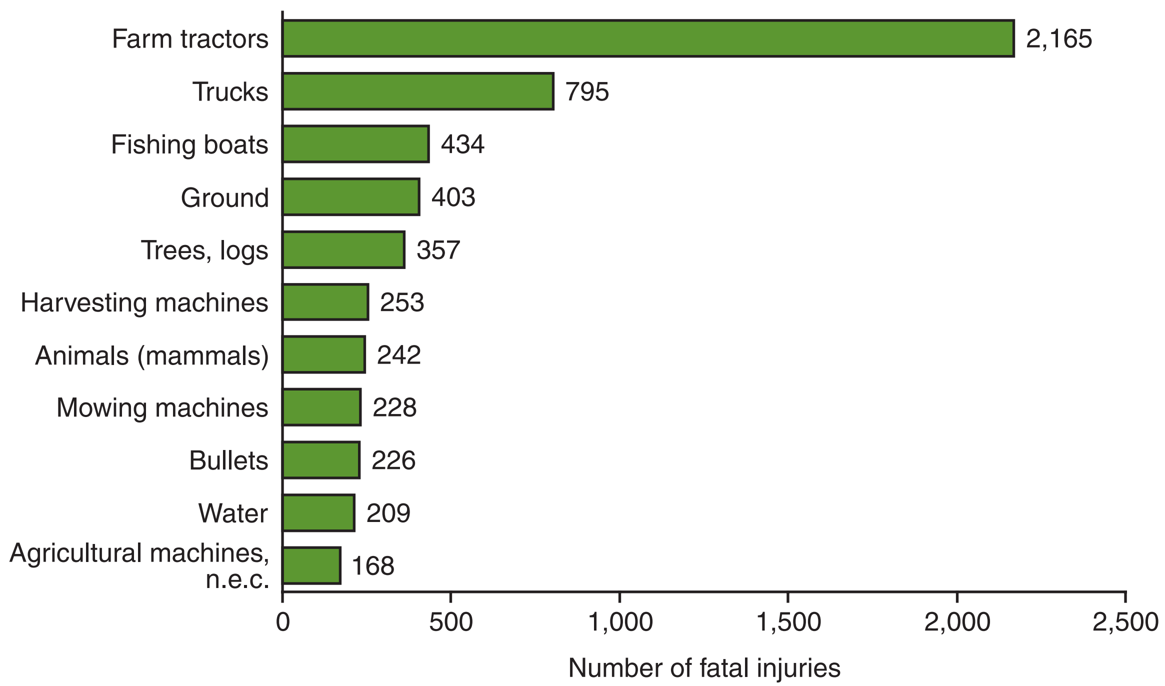
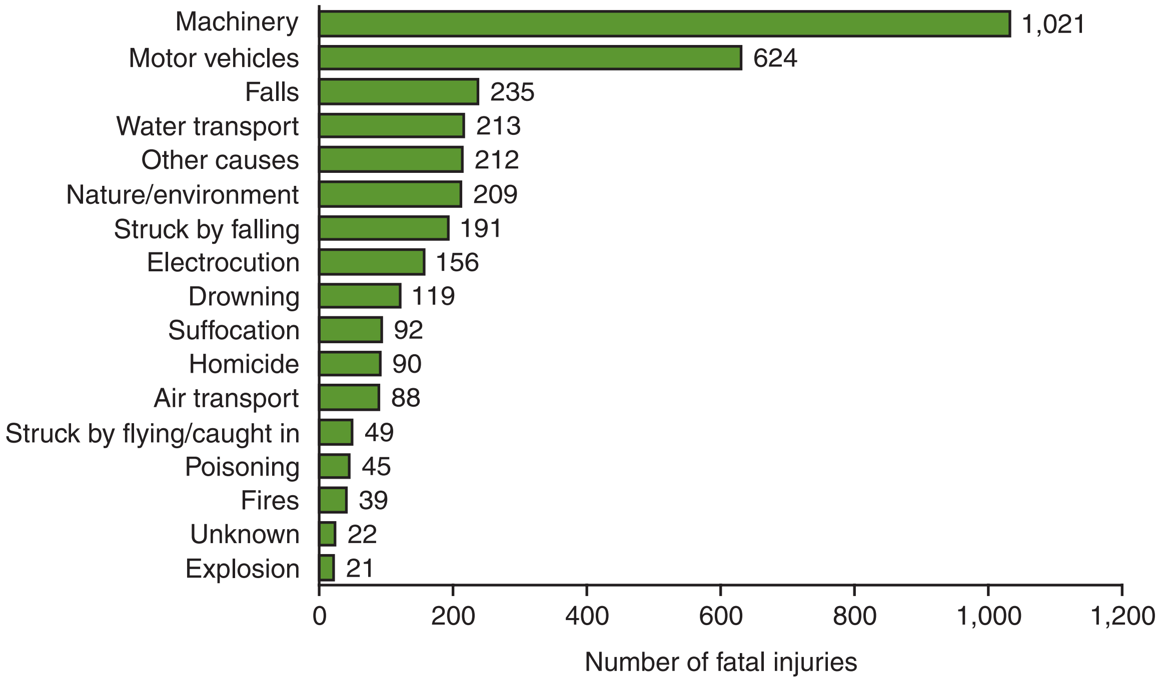
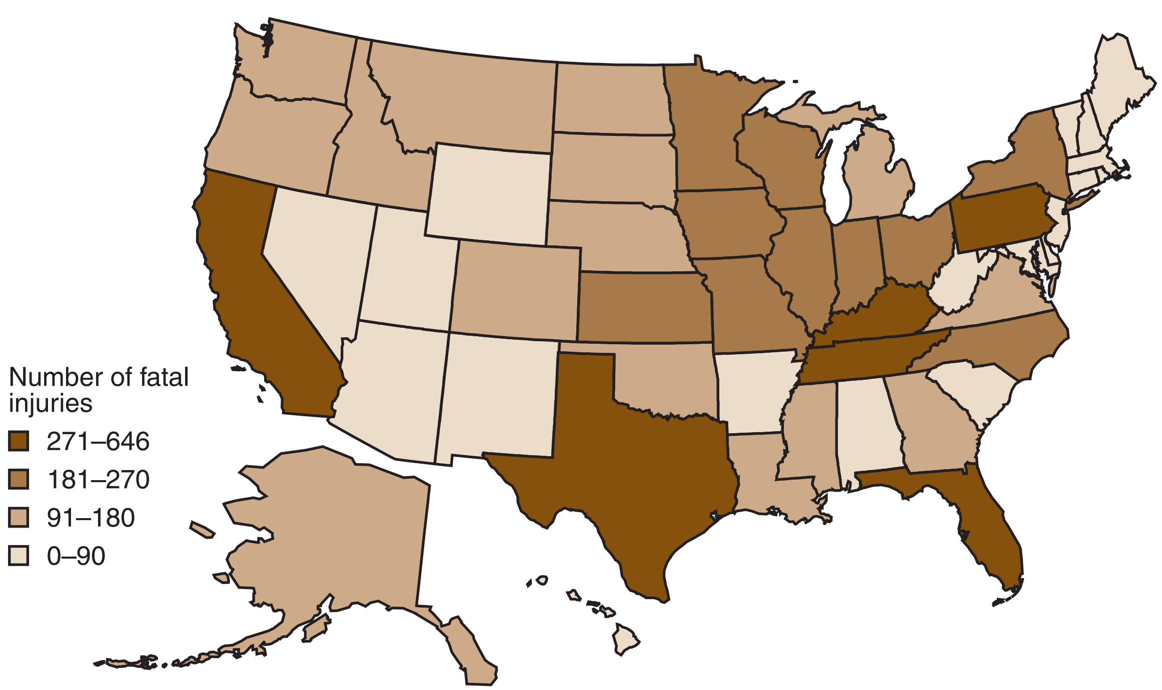


Figure 3–6. Leading sources of fatal occupational injuries in the agriculture, forestry, and fishing industry, 1992–2001. (Fatality data exclude New York City.) Farm tractors accounted for 2,165 fatal occupational injuries during 1992–2001 and were the leading source of these deaths in agriculture, forestry, and fishing. Trucks and fishing boats were also major sources of death in this industry and accounted for 795 and 434 fatal occupational injuries, respectively. *(Sources: BLS [2002a]; Myers [2003].)*



What did death certificates show to be the leading causes of fatal occupational injuries in agriculture, forestry, and fishing during 1992–1997?

Figure 3–7. Leading causes of fatal occupational injuries in the agriculture, forestry, and fishing industry, 1992–1997. During 1992–1997, machinery caused 1,021 fatal occupational injuries and was the leading cause of these deaths in agriculture, forestry, and fishing as reported on death certificates. The next leading causes of these deaths were motor vehicles (624 fatalities) and falls (235 fatalities). ***(Sources: NIOSH [2001a]; Myers [2001a].)***



Numbers and Rates among States

How did the number of fatal occupational injuries in agriculture, forestry, and fishing differ by State during 1992–2000?

Figure 3–8. Fatal occupational injuries in the agriculture, forestry, and fishing industry by State, 1992–2000. (Fatality data exclude New York City.) During 1992–2000, the highest numbers of fatal occupational injuries in agriculture, forestry, and fishing were reported by California (646), Texas (384), Florida (313), Kentucky (298), Pennsylvania (289), and Tennessee (271). ***(Sources: BLS [2001a]; Myers [2001b].)***

How did the rates of fatal occupational injury in agriculture, forestry, and fishing differ by State during 1992–2000?

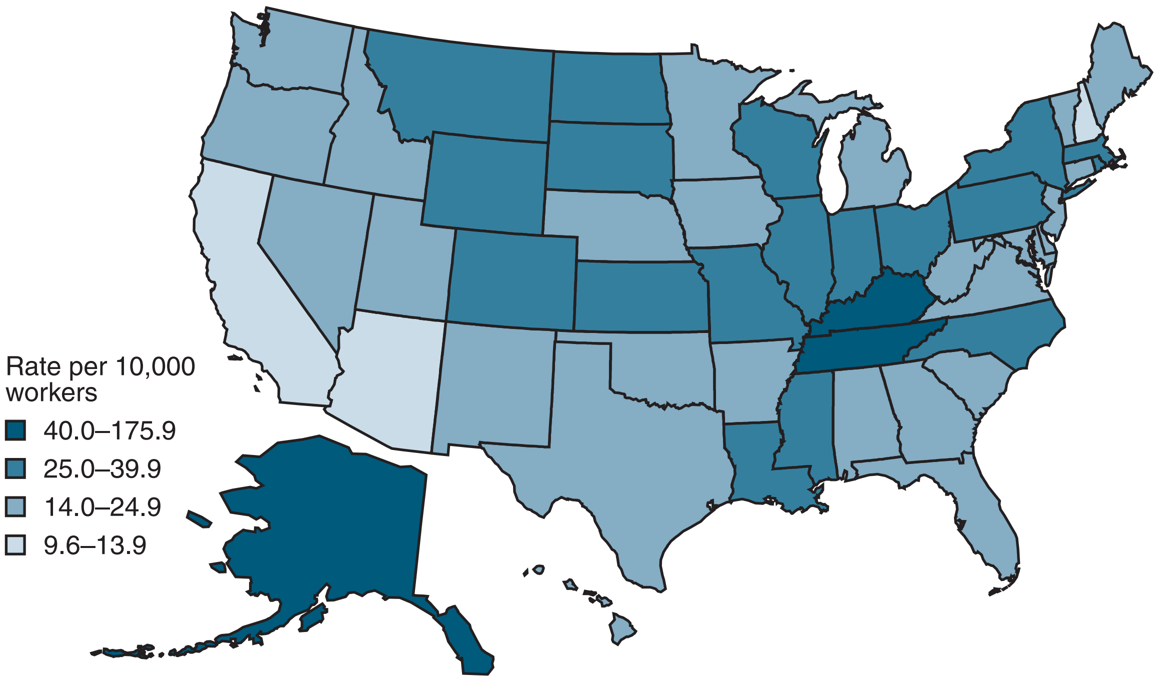


Figure 3–9. **Fatal occupational injury rates in the agriculture, forestry, and fishing industry by State, 1992–2000.** (Fatality data exclude New York City.) During 1992–2000, the highest fatal occupational injury rates in agriculture, forestry, and fishing were reported by Alaska (175.9 per 10,000 workers), Kentucky (62.3), and Tennessee (44.3). ***(Sources: BLS [2001a,b]; Myers [2001b].)***

Youths

Age

How were unintentional on-farm deaths distributed by age among youths during 1992–1996?

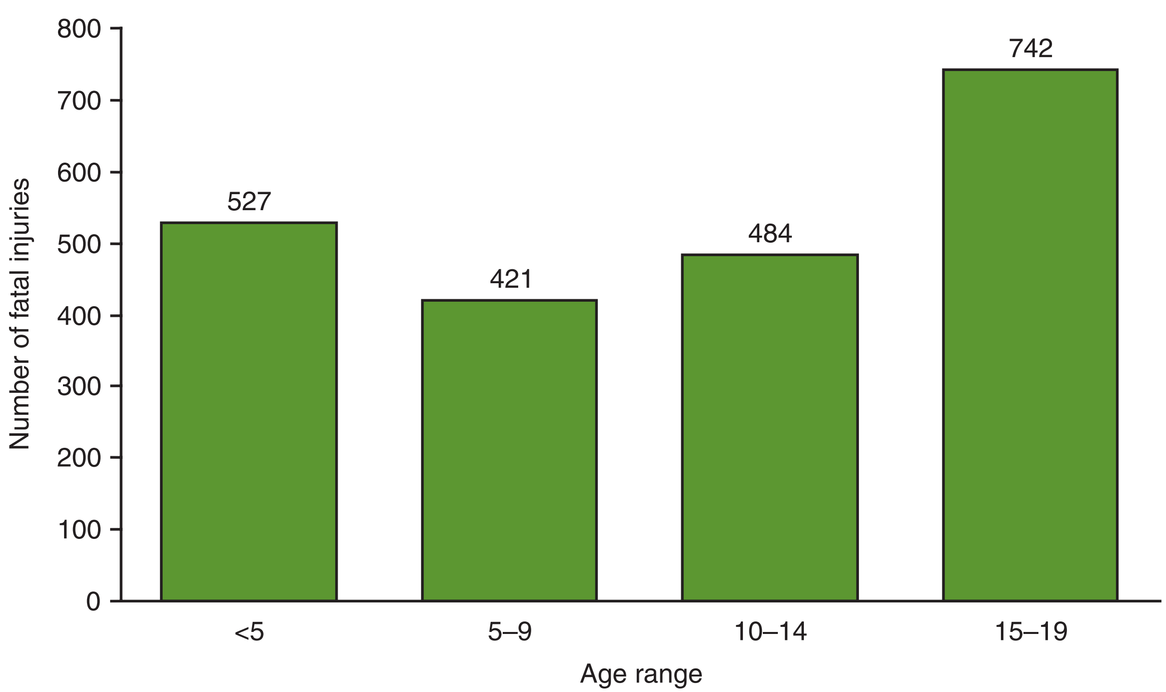
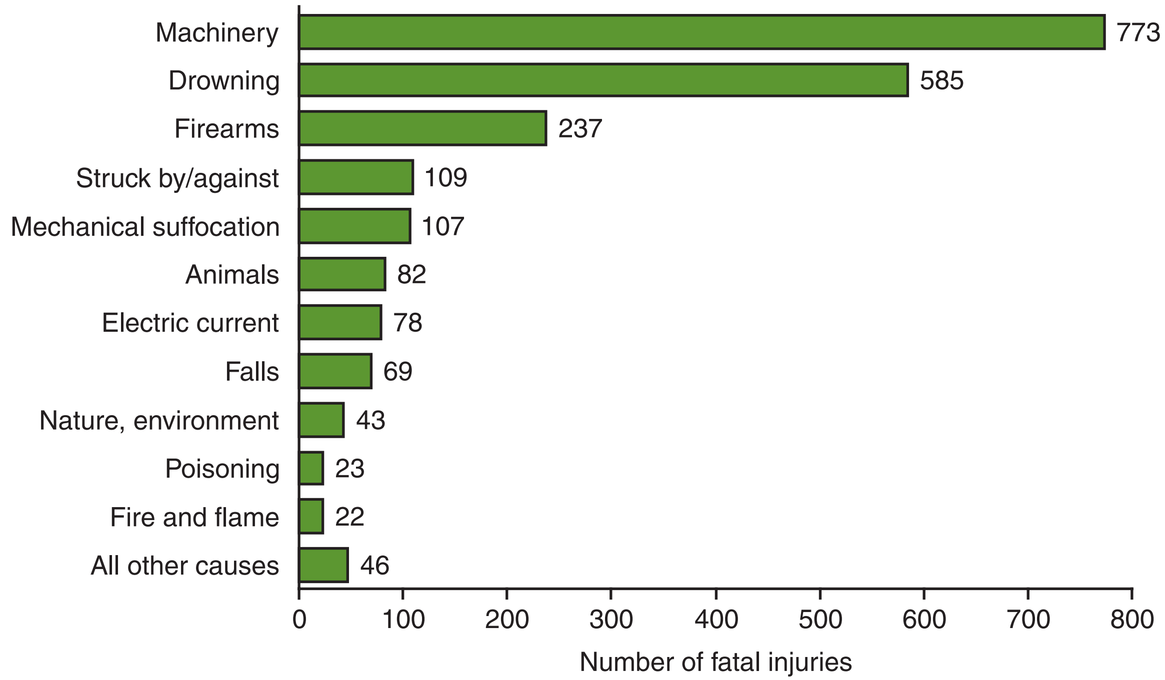


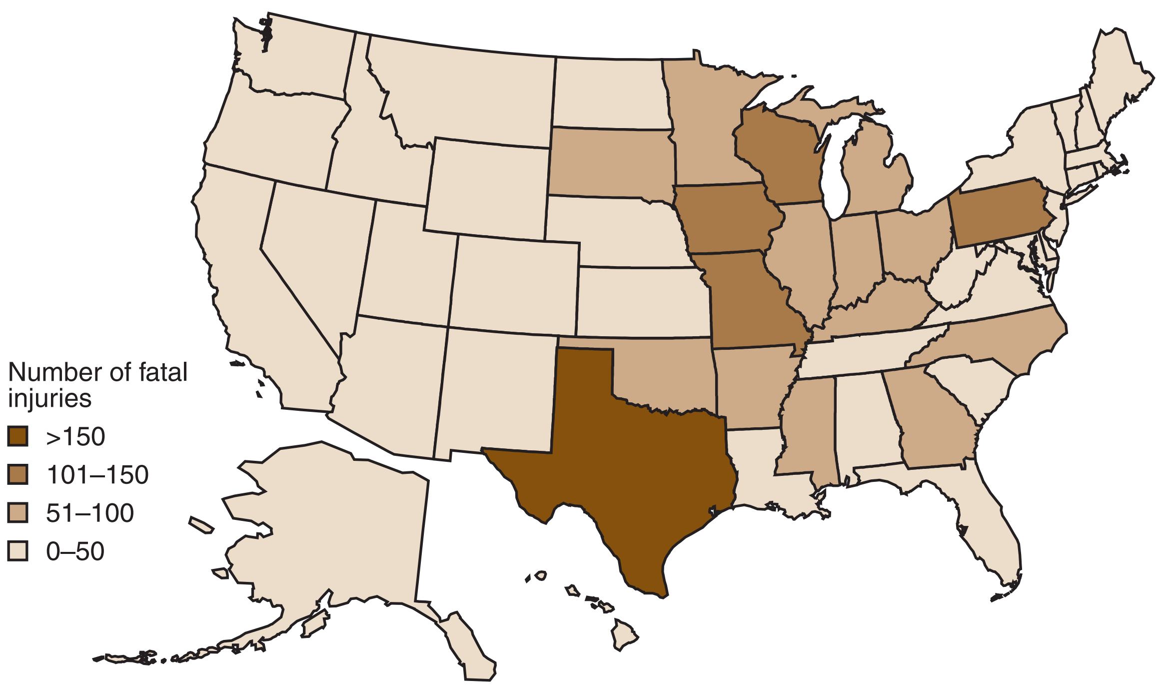
Figure 3–10. **Age distribution for unintentional on-farm deaths of youths under age 20, 1982–1996.** Youths aged 15–19 accounted for the most unintentional on-farm deaths (742) during 1982–1996, and youths under age 5 accounted for the next highest number of these deaths (527). ***(Sources: NCHS [2002]; Adekoya and Pratt [2001].)***



Causes of Death

What were the major causes of unintentional on-farm death for youths during 1982–1996?

Figure 3–11. Unintentional on-farm deaths of youths under age 20 by cause of death, 1982–1996. During 1982–1996, unintentional on-farm deaths of youths under age 20 most frequently involved machinery (773 fatalities), drowning (585 fatalities), or firearms (237 fatalities). ***(Sources: NCHS [2002]; Adekoya and Pratt [2001].)***



Numbers among States

How were unintentional on-farm deaths of youths distributed by State during 1982–1996?

Figure 3–12. Unintentional on-farm deaths of youths under age 20 by State, 1982–1996. During 1982–1996, the highest numbers of unintentional on-farm deaths of youths under age 20 were reported by Texas (204), Pennsylvania (109), Iowa (107), Missouri (106), and Wisconsin (105). ***(Sources: NCHS [2002]; Adekoya and Pratt [2001].)***

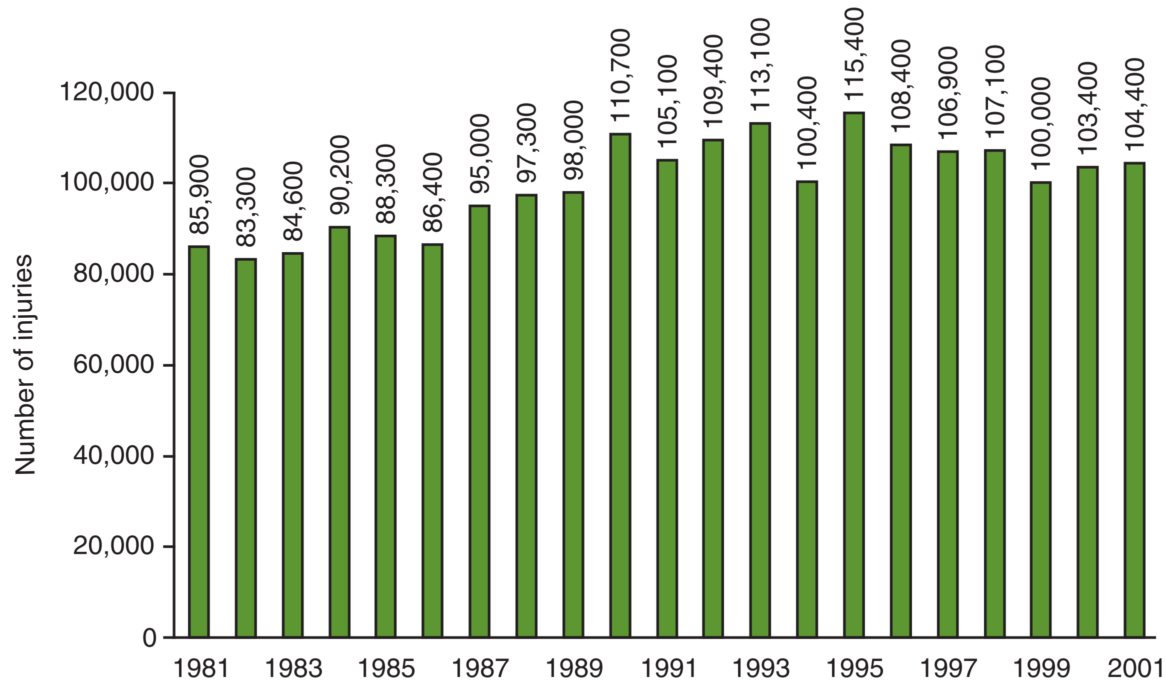
Nonfatal Agricultural Injuries

This section provides data for answering basic questions about nonfatal injuries among workers and youths exposed to agricultural hazards. These injuries occurred in the following types of operations: farming, agricultural services, forestry, commercial fishing, and commercial hunting. Farming refers to both crop and livestock operations unless otherwise specified.

Data for the figures come from four sources: (1) the BLS Survey of Occupational Injuries and Illnesses (SOII), which is an annual survey of U.S. business establishments that collects data on injuries and illnesses reportable to the Occupational Safety and Health Administration (OSHA); (2) the NIOSH Traumatic Injury Surveillance of Farmers (TISF) survey, which is a farm study on occupational farm injuries for 1993–1995; (3) the NIOSH Childhood Agricultural Injury Survey (CAIS), which is a farm survey on farm-related injuries among youths during 1998; and (4) the Minority Farm Operator Childhood Agricultural Injury Study (M–CAIS), a study of farm-related injuries among youths on minority farm operations in 2000.

The number of nonfatal occupational injuries in the agriculture, forestry, and fishing industry has been slowly increasing, and an estimated 104,400 of these injuries occurred in 2001 (Figure 3–13). Although injury rates in agriculture have declined since 1981, they consistently exceed those in the private sector (Figure 3–14). California had the highest number of nonfatal occupational farming injuries during 1993–1995, followed by Minnesota, Iowa, and Wisconsin (Figure 3–15). Nonfatal occupational farming injuries were highest on cattle, hog, or sheep operations, followed by cash grain and dairy operations (Figure 3–17). Rates for crop and livestock operations were similar (Figure 3–18), and injuries were primarily caused by machinery and livestock (Figure 3–19).

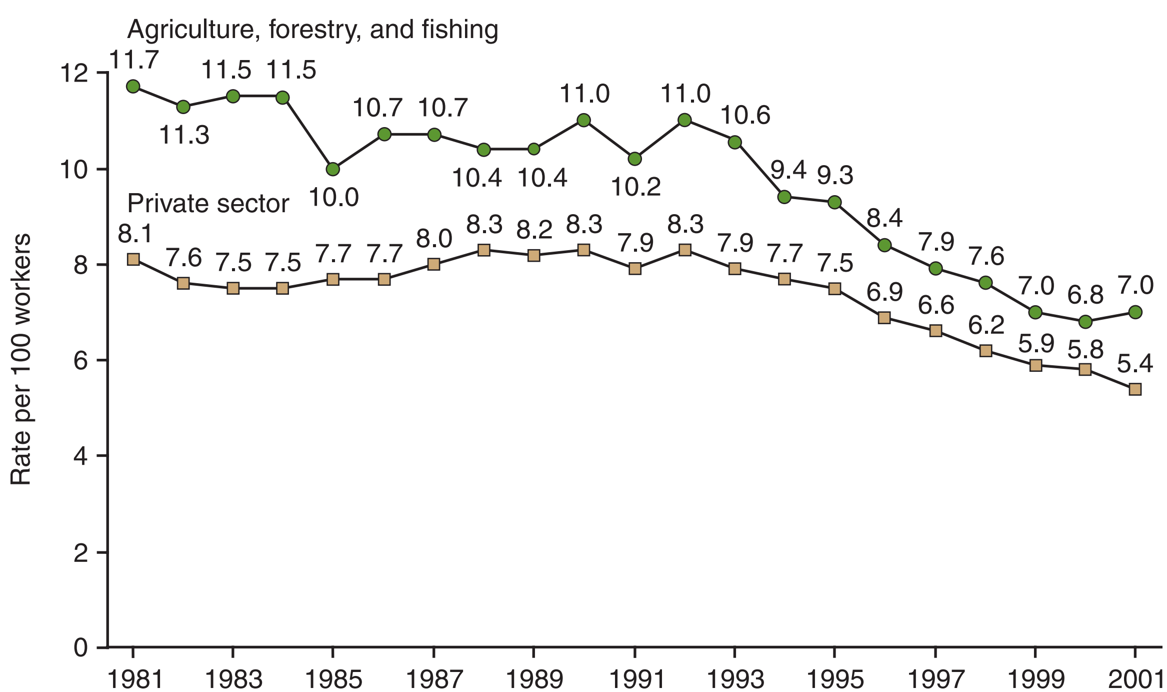
The farming environment is a concern for youths living or working on farms. Nearly 33,000 youths under age 20 were injured on farms in 1998 [Myers and Hendricks 2001]. The major causes of these injuries were falls, animals, and on-farm vehicles such as all-terrain vehicles [Myers and Hendricks 2001]. The rates of both occupational and nonoccupational injuries are higher for youths who reside and work on farms than for youths hired for on-farm labor (Figures 3–20 and 3–21). The Midwest region of the United States had the highest number and rate of occupational on-farm injuries among youths under age 20 in 1998 (6,107 injuries at a rate of 0.95 per 1,000 youths) (Figure 3–23). Youths residing on racial minority and Hispanic farms had the highest numbers and rates of nonfatal injuries—both nonoccupational (Figures 3–26 and 3–30) and occupational (Figures 3–27 and 3–31).



Magnitude and Trend

How did the number of occupational injuries in agriculture, forestry, and fishing change during 1981–2001?

Figure 3–13. Number of occupational injuries in the agriculture, forestry, and fishing industry (excluding farms with fewer than 11 employees), 1981–2001. The number of occupational injuries in agriculture, forestry, and fishing slowly increased from 83,300 injuries in 1982 to 115,400 in 1995. An estimated 104,400 nonfatal occupational injuries occurred in this industry in 2001. (*Note:* Data before 1992 include fatalities.) ***(Sources:* *BLS [2002c]; Myers [2002].)***



How did the annual rates of occupational injuries in agriculture, forestry, and fishing compare with the rates in the private sector during 1981–2001?

Figure 3–14. Occupational injury rates in the agriculture, forestry, and fishing industry (excluding farms with fewer than 11 employees) and the private sector, 1981–2001. Occupational injury rates in agriculture, forestry, and fishing declined from 11.7 per 100 full-time workers in 1981 to 6.8 in 2000. The rate increased slightly in 2001 to 7.0 per 100 full-time workers. Injury rates for agriculture consistently exceeded comparable rates in the private sector. (*Note:* Data before 1992 include fatalities.) ***(Sources: BLS [2002c]; Myers [2002].)***

Numbers and Rates among States

How did the number of nonfatal occupational farming injuries differ by State during 1993–1995?

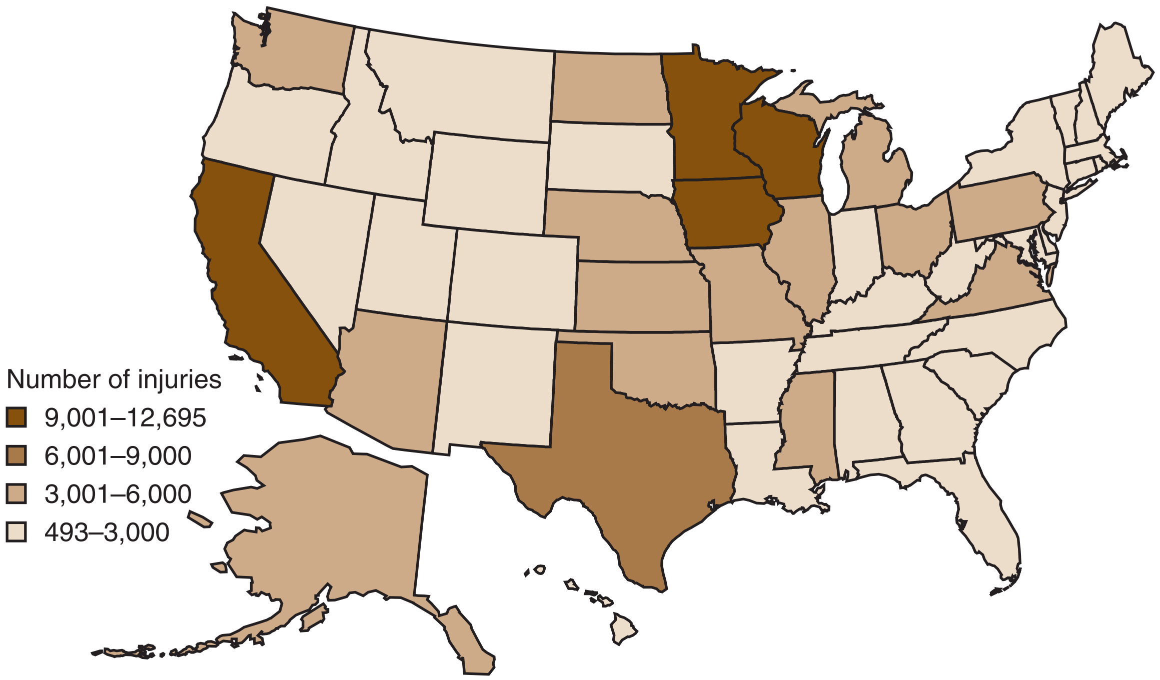


Figure 3–15. Number of nonfatal occupational farming injuries by State, 1993–1995. During 1993–1995, the highest numbers of nonfatal occupational farming injuries occurred in California (12,695), Minnesota (11,847), Iowa (11,137), and Wisconsin (10,173). (*Note:* For reporting purposes, the following States were combined: Alaska and Washington; Connecticut, Massachusetts, and Rhode Island; Delaware and Maryland; Maine, New Hampshire, and Vermont; Montana and Wyoming; and Nevada and Utah.) ***(Sources: NIOSH [2001b]; Myers [2001c].)***

How did the rates of nonfatal occupational farming injuries differ by State during 1993–1995?

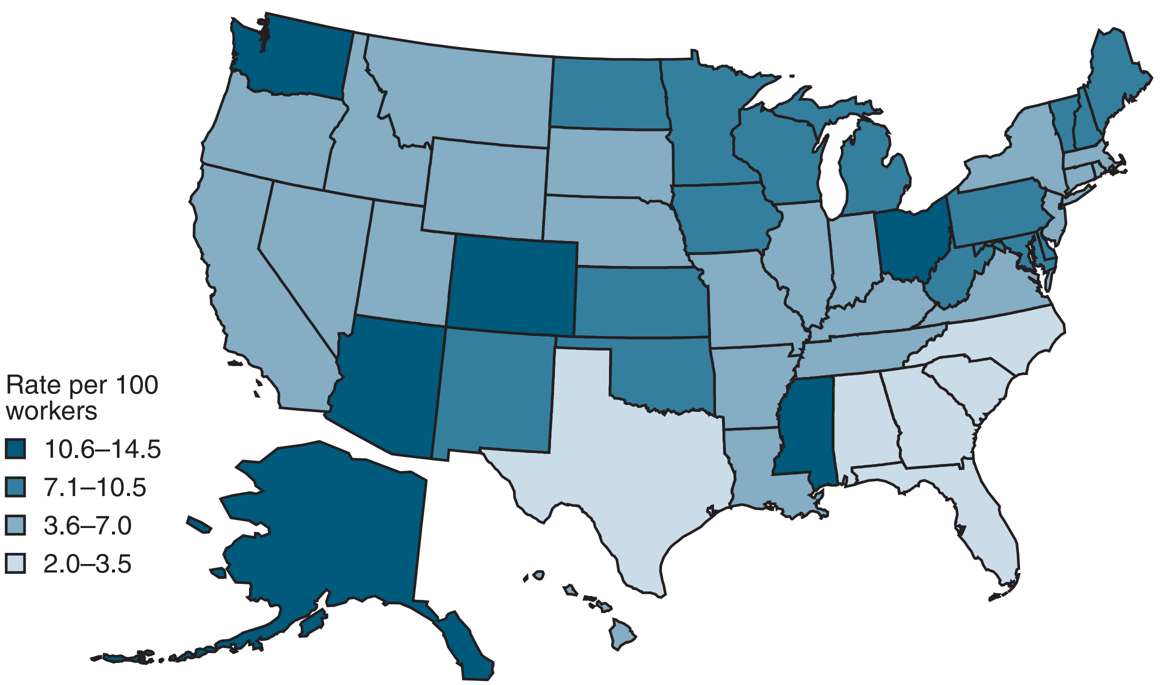
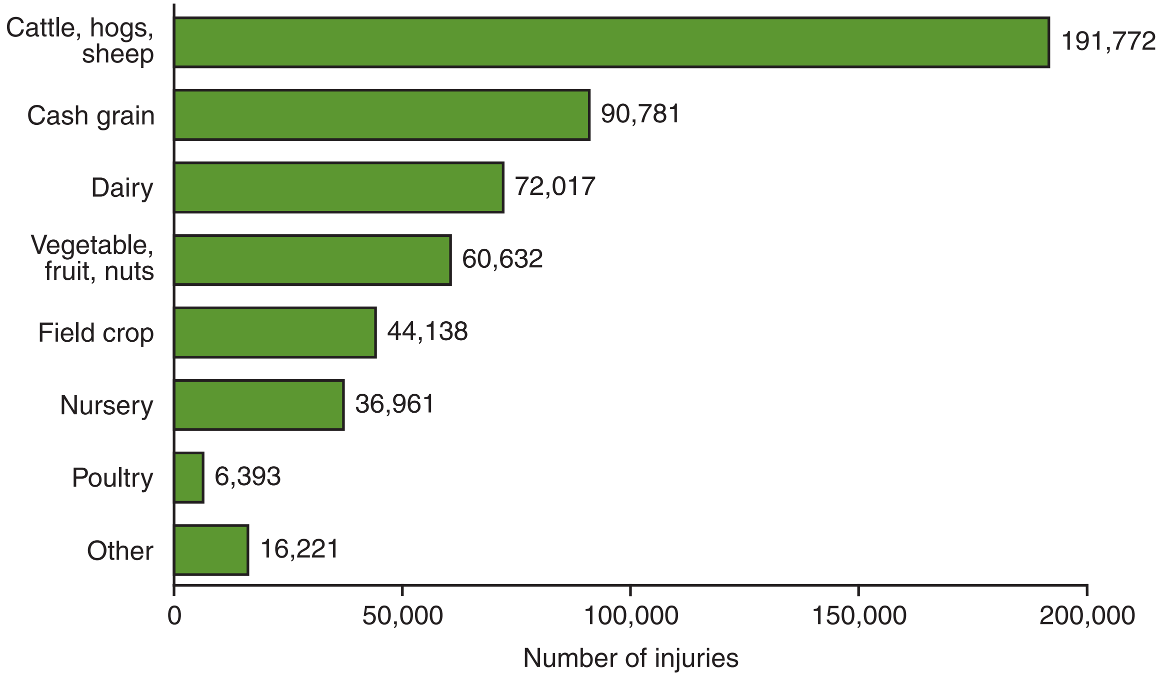


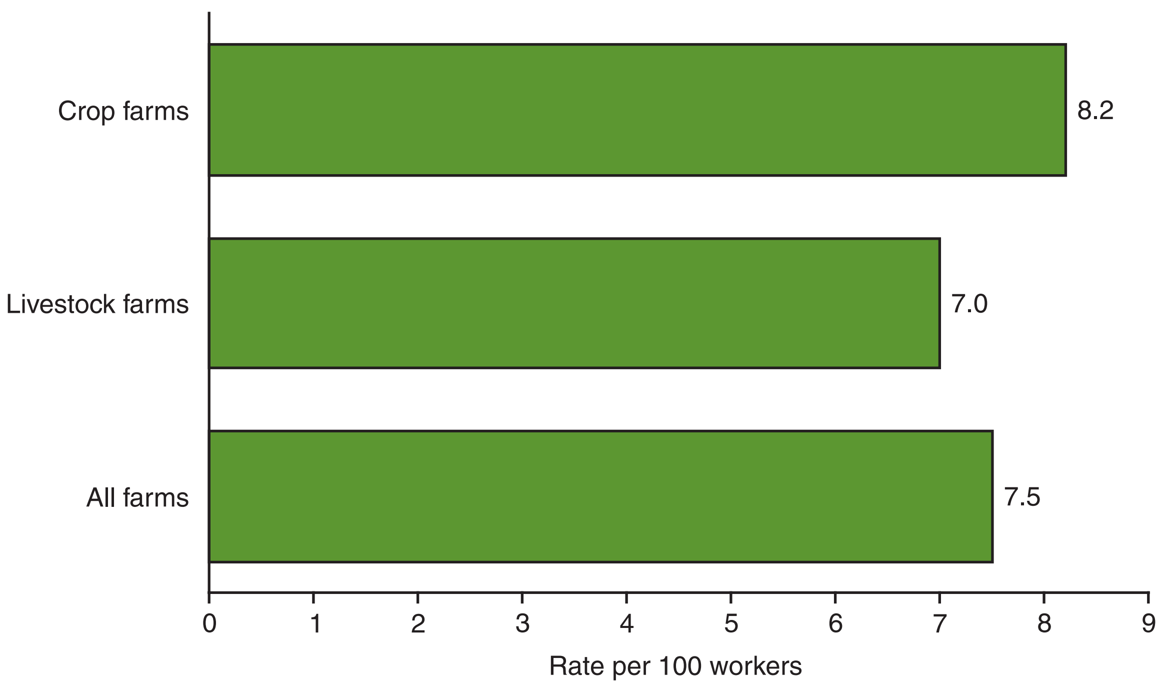
Figure 3–16. Rates of nonfatal occupational farming injuries by State, 1993–1995. Mississippi had the highest rate of nonfatal occupational farming injury (14.5 per 100 full-time workers), followed by Alaska and Washington (combined injury rate of 14.3), Arizona (13.7), Ohio (13.1), and Colorado (11.3). (*Note:* For reporting purposes, the following States were combined: Alaska and Washington; Connecticut, Massachusetts, and Rhode Island; Delaware and Maryland; Maine, New Hampshire, and Vermont; Montana and Wyoming; and Nevada and Utah.) ***(Sources: BLS [2002b]; NIOSH [2001b]; Myers [2001c].)***



Type of Farm

How did nonfatal occupational farming injuries differ by the type of farm operation during 1993–1995?

Figure 3–17. Number of nonfatal occupational farming injuries by type of farm operation, 1993–1995. During 1993–1995, most nonfatal occupational injuries occurred on cattle, hog, or sheep operations, followed by cash grain and dairy operations. ***(Sources: NIOSH [2001b]; Myers [2001c].)***



How did nonfatal occupational injury rates differ by type of farm operation during 1993–1995?

Figure 3–18. Rates of nonfatal occupational farming injuries by type of farm operation, 1993–1995. Nonfatal occupational injury rates were similar for crop and livestock farms during 1993–1995, but rates were slightly higher for crop farms. ***(Sources: NIOSH [2001b]; Myers [2001c].)***

Source of Injury

What were the leading sources of nonfatal occupational farming injuries during 1993–1995?

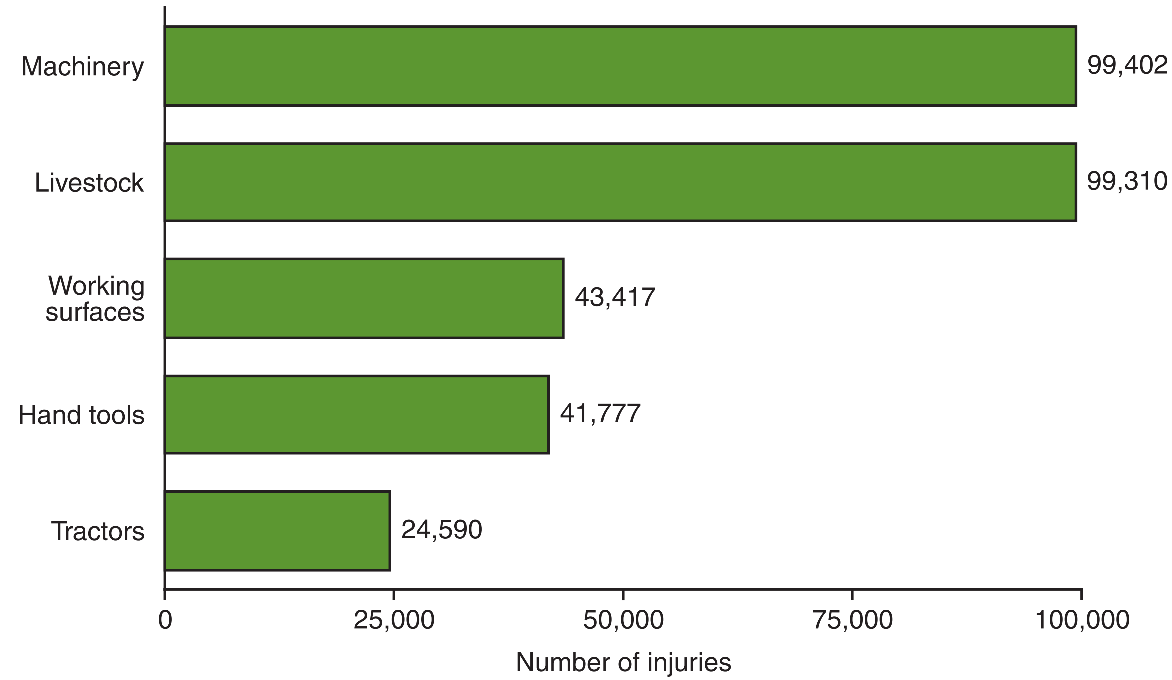


Figure 3–19. Number of nonfatal occupational farming injuries by leading sources of injury, 1993–1995. Nonfatal occupational farming injuries were primarily caused by machinery and livestock during 1993–1995. Other major sources of injury included working surfaces and hand tools. ***(Sources:** NIOSH [2001b]; Myers [2001c].)*

Youths on Farms

How were injured youths related to the farms where the injuries occurred in 1998?

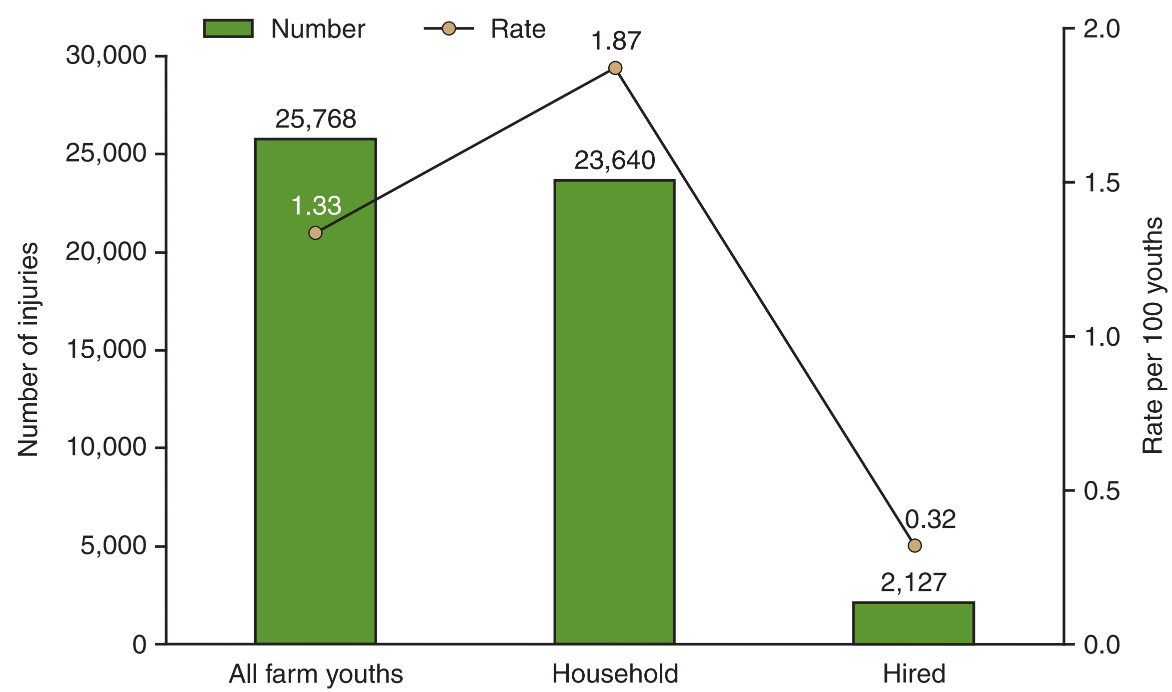
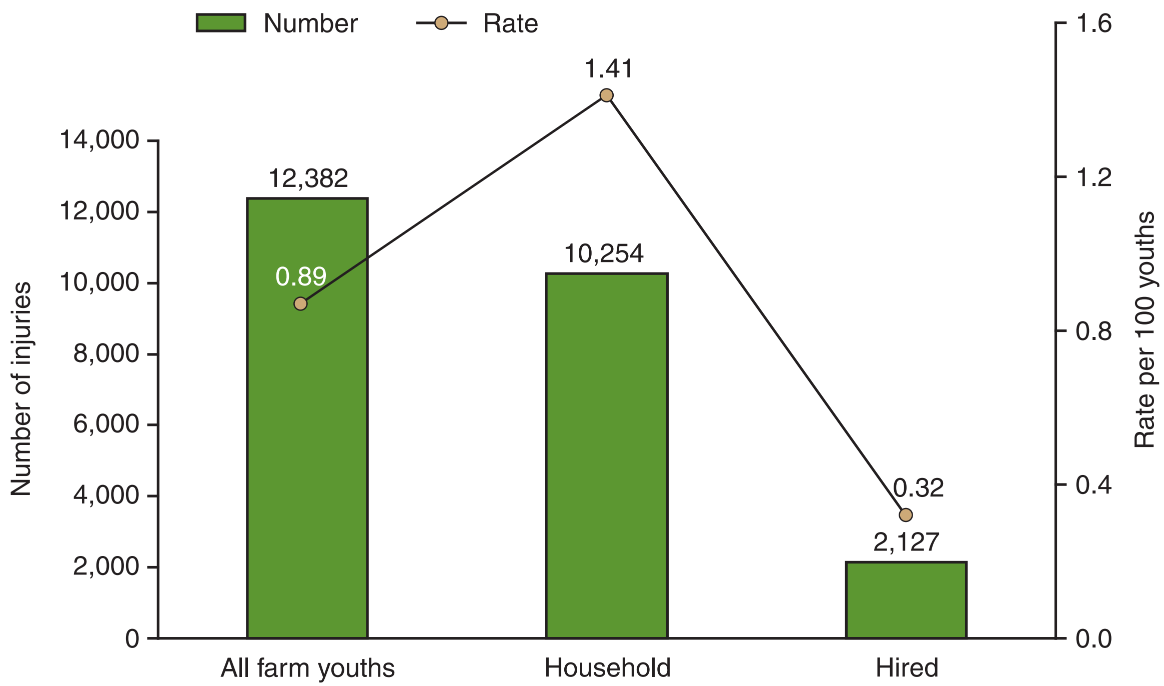
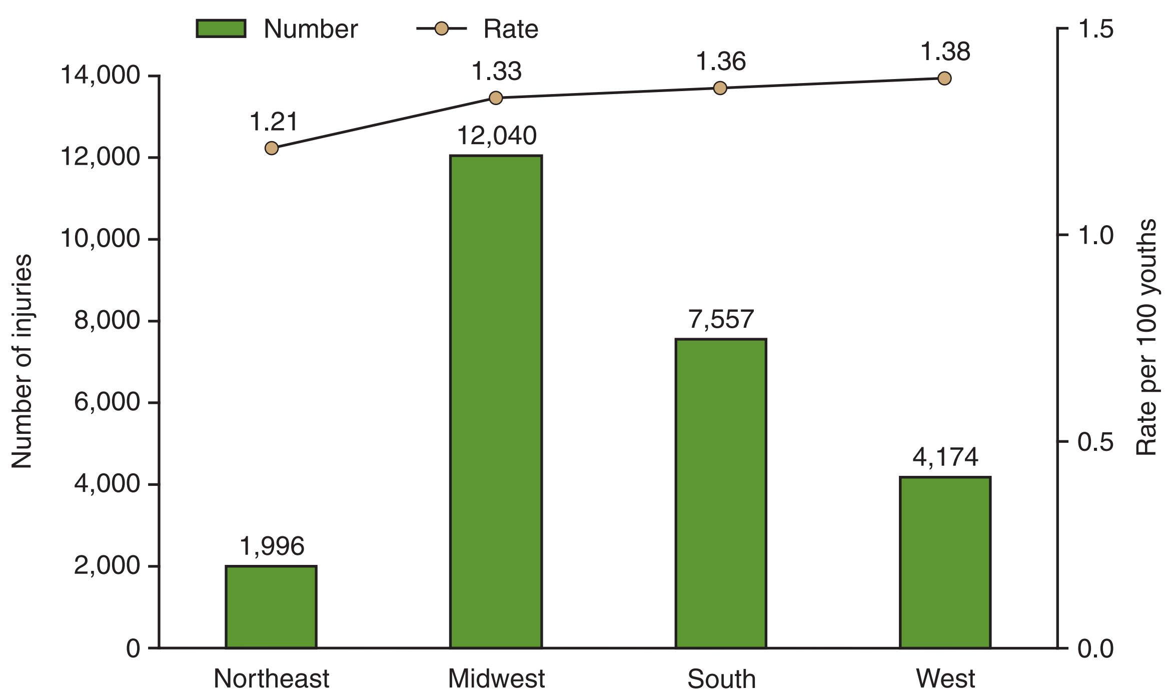


Figure 3–20. Number and rate of all nonfatal on-farm injuries to youths under age 20 by relationship to the farm, 1998. In 1998, farm youths accounted for 25,768 nonfatal on-farm injuries, both occupational and nonoccupational. Household farm youths had a higher overall nonfatal injury rate (1.87 per 100) than youths hired to work on the farm (0.32 per 100). (*Note:* A probability sample was used to produce different injury estimates. Because of rounding in calculating these estimates, data may not sum to the totals.) ***(Source:** Myers and Hendricks [2001].)*



How were injured youths related to the farms where they were injured while working in 1998?

Figure 3–21. Number and rate of nonfatal occupational on-farm injuries to youths under age 20 by relationship to the farm, 1998. In 1998, farm youths under age 20 accounted for 12,382 nonfatal occupational on-farm injuries. Youth visitors and hired youths accounted for similar numbers of occupational injuries (2,208 and 2,127 injuries, respectively). Household farm youths had a higher overall occupational injury rate than youths hired to work on the farm. (*Note:* A probability sample was used to produce different injury estimates. Because of rounding in calculating these estimates, data may not sum to the totals.) ***(Source: Myers and Hendricks [2001].)***



How did the number and rate of all nonfatal on-farm injuries differ by U.S. region for youths in 1998?

Figure 3–22. Number and rate of all nonfatal on-farm injuries to youths under age 20 by region, 1998. In 1998, the Midwest region of the United States had the highest number of all nonfatal on-farm injuries to youths under age 20 (12,040 injuries), whereas the West had the highest rate of these injuries (1.38 per 100 youths). ***(Source: Myers and Hendricks [2001].)***

How did the number and rate of nonfatal occupational on-farm injuries differ by U.S. region for youths in 1998?

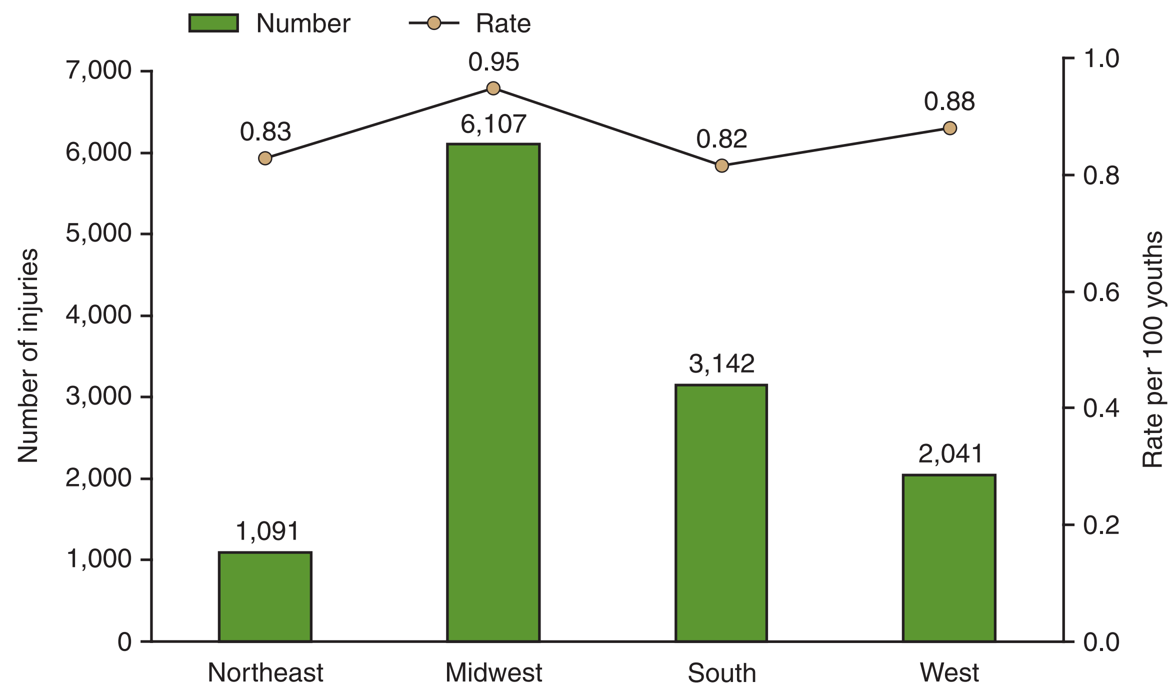


Figure 3–23. Number and rate of occupational on-farm injuries to youths under age 20 by region, 1998. The Midwest region of the United States had the highest number of occupational on-farm injuries to youths in 1998 (6,107 injuries) as well as the highest occupational injury rate (0.95 per 100 youths). ***(Source: Myers and Hendricks [2001].)***

Youths on Minority Farms

How did the number of nonfatal injuries to youths on racial minority farms differ by race in 2000?

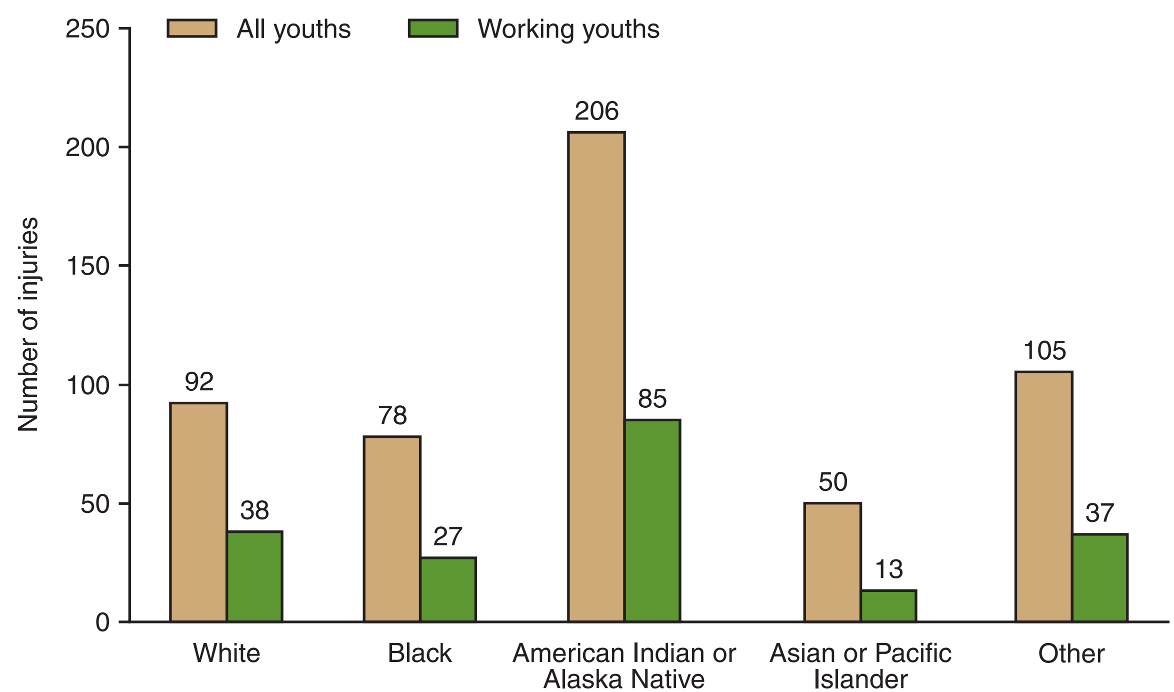
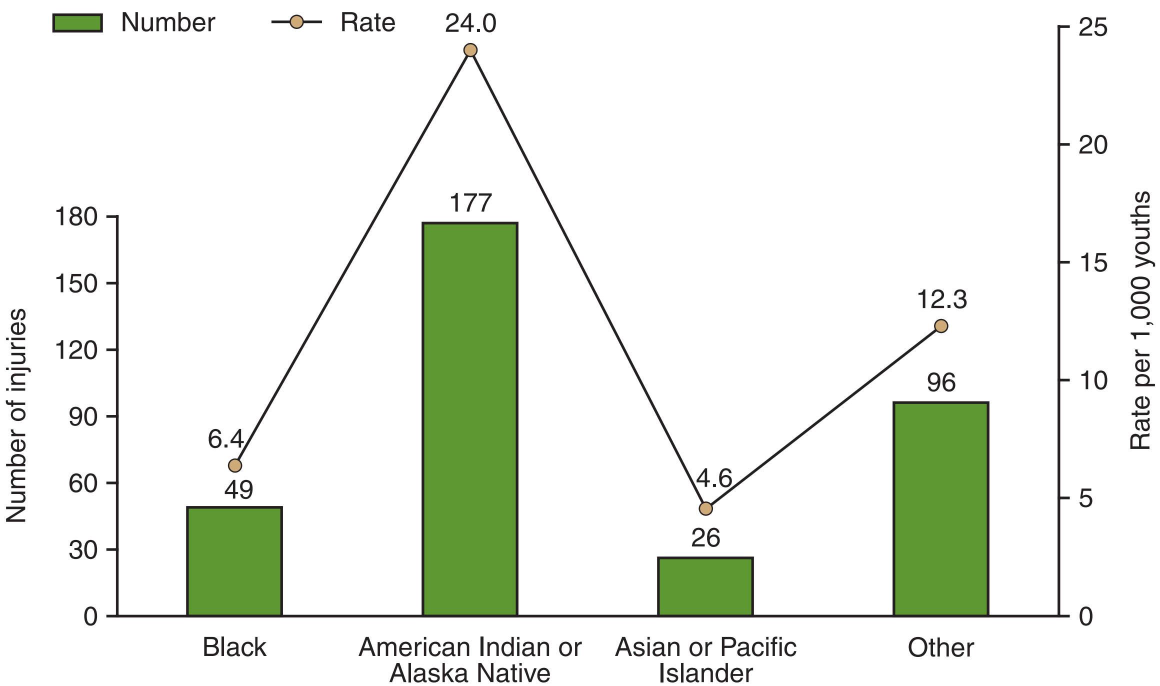
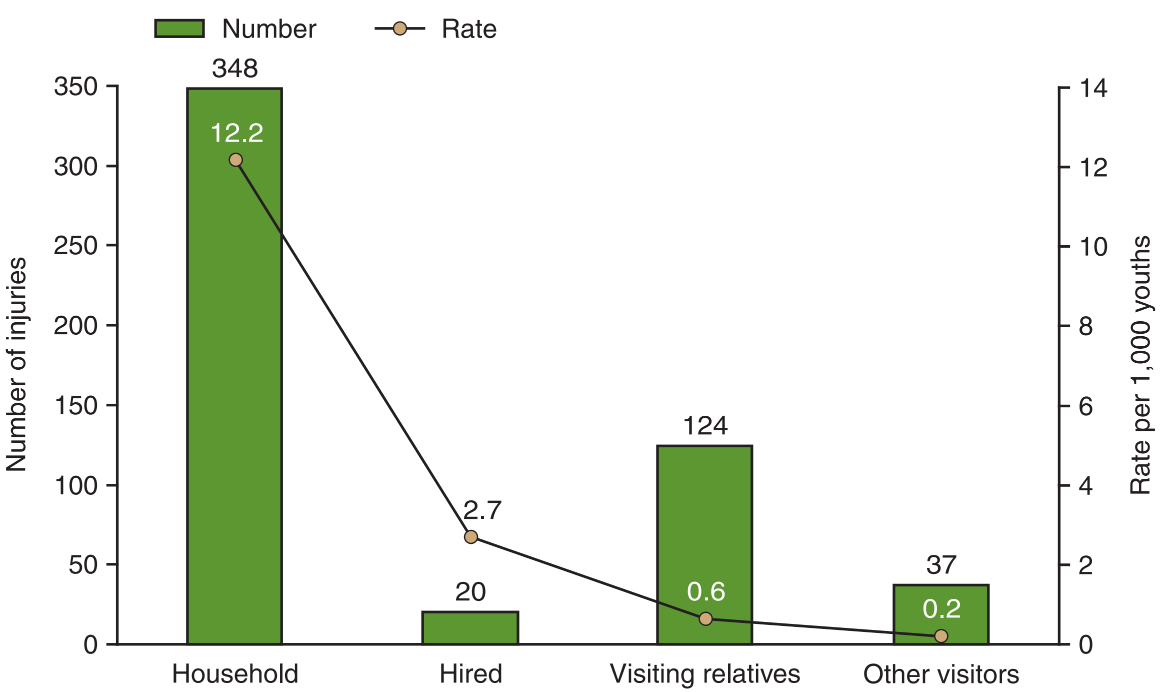


Figure 3–24. Number of nonfatal injuries to all youths and working youths under age 20 on racial minority farm operations by race, 2000. On minority farm operations in 2000, the most nonfatal injuries to all youths under age 20 occurred among American Indian or Alaska Native youths (206 injuries), followed by other (105), white youths (92), black youths (78), and Asian or Pacific Islanders (50). Far fewer nonfatal injuries occurred among working youths. ***(Source: Myers et al. [2003].)***



How did the number and rate of nonfatal injuries to household youths on racial minority farms differ by race in 2000?

Figure 3–25. Number and rate of nonfatal injuries to household youths under age 20 on racial minority farm operations by race, 2000. American Indian and Alaska Native youths had the highest number (177) and rate (24.0 per 1,000 youths) of nonfatal injuries among household youths on minority farm operations. Youths of other races had the second highest number (96) and rate (12.3 per 1,000 youths) of nonfatal injuries among household youths, followed by black youths and Asian or Pacific Islander youths. ***(Source: Myers et al. [2003].)***



How did the number and rate of nonfatal injuries to youths on racial minority farms differ by relationship to the farm in 2000?

Figure 3–26. Number and rate of nonfatal injuries to youths under age 20 on racial minority farm operations by relationship to the farm, 2000. Household youths had the highest number (348) and rate (12.2 per 1,000 youths) of nonfatal injuries among youths on racial minority farm operations in 2000. Hired workers had the second highest injury rate (2.7 per 1,000 hired working youths) but the lowest number of injuries (20). Visiting relatives accounted for the second highest number of nonfatal youth injuries (124), followed by hired workers (20). ***(Source: Myers et al. [2003].)***

How did the number and rate of nonfatal occupational injuries to youths on racial minority farms differ by relationship to the farm in 2000?

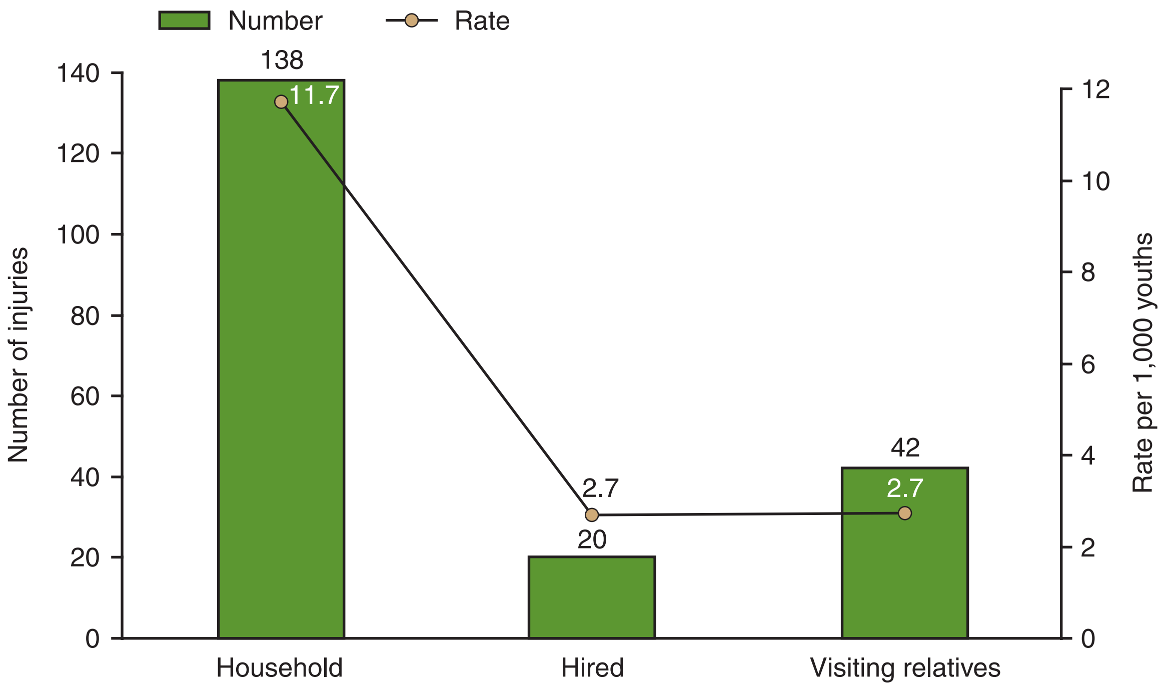


Figure 3–27. Number and rate of nonfatal occupational injuries to youths under age 20 on racial minority farm operations by relationship to the farm, 2000. Household youths had the highest number (138) and rate (11.7 per 1,000 youths) of nonfatal occupational injuries to youths on racial minority farm operations in 2000. Visiting relatives had the next highest number of injuries (42) and the same rate of nonfatal occupational injuries as hired workers (2.7 per 1,000 youths). ***(Source: Myers et al. [2003].)***

What injury hazard accounted for the highest number and rate of nonfatal injuries to household youths on racial minority farm operations in 2000?

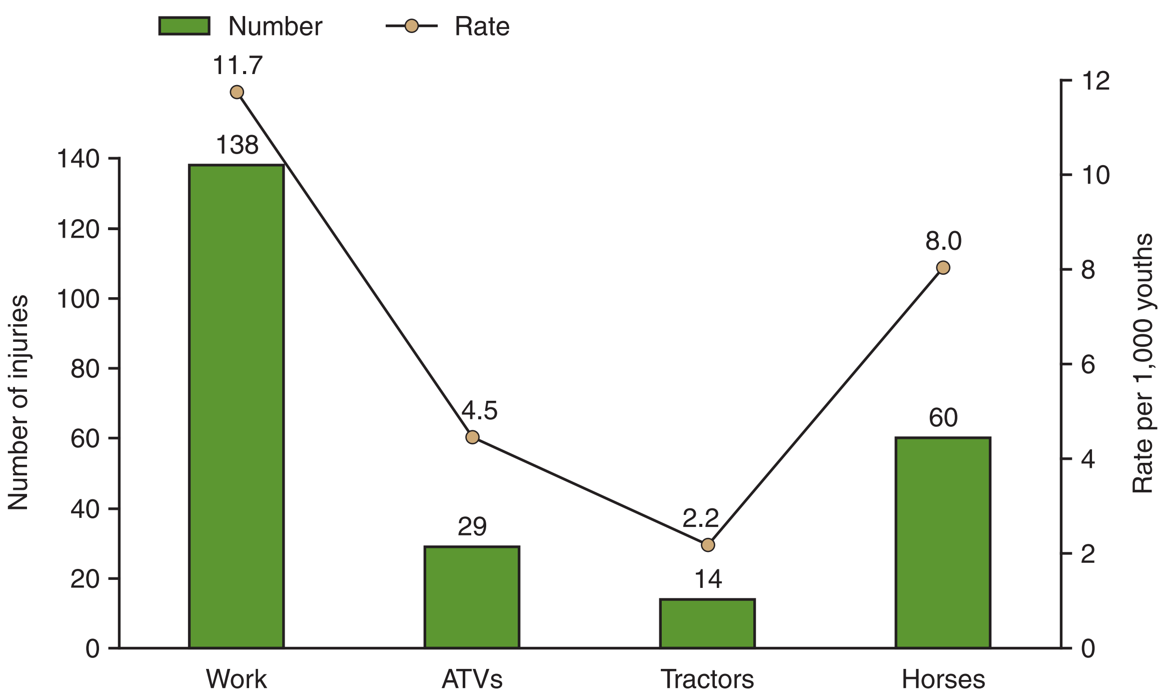
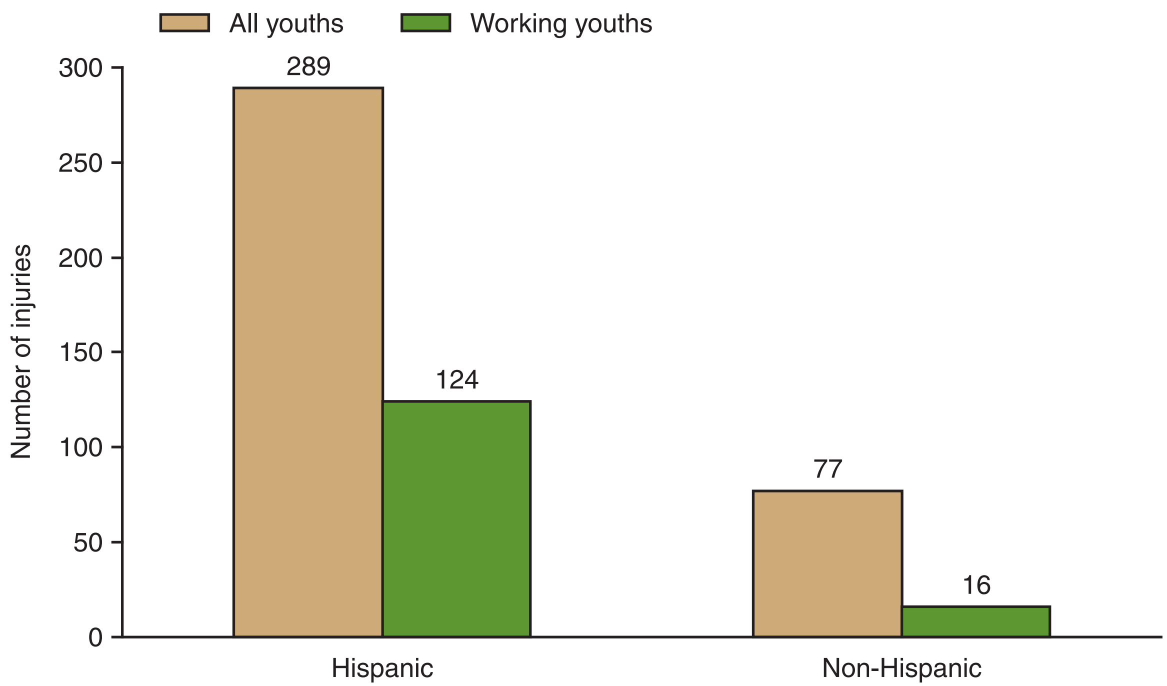


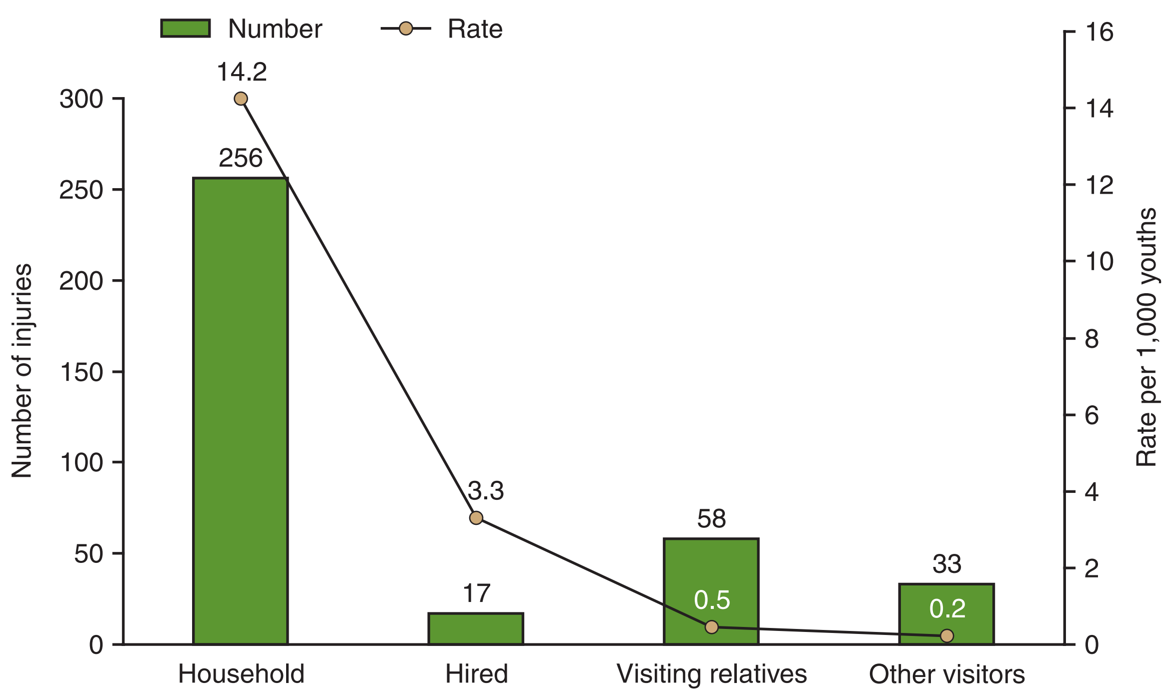
Figure 3–28. Number and rate of nonfatal injuries to household youths under age 20 on racial minority farm operations by known injury hazard, 2000. Of the four known injury hazards to household youths in 2000, work accounted for the highest number (138) and rate (11.7 per 1,000 youths) of nonfatal injuries to these youths on racial minority farm operations. Horses accounted for the second highest number (60) and rate (8.0 per 1,000 youths) of these nonfatal injuries, followed by all-terrain vehicles (ATVs) and tractors. ***(Source: Myers et al. [2003].)***



Youths on Hispanic Farms

How did the number of nonfatal injuries to youths differ between Hispanic and non-Hispanic youths on Hispanic farm operations in 2000?

Figure 3–29. Nonfatal injuries to Hispanic and non-Hispanic youths under age 20 on Hispanic farm operations, 2000. On Hispanic farm operations in 2000, Hispanic youths accounted for much higher numbers of nonfatal injuries (289) and occupational nonfatal injuries (124) than did non-Hispanic youths. ***(Source:** Myers et al. [2003].)*



How did the number and rate of nonfatal injuries to youths on Hispanic farms differ by relationship to the farm in 2000?

Figure 3–30. Number and rate of nonfatal injuries to youths under age 20 on Hispanic farm operations by relationship to the farm, 2000. Household youths had the highest number (256) and rate (14.2 per 1,000) of nonfatal injuries to youths on Hispanic farm operations in 2000. Visiting relatives accounted for an additional 58 injuries on these farms, followed by other visitors (33 injuries). Hired workers accounted for the lowest number of nonfatal injuries to youths (17), but they had the second highest injury rate (3.3 per 1,000 youths). ***(Source:** Myers et al. [2003].)*

How did the number and rate of nonfatal occupational injuries to youths on Hispanic farms differ by relationship to the farm in 2000?

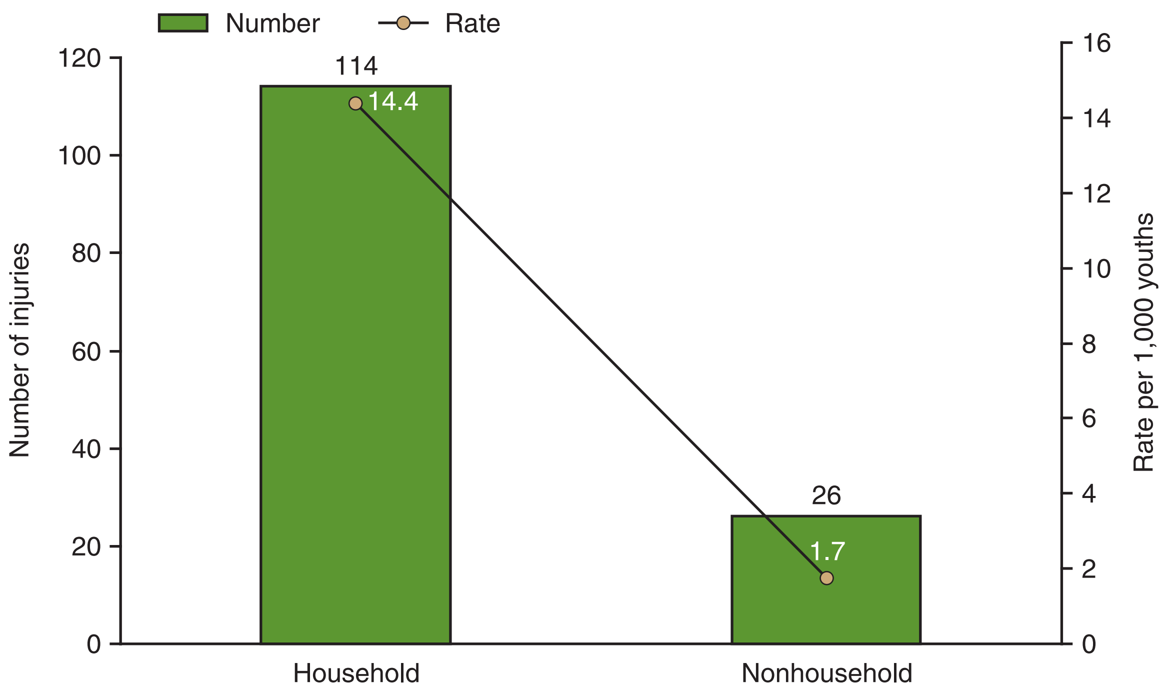


Figure 3–31. Number and rate of nonfatal occupational injuries to youths under age 20 on Hispanic farm operations by relationship to the farm, 2000. On Hispanic farm operations in 2000, household youths had a much higher number (114) of occupational injuries than nonhousehold youths, and their rate of injury (14.4 per 1,000 youths) was 8 times the rate for nonhousehold working youths (1.7 per 1,000 youths). ***(Source:** Myers et al. [2003].)*

What injury hazard accounted for the highest number and rate of nonfatal injuries to youths on Hispanic farms in 2000?

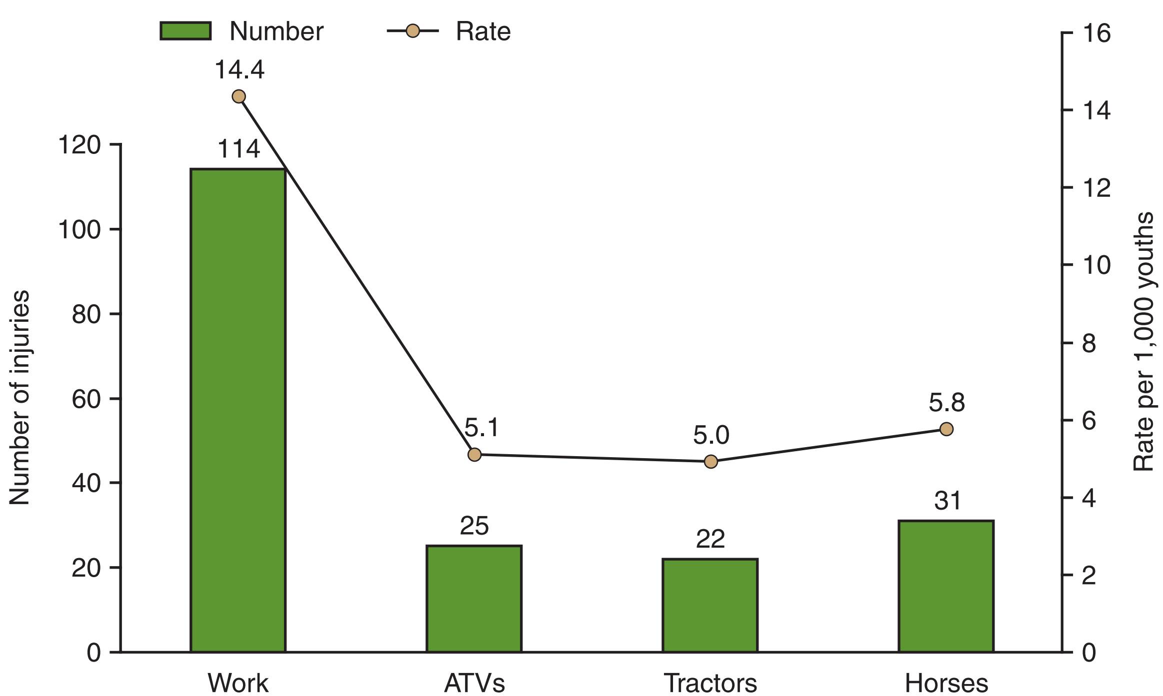


Figure 3–32. Number and rate of nonfatal injuries to household youths under age 20 on Hispanic farm operations by known injury hazard, 2000. Of the four recognized hazards to household youths in 2000, work accounted for the highest number (114) and rate (14.4 per 1,000 youths) of nonfatal injuries to these youths on Hispanic farm operations. Horses accounted for the second highest number (31) and rate (5.8 per 1,000 youths) of these nonfatal injuries, followed by ATVs and tractors. ***(Source:** Myers et al. [2003].)*

Farm Workers

This section provides data for answering basic questions about the occupational health of hired agricultural workers. Data for the figures come from the U.S. Department of Labor (DOL) National Agricultural Workers Survey (NAWS). This annual workplace-based survey of hired crop workers across the United States has included occupational farm injury and health questions since 1999 [DOL 2001]. During that year, 84% of farm workers were foreign born and 53% lacked legal documentation [DOL 2001]. These characteristics distinguished farm workers from other employed workers. One criterion for inclusion in the survey is employment in agriculture during the preceding 14 days. To capture seasonal and geographic variations in the volume of farm labor, NAWS bases its sampling of agricultural workplaces on three interviewing cycles that last 10 to 12 weeks each. Cycles begin in February, June, and October.

In 1999, 49% of farm workers were settled (residing within 75 miles of their farm work job) (Figure 3–33), and 36% had been employed in farm work for more than 10 years (Figure 3–34). Farm workers were predominately young (85% were under age 45), male (78%), and Hispanic (93%) (Figures 3–35 and 3–36). The highest number of nonfatal injuries occurred among farm workers aged 30–34 (Figure 3–37). Occupational injury rates in 1999 ranged from 1.5 per 100 workers under age 20 to 11.2 per 100 workers aged 45–54. (Figure 3–38). The percentage of farm workers reporting at least one health condition (respiratory, musculoskeletal, dermatologic, or gastrointestinal) during the preceding 12 months increased with years of U.S. farm work, and the highest percentage (34%) was reported for farm workers with more than 10 years of this work (Figure 3–39).

During 1999, the percentage of workers with musculoskeletal pain or discomfort ranged from 11% of those in their first year of farm work in the United States to 19% in workers having more than 10 years of this work (Figure 3–40). The percentage of farm workers with joint or muscle pain was highest in those reporting work in multiple crop categories (Figure 3–41). The percentage of workers reporting dermatitis was similar regardless of the number of years in U.S. farm work (Figure 3–42), ranging from 6.7% to 7.8% (Figure 3–42). Dermatitis was most common in farm workers reporting work in multiple crop categories (8.0%) and in fruits and nuts (7.9%) (Figure 3–43). The percentage of farm workers reporting wheezing increased steadily with years of U.S. farm work, from 1.5% for workers with less than 1 year to 4.7% for workers with more than 10 years of this work (Figure 3–44). Wheezing was most common in farm workers reporting work in multiple crop categories (4.8%) (Figure 3–45).

Migrant Status

What was the migrant status of farm workers in 1999?

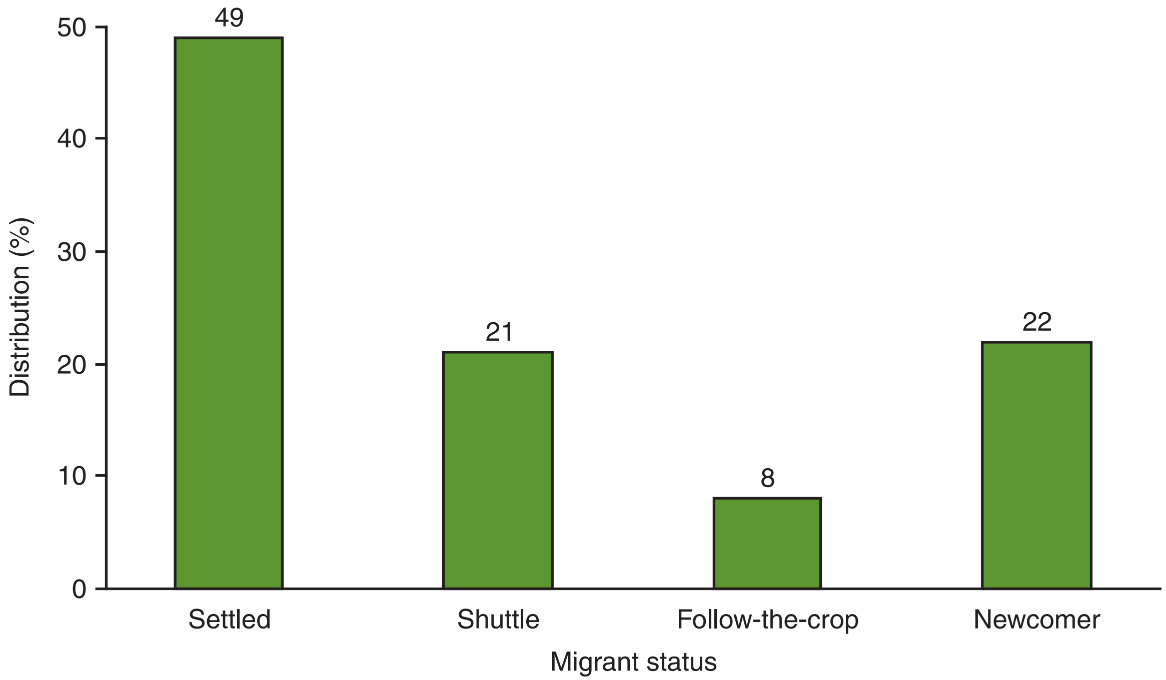


Figure 3–33. Distribution of farm workers by migrant status, 1999. In 1999, 49% of farm workers were settled (residing within 75 miles of their farm work job). The rest were migrant workers to varying degrees: 22% were newcomers (entered the United States to work in farm work during the past year); 21% were shuttle migrants (have a residence in the United States but commute to farm work at a distance); and 8% were follow-the-crop migrants (perform farm work in more than one location and must move for employment). ***(Sources: DOL [2001]; Steege and Baron [2002].)***

Years in Farm Work

How were farm workers distributed by years in U.S. farm work in 1999?

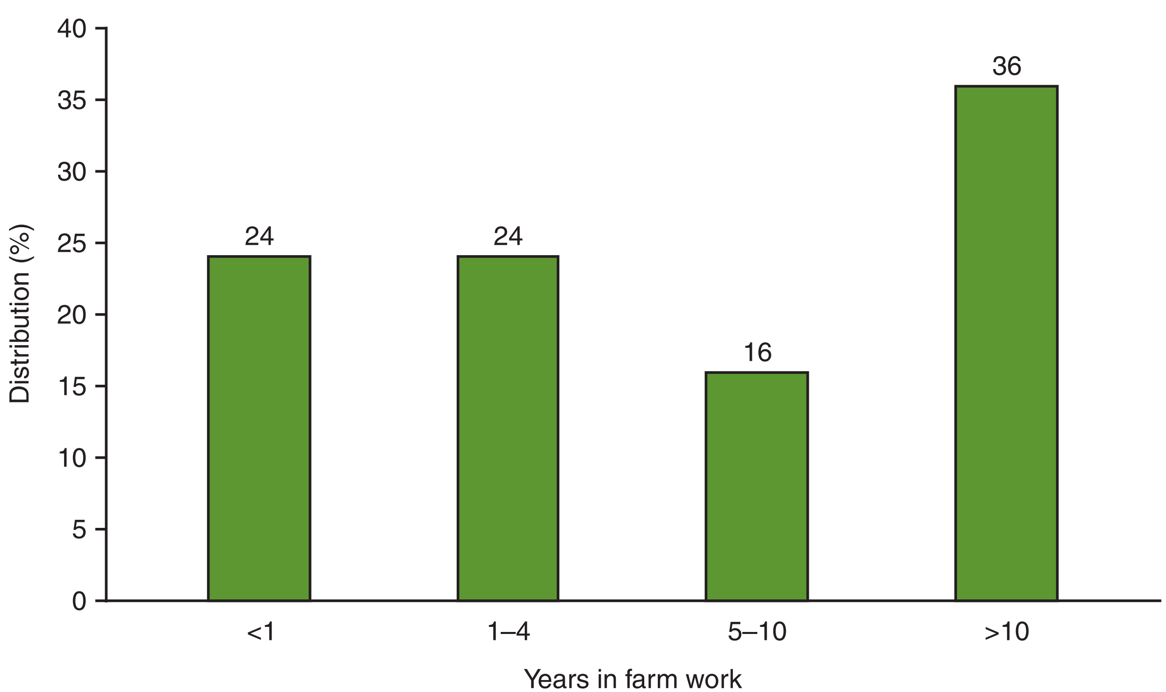
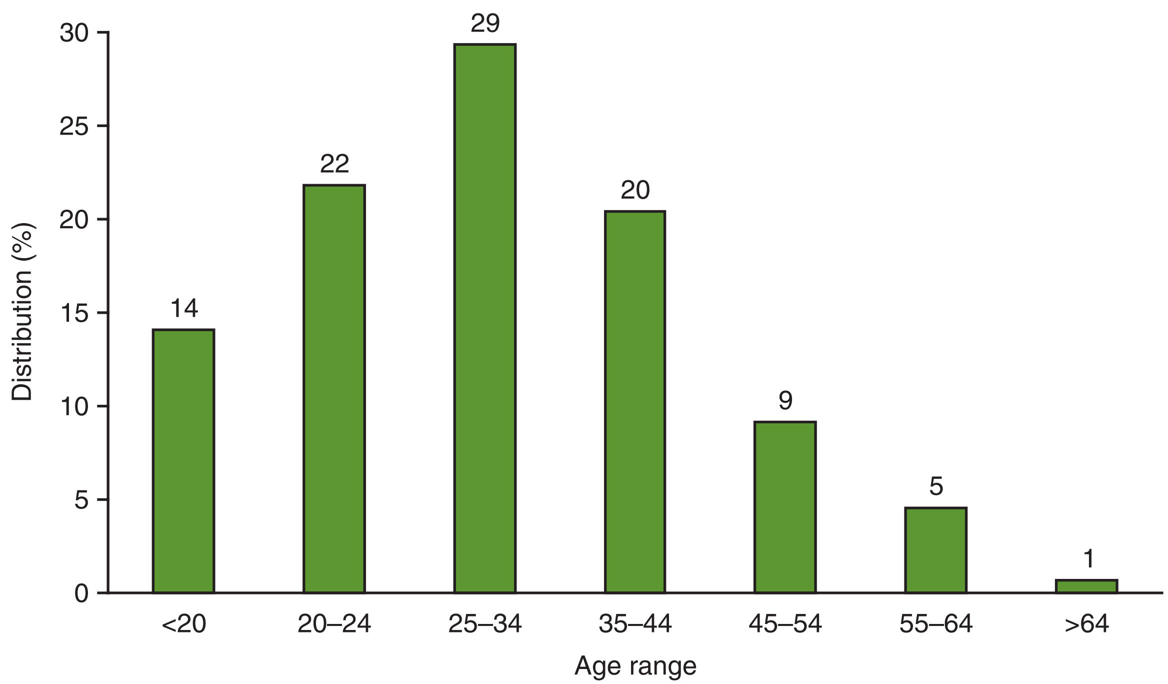


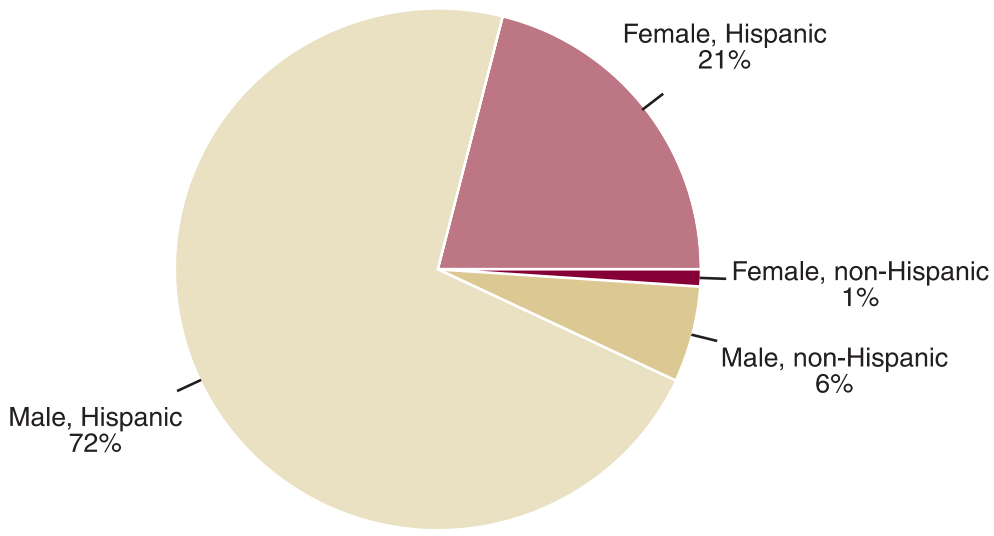
Figure 3–34. Distribution of farm workers by years in U.S. farm work, 1999. In 1999, 36% percent of farm workers had been employed more than 10 years in farm work. ***(Sources: DOL [2001]; Steege and Baron [2002].)***



Age

How were farm workers distributed by age in 1999?

Figure 3–35. Distribution of farm workers by age, 1999. Farm workers were predominately young in 1999, with 85% under age 45. ***(Sources: DOL [2001]; Steege and Baron [2002].)***



Sex and Hispanic Ethnicity

How were farm workers distributed by sex and Hispanic ethnicity in 1999?

Figure 3–36. Distribution of farm workers by sex and Hispanic ethnicity, 1999. In 1999, farm workers were predominately male (78%) and Hispanic (93%). ***(Sources: DOL [2001]; Steege and Baron [2002].)***

Nonfatal Injuries

How did nonfatal occupational injuries differ by age among farm workers in 1999?

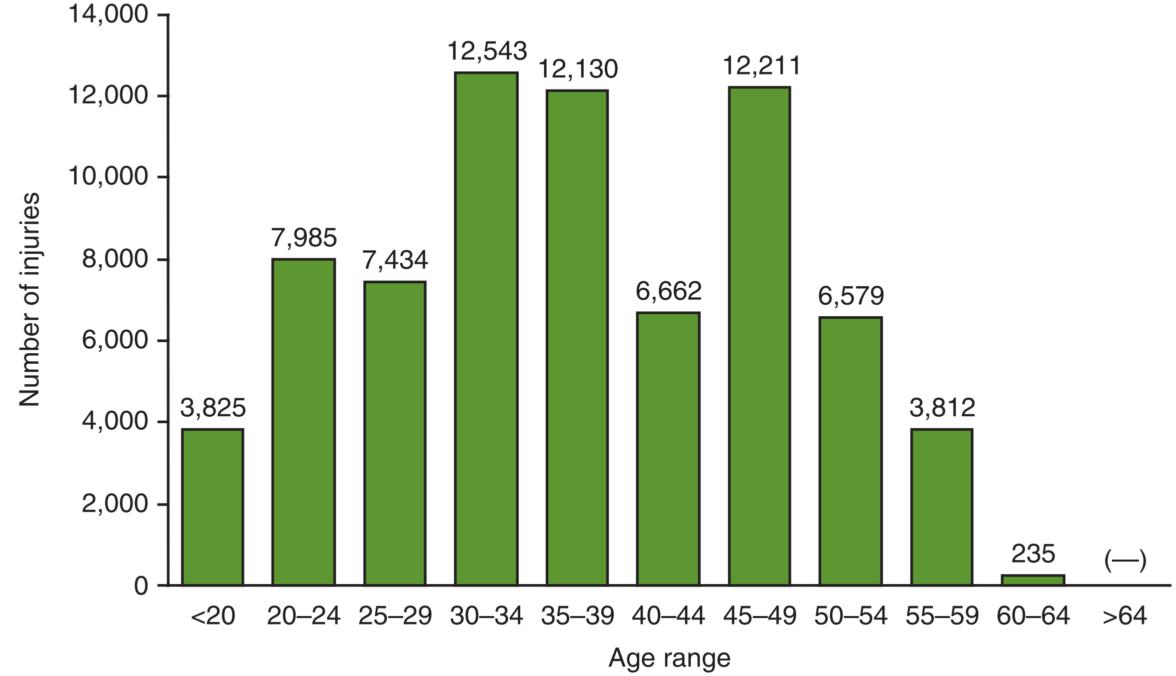


Figure 3–37. Nonfatal occupational injuries to farm workers by age, 1999. In 1999, the highest number of nonfatal occupational injuries (12,543) occurred among farm workers aged 30–34. However, workers aged 35–39 and 45–49 accounted for similar numbers of injuries (12,130 and 12,211). (*Note:* A dash in parentheses indicates that no injury data were reported or estimated from the survey for this age group.) ***(Sources: DOL [2001]; Myers [2001d].)***

How did nonfatal occupational injury rates among farm workers differ by age in 1999?

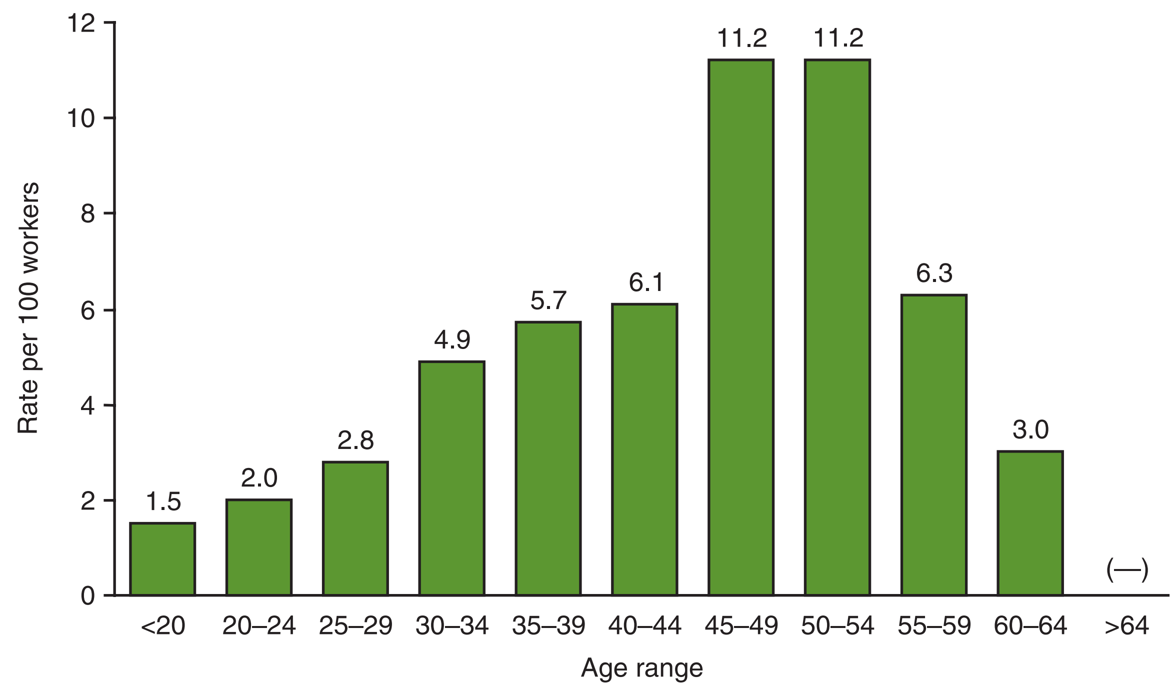
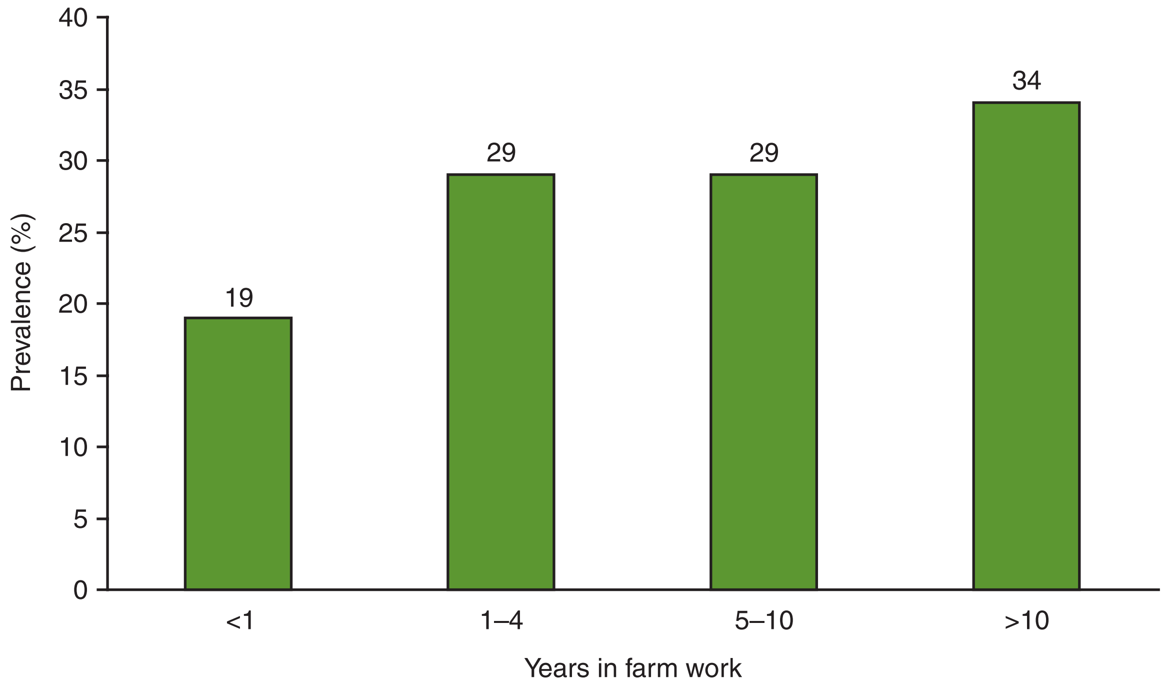


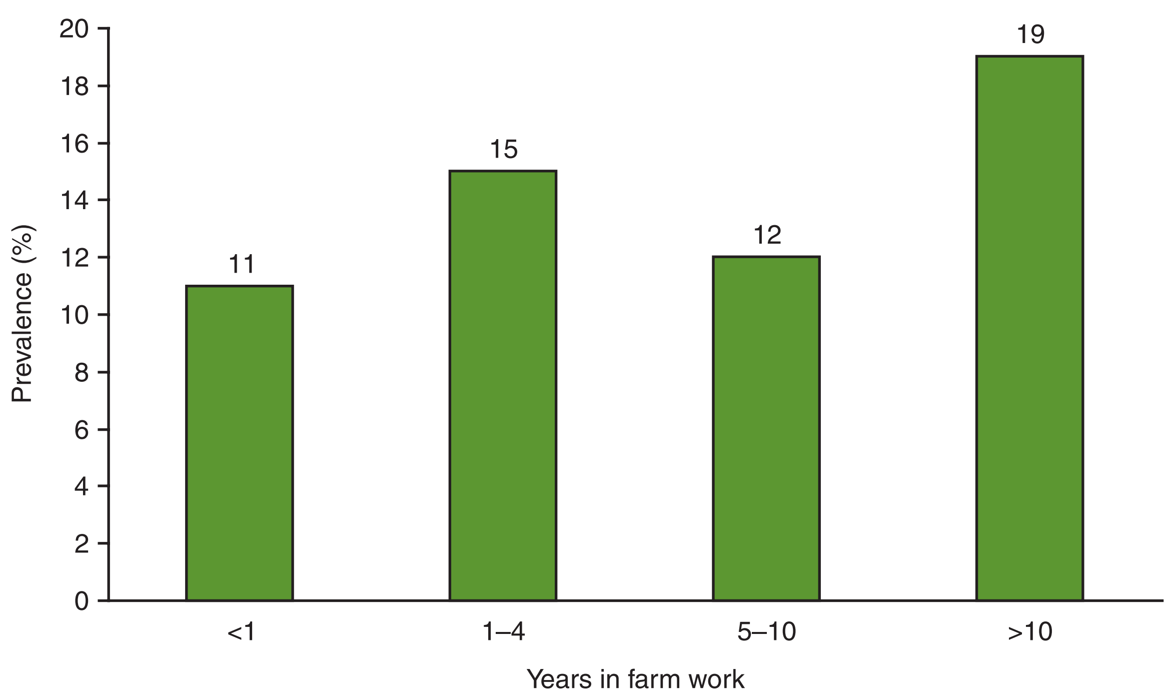
Figure 3–38. Occupational injury rates for farm workers by age, 1999. In 1999, nonfatal occupational injury rates for farm workers increased with age, peaking at 11.2 per 100 workers aged 45–54 and declining steeply for workers aged 55–64. (*Note:* A dash in parentheses indicates that no injury data were reported or estimated from the survey for this age group; thus no rate estimates were made.) ***(Sources: DOL [2001]; Myers [2001d].)***



Health Conditions or Symptoms

How did the percentage of farm workers reporting at least one health condition in 1999 differ by years in U.S. farm work?

Figure 3–39. Percentage of farm workers reporting at least one health condition during the preceding 12 months by years in U.S. farm work, 1999. In 1999, the percentage of farm workers reporting at least one health condition (respiratory, musculoskeletal, dermatologic, or gastrointestinal) during the preceding 12 months increased gradually with years of farm work. The lowest percentage (19%) was reported for farm workers with less than 1 year of work experience in U.S. farming. The highest percentage (34%) was reported for farm workers with more than 10 years of U.S. farm work. ***(Sources: DOL [2001]; Steege and Baron [2002].)***



Joint or Muscle Pain

How did the percentage of farm workers reporting joint or muscle pain differ by years of U.S. farm work in 1999?

Figure 3–40. Percentage of farm workers reporting joint or muscle pain in at least one body part during the preceding 12 months by years in U.S. farm work, 1999. In 1999, the percentage of workers reporting joint or muscle pain in the back, shoulder, elbow/arm, hand/wrist, or legs/feet ranged from 11% for those in their first year of U.S. farm work to 19% for workers with more than 10 years of this work. ***(Sources: DOL [2001]; Steege and Baron [2002].)***

How did the percentage of farm workers reporting joint or muscle pain differ by crop in 1999?

Figure 3–41. **Percentage of farm workers reporting joint or muscle pain in at least one body part during the preceding 12 months by crop category last worked, 1999.** The percentage of farm workers reporting joint or muscle pain in 1999 is highest (20%) among those working in multiple crop categories and lowest (11%) among horticulture workers. An average of 15% of workers in vegetables, fruits and nuts, and field crops reported joint or muscle pain. ***(Sources: DOL [2001]; Steege and Baron [2002].)***

Dermatitis

How did the percentage of farm workers reporting dermatitis differ by years of U.S. farm work in 1999?

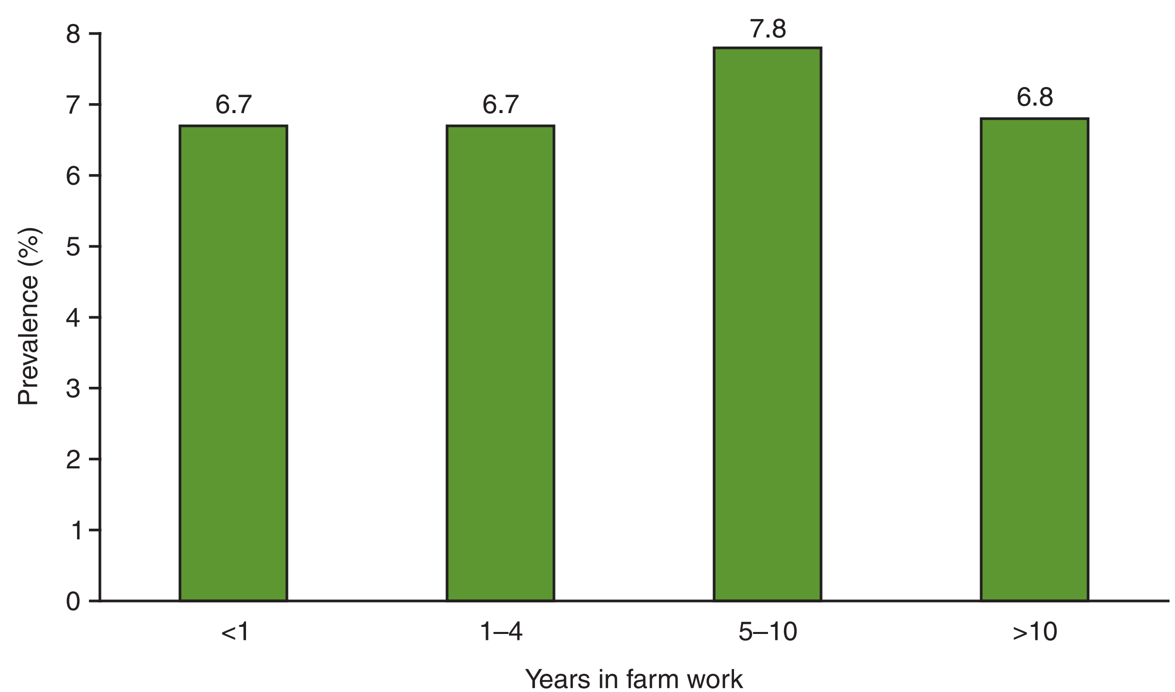
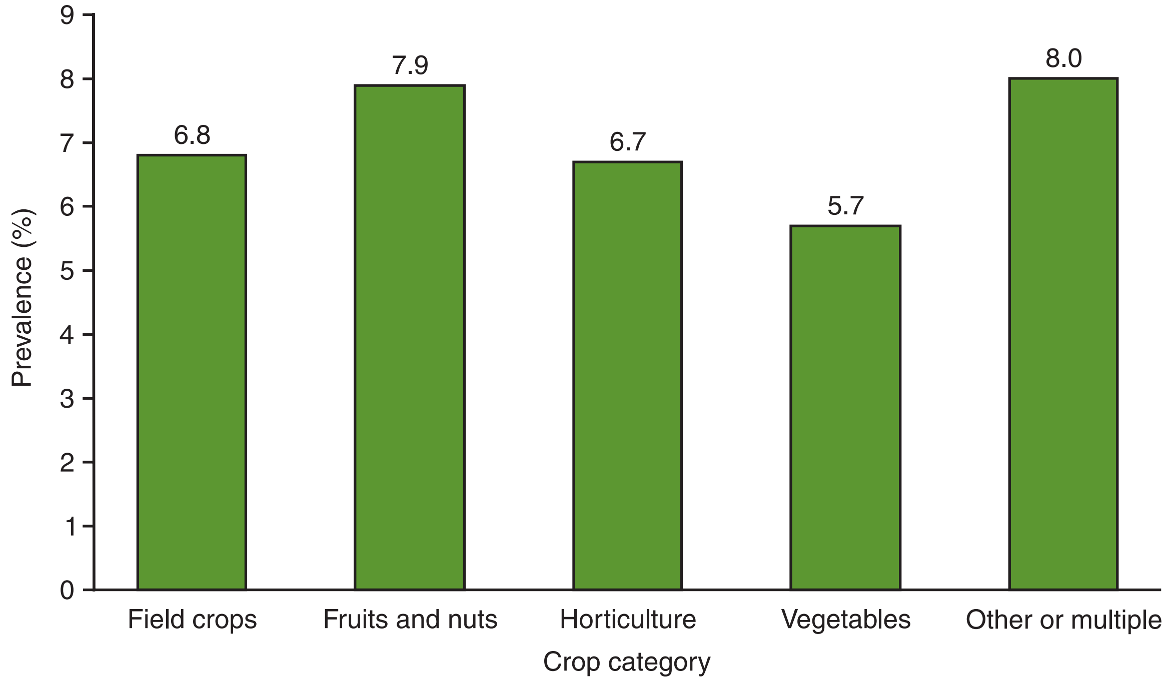
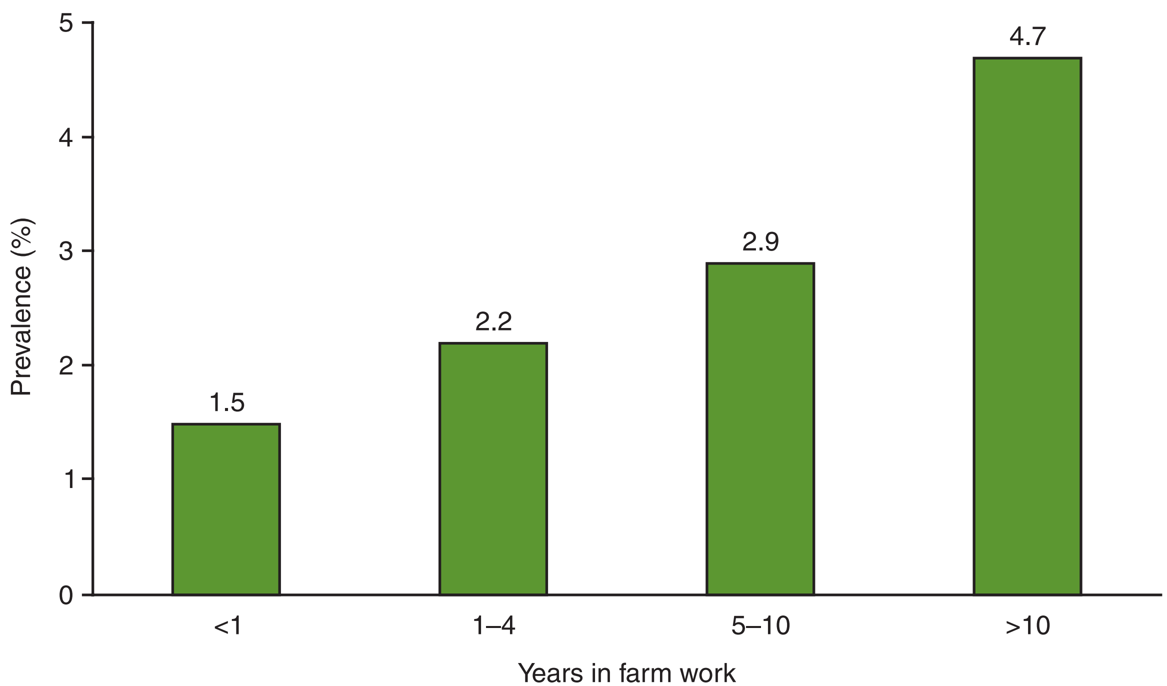


Figure 3–42. **Percentage of farm workers reporting dermatitis during the preceding 12 months by years in U.S. farm work, 1999.** The percentage of farm workers reporting dermatitis on the hands, arms, face, torso, or legs in 1999 was similar regardless of the number of years in U.S. farm work. The percentage ranged from 6.7% in farm workers with less than 5 years of U.S. farm work to 7.8% in those with 5–10 years of this work. ***(Sources: DOL [2001]; Steege and Baron [2002].)***



How did the percentage of farm workers reporting dermatitis differ by crop in 1999?

Figure 3–43. Percentage of farm workers reporting dermatitis during the preceding 12 months by crop category last worked, 1999. In 1999, dermatitis was most common in farm workers reporting work in multiple crop categories (8.0%) and fruits and nuts (7.9%). The percentage of workers with dermatitis was lowest in vegetable workers (5.7%). ***(Sources: DOL [2001]; Steege and Baron [2002].)***



Wheezing

How did the percentage of farm workers reporting wheezing or whistling in the chest differ by years of U.S. farm work in 1999?

Figure 3–44. Percentage of farm workers reporting wheezing or whistling in the chest at any time during the preceding 12 months by years in U.S. farm work, 1999. The percentage of farm workers reporting wheezing or whistling in the chest increased with years of U.S. farm work, from 1.5% of farm workers with less than 1 year to 4.7% of those with more than 10 years of this work. ***(Sources: DOL [2001]; Steege and Baron [2002].)***

How did the percentage of farm workers reporting wheezing or whistling in the chest symptoms differ by crop in 1999?

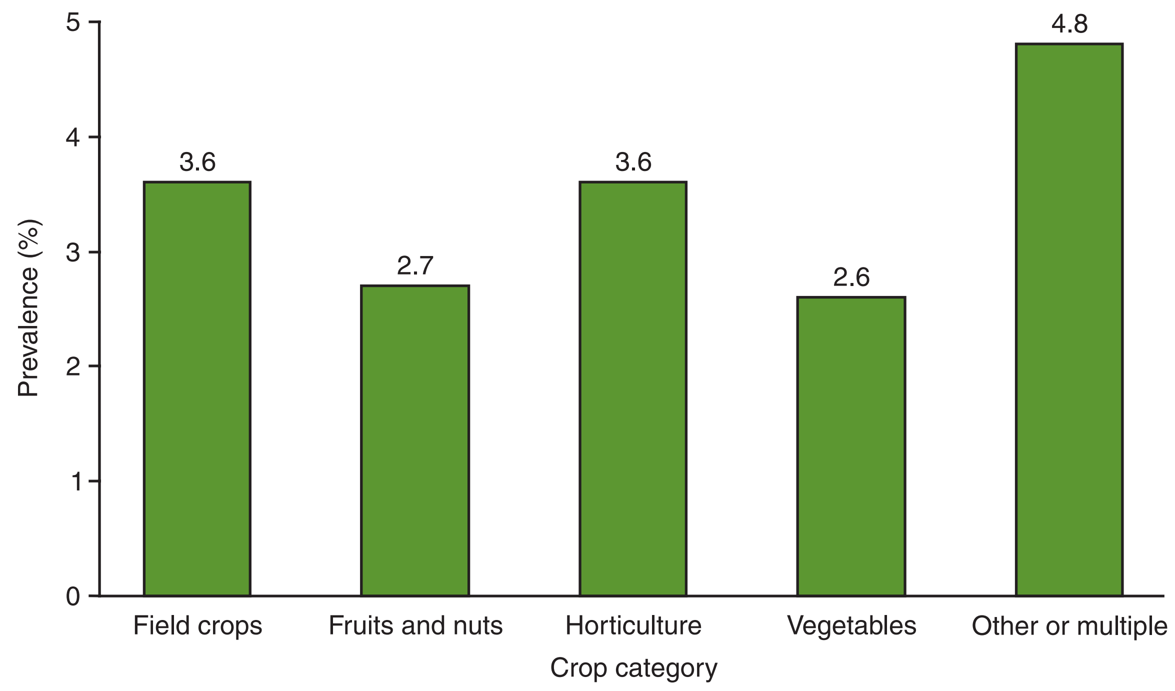


Figure 3–45. Percentage of farm workers reporting wheezing or whistling in the chest at any time during the preceding 12 months by crop category last worked, 1999. Wheezing or whistling in the chest was most common in farm workers reporting work in multiple crop categories (4.8%) and less common in vegetable workers (2.6%) and workers in fruits and nuts (2.7%). ***(Sources: DOL [2001]; Steege and Baron [2002].)***

References

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Chapter 4 • High-Risk Industries and Occupations

The National Institute for Occupational Safety and Health (NIOSH) conducts comprehensive surveillance and research programs focused on selected high-risk industrial sectors such as agriculture, mining, and construction. Historically, workers in these industries have suffered the highest rates of fatal injury. The most recent data from the Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) reveal that fatal injury rates in these high-risk industries range from 3.0 to 5.6 times the private industry rate of 4.2 per 100,000 workers (Figure 4–1) [BLS 2003a].

Except for mining, these high-risk industries also have elevated rates of nonfatal occupational injuries and illnesses, as shown by data from the BLS annual Survey of Occupational Injuries and Illnesses (SOII) (Figure 4–2).

This chapter provides data on nonfatal and fatal injuries and illnesses in the mining* and construction industries as well as associated occupations. Similar data for the agriculture industry are provided in Chapter 3.

*The Mine Safety and Health Administration (MSHA) provides BLS with data conforming to the Occupational Safety and Health Administration (OSHA) definitions for "mining operators in coal, metal, and nonmetal mining." Readers should note the following within the BLS data: (1) mining includes oil and gas extraction, and (2) independent mining contractors are excluded from the coal, metal, and nonmetal mining industries.

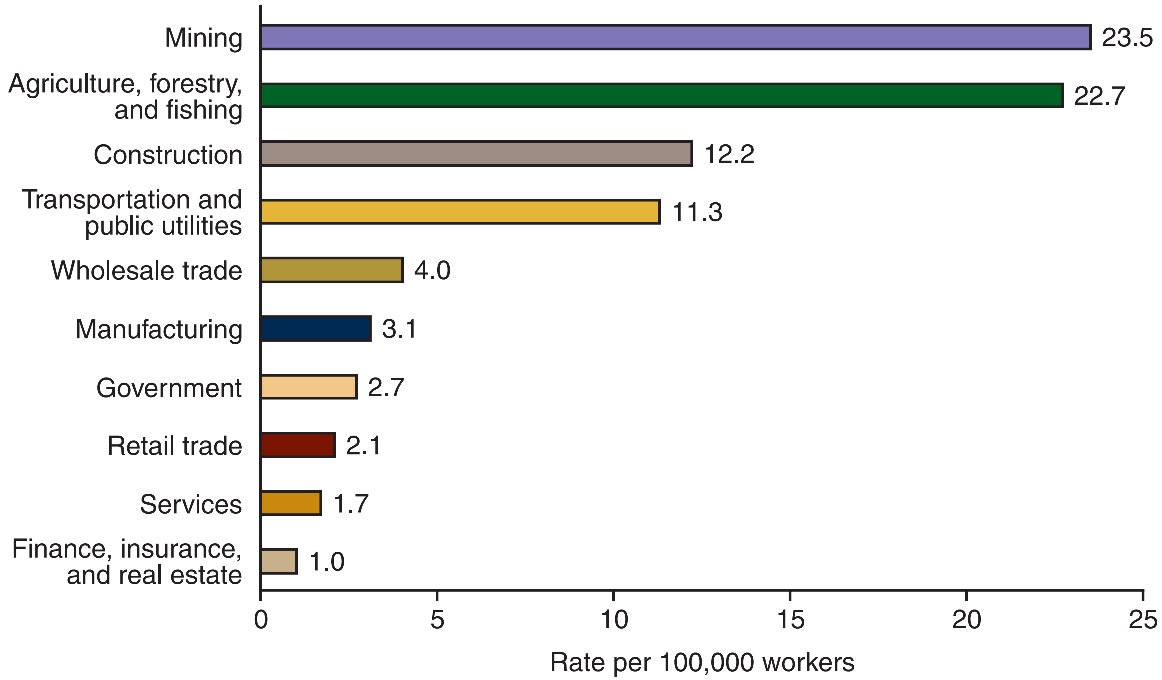


Figure 4–1. Fatal occupational injury rates by industry division, 2002. Fatal occupational injury rates in 2002 were highest in mining (23.5 per 100,000 workers), agriculture, forestry, and fishing (22.7), construction (12.2), and transportation and public utilities (11.3). The rate for all private industry was 4.2 per 100,000 workers. ***(Source: BLS [2003a].)***

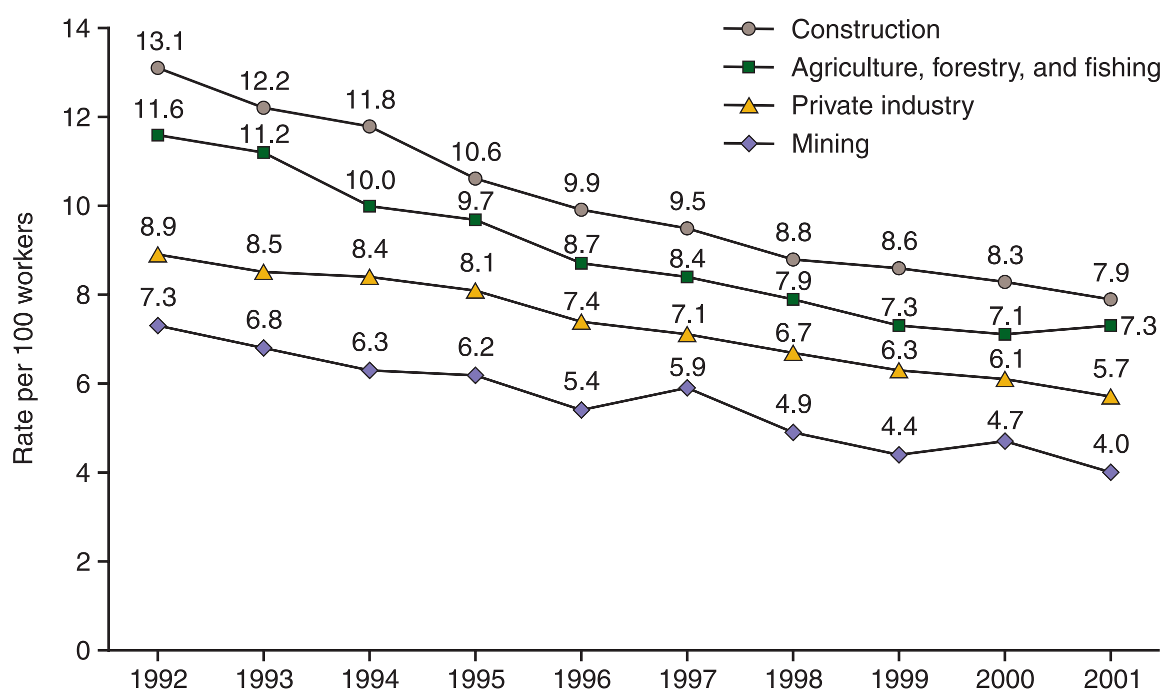


Figure 4–2. Incidence rates of nonfatal occupational injuries and illnesses in private industry and in high-risk industrial sectors, 1992–2001. During 1992–2001, the rates of total recordable injuries and illnesses in construction and agriculture exceeded those for all private industry by an average of 37% and 22%, respectively. However, the rates all decreased by similar percentages during this period—36% for all private industry, 40% for construction, and 37% for agriculture, forestry, and fishing. ***(Source: BLS [2002a].)***

Mining

This section contains an overview of the occupational health status of workers in the mining industry (excluding oil and gas extraction). An estimated 567,000 workers were employed in the mining industry in 2001. Most of these workers were aged 25–54, (79.4% compared with 71.5 % for all employed workers), male (85.4% compared with 53.4% for all employed workers), and white (93.3% compared with 83.8% for all employed workers) (BLS [2001]).

Although fatal occupational injury rates among mine workers decreased from 1966 to 2000 (Figure 4–5), these rates were still high—27 per 100,000 workers for metal/nonmetal mine workers and 33 per 100,000 for coal mine workers. Both fatal occupational injuries and lost-workday injuries were distributed unevenly among various subpopulations in mining (Tables 4–1 and 4–2). For example, the 1998–2002 rate of lost-workday cases in the underground areas of underground mines (7.8 per 100 full-time equivalent workers) was more than double the rate for all mining (Table 4–2). Hence, surveillance of the mining population continues to be an important part of mining safety and health research.

Data in this section were obtained primarily from the Mine Safety and Health Administration (MSHA) databases of employment and accident/injury/illness cases for mine operators and independent contractors. Major commodities covered under MSHA jurisdiction include coal, metal ores, stone, sand and gravel, and other nonmetals (for example, clay). In the following figures, the employer type *metal/nonmetal—independent contractor* includes contractors working at metal, nonmetal, stone, and sand and gravel operations. Data on coal workers' pneumoconiosis were obtained from the National Surveillance System for Pneumoconiosis Mortality (NSSPM), which is developed and maintained by the NIOSH Division of Respiratory Disease Studies and is based on a subset of multiple-cause-of-death, public-use mortality data obtained annually from the National Center for Health Statistics (NCHS).

Employment

Surface

How has the number of workers employed at surface work mining operations changed in recent years?

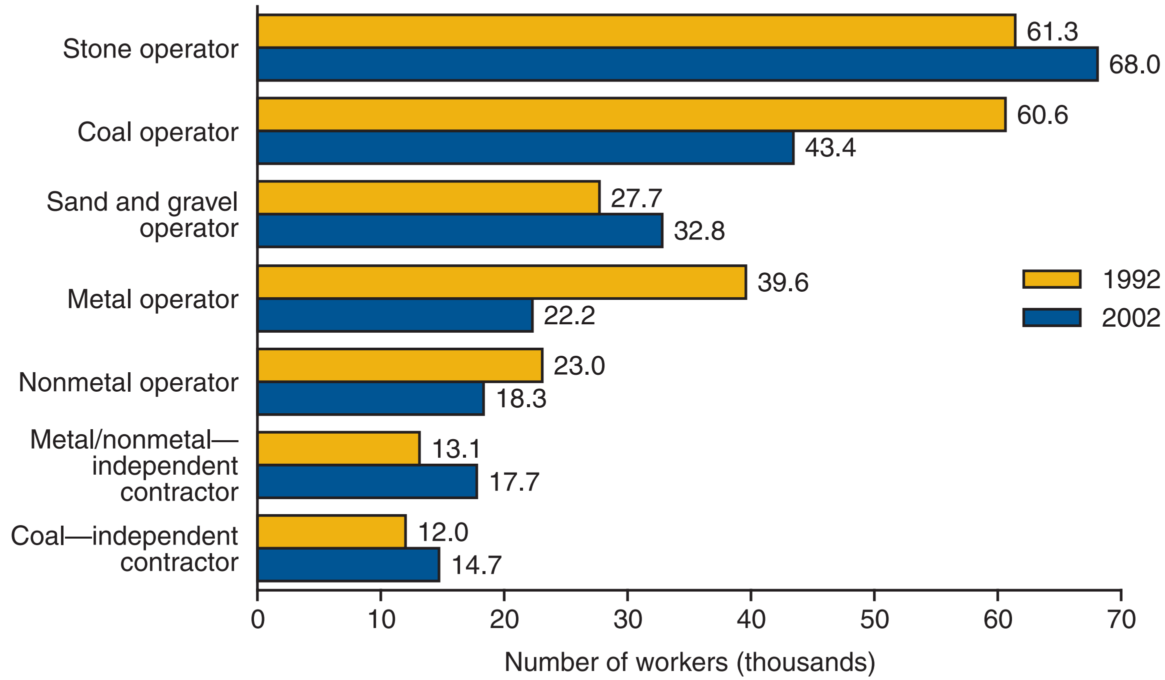


Figure 4–3. Number of full-time equivalent workers at surface work locations by type of employer, 1992 and 2002. From 1992 to 2002, overall employment at surface mining work locations decreased by 8.5%, from 237,300 to 217,000. At surface locations, the number of metal operator workers decreased 44%, the number of coal operator workers decreased 28%, and the number of nonmetal operator workers decreased 21%. The number employed at surface operations increased for stone operator workers, sand and gravel operator workers, and independent contractor workers. ***(Sources: MSHA [2003]; NIOSH [2003a].)***

Underground

How has employment at underground mining operations changed in recent years?

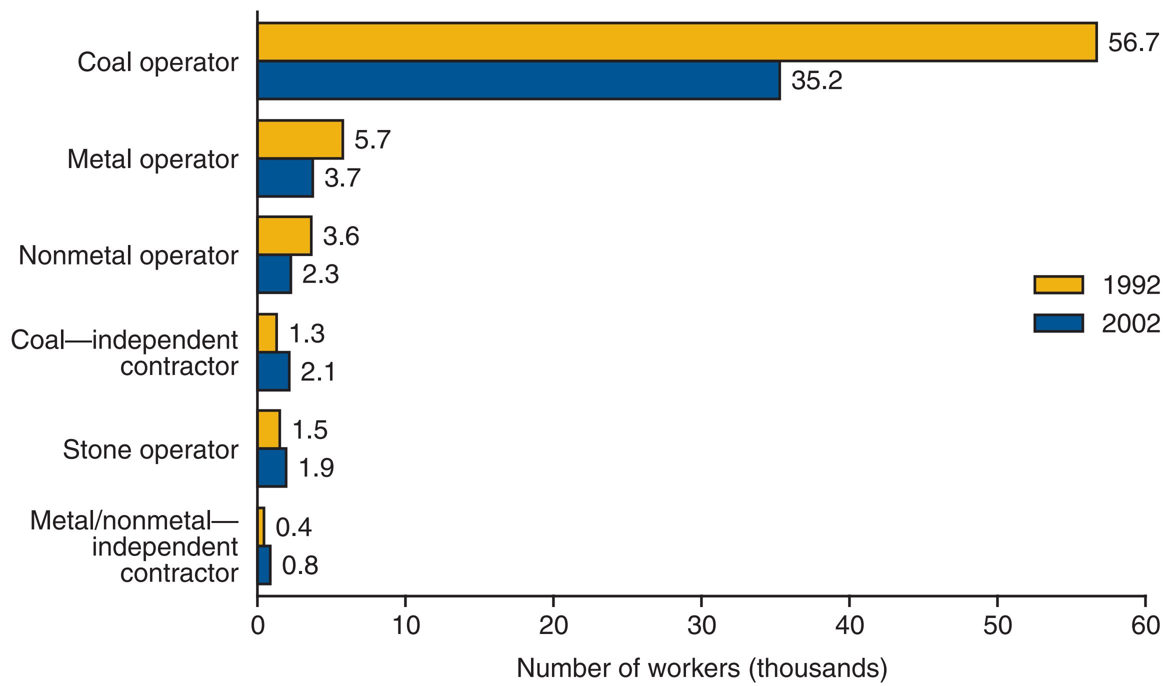


Figure 4–4. Number of full-time equivalent workers at underground work locations by type of employer, 1992 and 2002. From 1992 to 2002, the number of full-time equivalent workers at underground locations declined by 34% (from 69,300 to 46,000). The number of workers in coal operations declined 38% but still accounted for 77% of underground employment during this period. The number of metal and nonmetal operator workers also declined, whereas the number increased for stone operator workers and metal/nonmetal—independent contractor workers. ***(Sources: MSHA [2003]; NIOSH [2003a].)***

Fatal Injuries

Magnitude and Trend

How many fatal injuries occurred in coal and metal/nonmetal mining during 1966–2000?

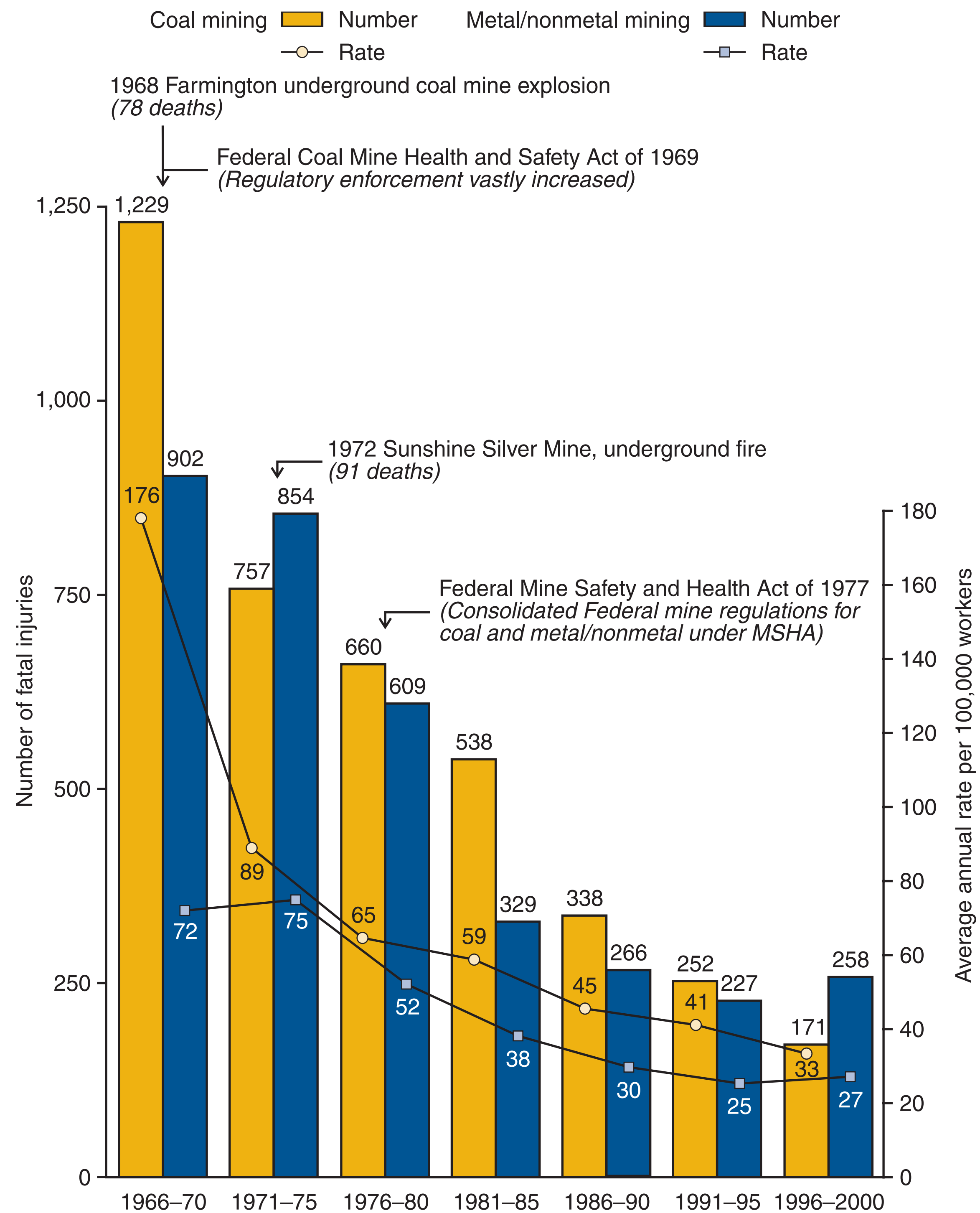
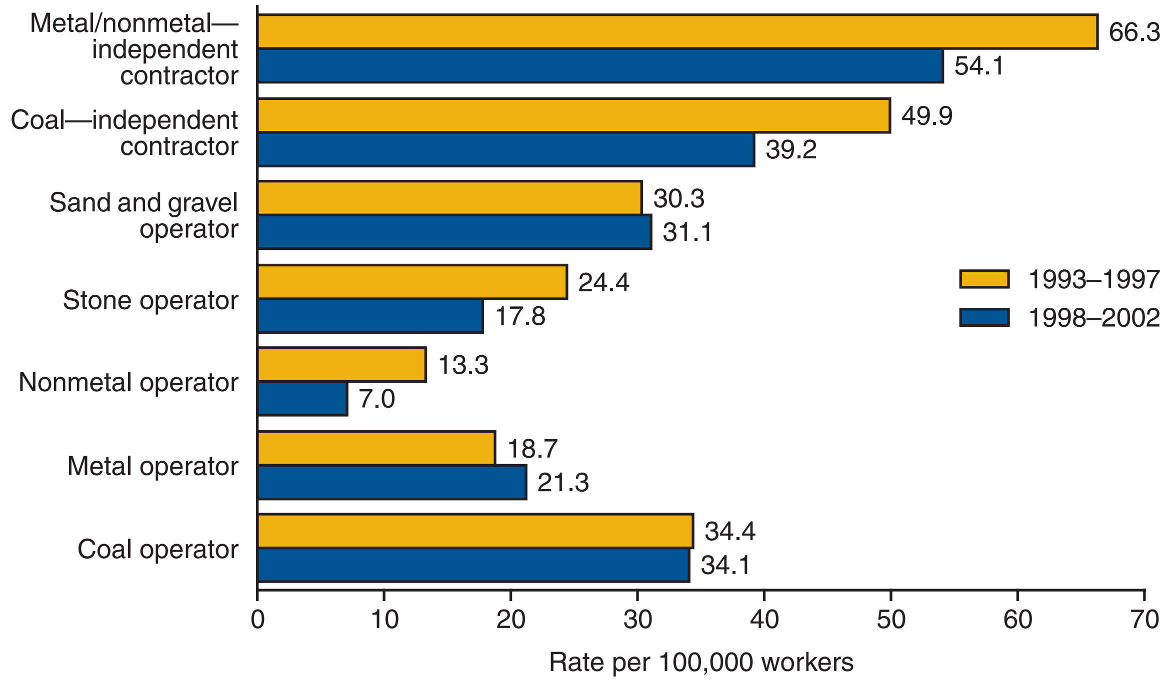


Figure 4–5. Number and average annual rate of fatal occupational injuries in coal and metal/nonmetal mining for each 5-year period during 1966–2000, including factors affecting reductions in these injuries. The Federal Coal Mine Health and Safety Act of 1969 was passed soon after 78 coal miners died in 1968 during an underground explosion in the Consol No. 9 Mine at Farmington, West Virginia. Numbers and rates of fatal injuries in coal mining declined steadily after passage of the 1969 Act. During the most recent 5-year period (1996–2000), the fatal injury rate for coal mining was at its lowest—33 per 100,000 full-time equivalent workers.

The Federal Mine Safety and Health Act of 1977 (which included metal/nonmetal mining) was passed a few years after 91 miners lost their lives in a 1972 underground mine fire at the Sunshine Silver Mine. The fatal occupational injury rate for metal/nonmetal mining declined to its lowest rate (25.3 per 100,000 full-time equivalent workers) in 1991–1995. During 1996–2000, this rate increased to 27.1 fatalities per 100,000 full-time equivalent workers.

Safety and health legislation has been an important factor in reducing fatal occupational injury rates over the past three decades. However, other critical factors include improvements in mining technology such as roof bolting to prevent roof cave-ins, dust suppression and ventilation techniques, and use of noncombustible materials to prevent explosions and fires. Despite large declines in the numbers and rates of fatal injuries to miners, mining continues to be one of the most hazardous occupations. *(Sources: MSHA [2002]; NIOSH [2003a].)*



Type of Employer and Commodity

How has the rate of fatal mining injuries changed in recent years?

Figure 4–6. **Rates of fatal mining injuries by type of employer and commodity, 1993–1997 and 1998–2002.** For these two periods, the 5-year average rate of fatal mining injuries declined from 30.2 per 100,000 full-time equivalent workers (1993–1997) to 27.7 (1998–2002). Most of this decline was due to decreases in the rates of fatal mining injuries among independent contractor workers, stone operator workers, and nonmetal operator workers. Increased rates occurred among sand and gravel operator workers and metal operator workers. ***(Sources: MSHA [2003]; NIOSH [2003a].)***

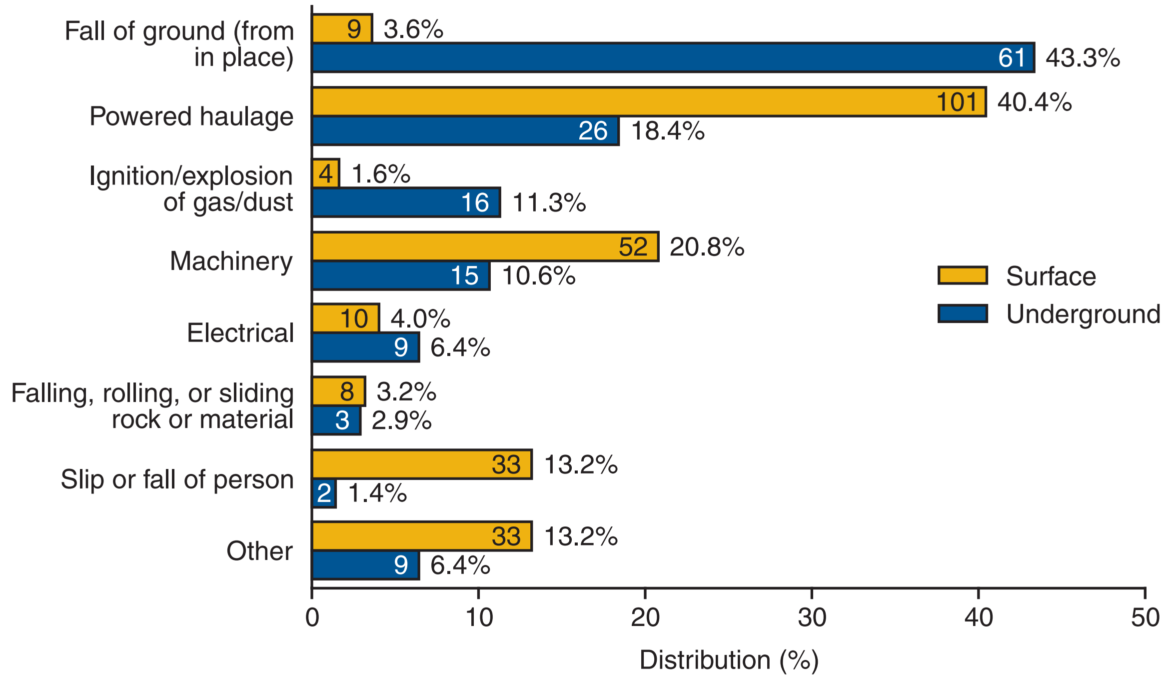
Work Location

Which sectors of the mining industry posed the highest risks of fatal injury to mine workers during 1998–2002?

Table 4–1. **Number and 5-year average rate of fatal mining injuries by type of employer and commodity at various work locations, 1998–2002.** Underground mines posed the greatest risk of fatal injury to mine workers during 1998–2002. At these mines, the highest fatal injury rates were among metal mine operator workers and all independent contractor workers. At surface locations, the highest fatal injury rate was at the dredge. All 11 fatalities at the dredge occurred at sand and gravel mines. Within each commodity, fatal injury rates were highest for independent contractor workers at two metal/nonmetal surface locations: strip/open pit/quarry and mills. ***(Sources: MSHA [2003]; NIOSH [2003a].)***

Type of employer and commodity	Work location											
	Underground mines				Surface locations							
	Underground		Surface areas		Strip/ open pit/ quarry*		Dredge		Mills/plants		All	
	Number	Rate†	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Mine operator:												
Coal	97	51.4	2	NC‡	27	17.6	0	0.0	12	25.9	138	34.1
Metal	24	103.1	3	NC	3	NC	0	0.0	6	8.1	36	21.3
Nonmetal	3	NC	0	0.0	4	14.9	0	0.0	1	NC	8	7.0
Stone	3	NC	0	0.0	42	26.7	0	0.0	19	10.0	64	17.8
Sand and gravel	NA§	NA	NA	NA	41	28.6	11	46.0	NR**	NR	52	31.1
Independent contractor:												
Coal	9	86.7	5	39.2	11	26.2	NA	NA	8	42.5	33	39.2
Metal and nonmetal††	5	86.5	2	NC	31	48.7	0	0.0	22	58.7	60	54.1
All	141	56.2	12	29.2	159	24.4	11	40.8	68	15.5	391	27.7

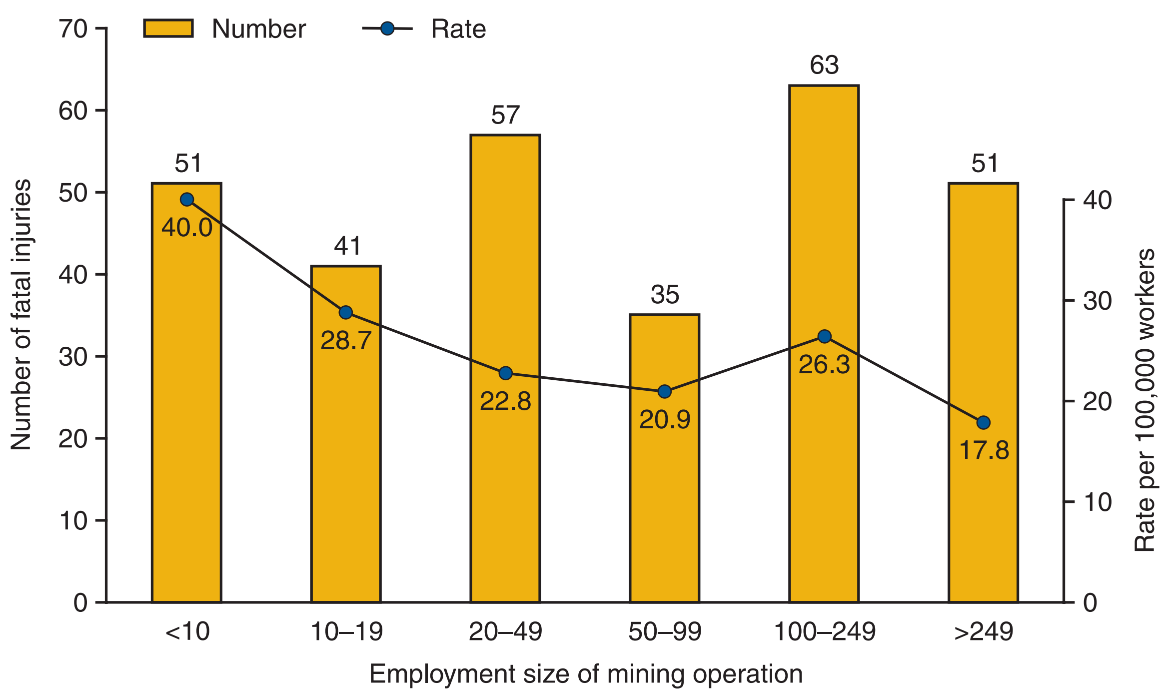
*Also includes culm banks, auger mining, independent shops and yards, and surface mining n.e.c.
†Computed per 100,000 full-time equivalent workers.
‡NC = Not computed for 3 or fewer fatalities.
§NA = Not applicable for this commodity.
**NR = Not reported separately. Sand and gravel operators report mill employment under strip or dredge operations.
††Includes metal, nonmetal, stone, and sand and gravel.



Type of Incident

How and where were mine workers fatally injured during 1998–2002?

Figure 4–7. Number and distribution of fatal mining injuries by type of incident and work location, 1998–2002. During 1998–2002, most fatal injuries to miners working at surface mining locations (61.2%) were associated with the use of powered haulage (such as motors and rail cars, conveyors, bucket elevators, vertical manlifts, shuttle cars, haulage trucks, and front-end loaders) and machinery (for example, electric and air-powered tools and mining machinery such as drills, draglines, power shovels, and loading machines). Most fatal mining injuries underground (43.3%) were classified as fall of ground (that is, fall of roof or back). *(Sources: MSHA [2003]; NIOSH [2003a].)*



Size of Operation (Employment)

How did fatal injury rates vary by employment size of the mining operation in 1998–2002?

Figure 4–8. Number and rate of fatal mining injuries by employment size of mining operation (excluding independent contractor workers), 1998–2002. During 1998–2002, rates of fatal mining injuries generally decreased as the employment size of mining operations increased. The highest fatal injury rate occurred in mining operations employing fewer than 10 workers (40.0 fatal per 100,000 workers). Conversely, the lowest fatal injury rate (17.8 per 100,000 workers) occurred in mining operations employing 250 or more workers. *(Sources: MSHA [2003]; NIOSH [2003a].)*

Nonfatal Injuries and Illnesses

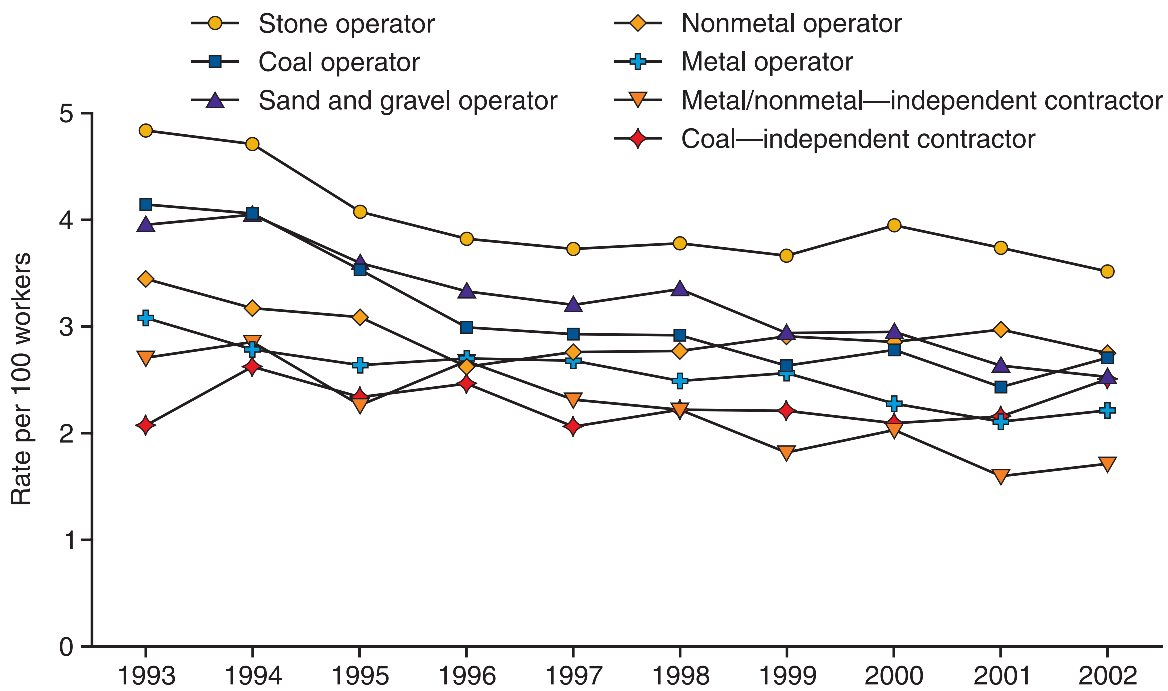
Magnitude and Trend

Which sectors of the mining industry posed the highest risks of nonfatal injury to mine workers during 1998–2002?

Table 4–2. **Number and 5-year average rate of lost-workday injuries by type of employer and commodity at various work locations, 1998–2002.** During 1998–2002, both the highest numbers and rates of lost-workday injuries occurred in the underground work areas of underground mines. Within underground work areas, the highest rates were observed for coal mine operator and coal mine contractor workers, who together accounted for 88% (17,260) of all the lost-workday injuries in underground work areas. Within surface locations, the highest injury rates were in stone and nonmetal dredge locations. High numbers and rates of injuries were also experienced by stone mine operator workers at both surface production areas and processing (mill) work areas. *(Sources: MSHA [2003]; NIOSH [2003a].)*

Type of employer and commodity	Work location											
	Underground mines				Surface locations							
	Underground		Surface areas		Strip/ open pit/ quarry*		Dredge		Mills/plants		All	
	Number	Rate†	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Mine operator:												
Coal	15,980	8.5	847	5.1	3,501	2.3	7	2.3	1,475	3.2	21,810	5.4
Metal	1,273	5.5	150	3.2	1,397	2.1	40	2.9	1,839	2.5	4,699	2.8
Nonmetal	510	3.9	62	3.3	687	2.6	7	5.0	2,110	2.9	3,376	3.0
Stone	354	3.7	115	6.0	5,527	3.5	9	5.0	7,416	3.9	13,421	3.7
Sand and gravel	NA‡	NA	NA	NA	4,034	2.8	777	3.2	NR§	NR	4,811	2.9
Independent contractor:												
Coal	1,280	12.3	245	1.9	871	2.1	NA	NA	531	2.8	2,927	3.5
Metal and nonmetal**	246	4.3	99	3.1	971	1.5	16	2.0	886	2.4	2,218	2.0
All	19,643	7.8	1,518	3.7	16,988	2.6	856	3.2	14,257	3.2	53,262	3.8

*Also includes culm banks, auger mining, independent shops and yards, and surface mining n.e.c.
†Computed per 100 full-time equivalent workers.
‡NA = Not applicable for this commodity.
§NR = Not reported separately. Sand and gravel operators report mill employment under strip or dredge operations.
**Includes metal, nonmetal, stone, and sand and gravel.

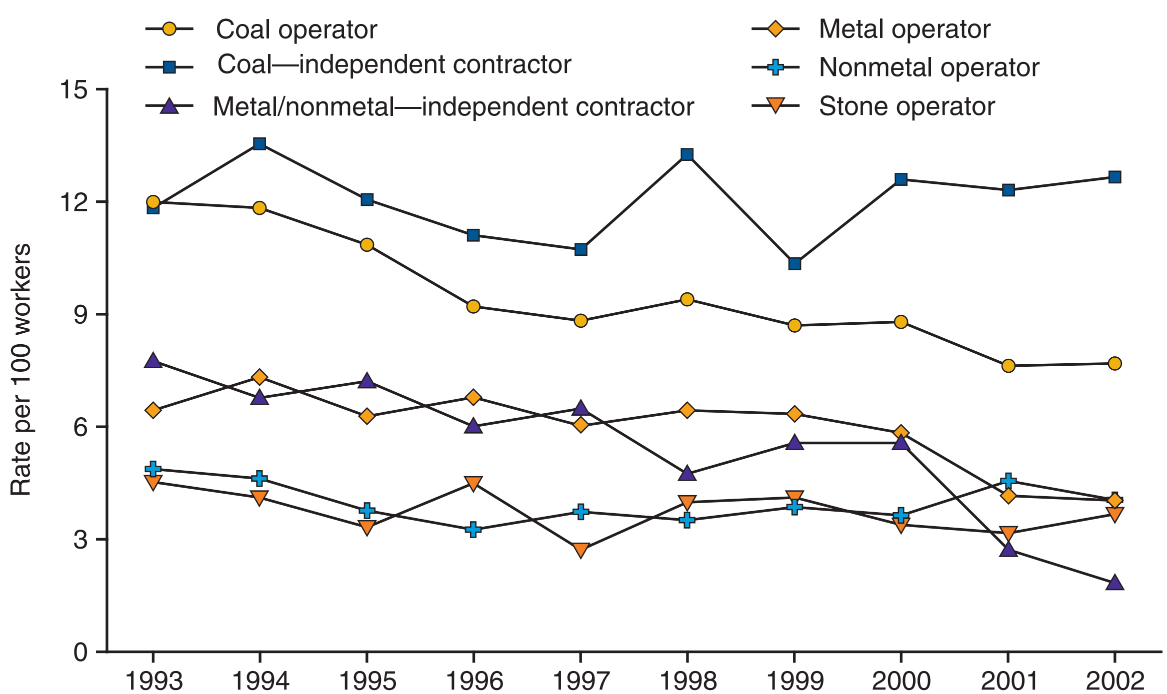


Type of Employer and Commodity

Surface

How did the rate of lost-workday injuries change for surface mining operations during 1993–2002?

Figure 4–9. Rate of lost-workday injuries for surface mining operations by type of employer and commodity, 1993–2002. From 1993 to 2002, the rate of lost-workday injuries declined overall for operator workers in all commodities and for metal/nonmetal—independent contractor workers. Throughout this 10-year period, the highest rates of lost-workday injuries were consistently observed for stone operator workers. ***(Sources:** MSHA [2003]; NIOSH [2003a].)*



Underground

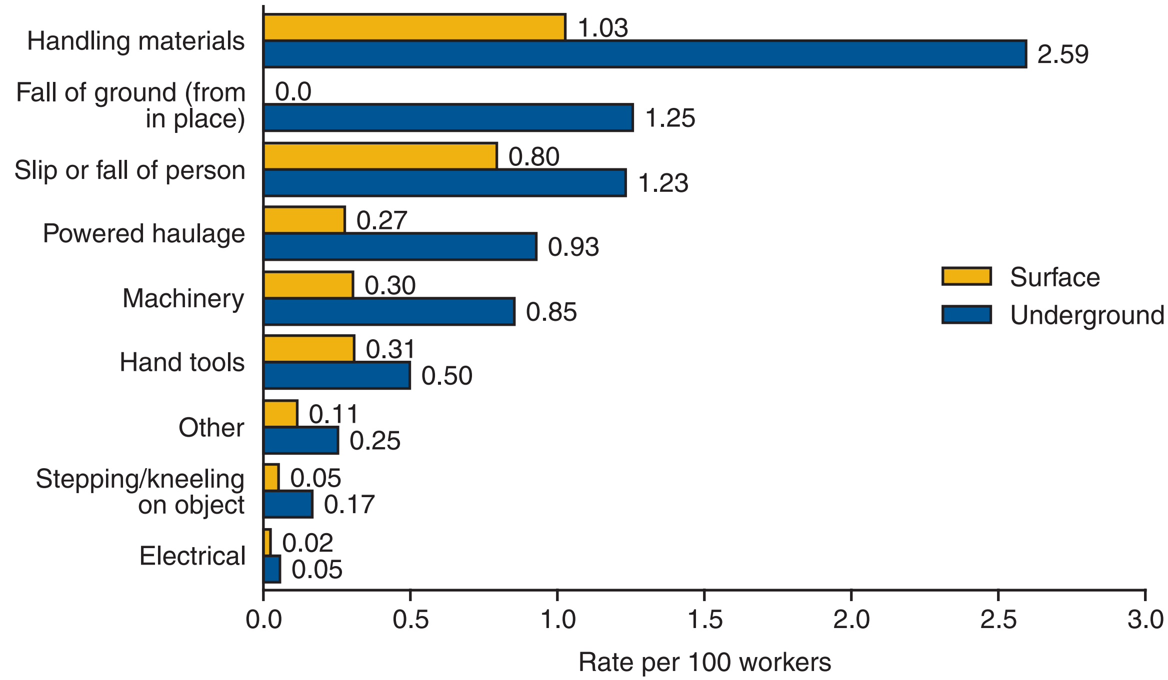
How did the rate of lost-workday injuries change for underground mining operations during 1993–2002?

Figure 4–10. Rate of lost-workday injuries for underground mining operations by type of employer and commodity, 1993–2002. During 1993–2002, underground coal operator workers and underground coal—independent contractor workers consistently had the highest rates of lost-workday injuries. Although marked by slight increases and decreases during this 10-year period, lost-workday injury rates for underground nonmetal operator workers and underground stone operator workers have remained relatively constant. ***(Sources:** MSHA [2003]; NIOSH [2003a].)*

Work Location and Type of Incident

How and where were mine workers injured during 1998–2002?

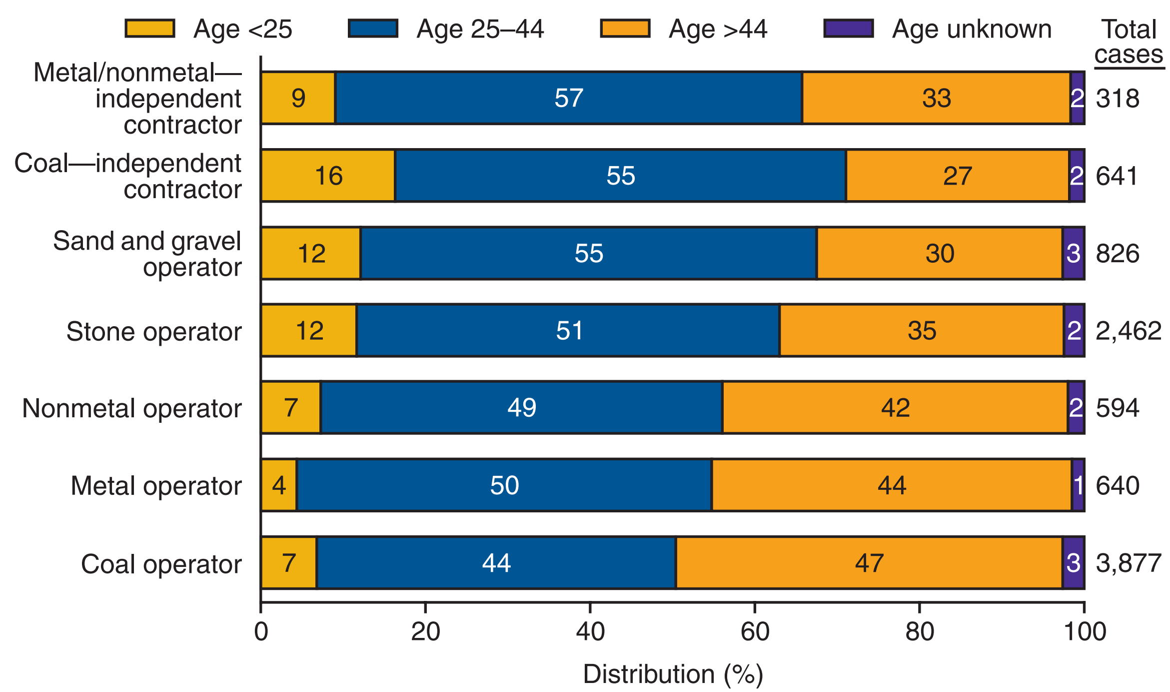
Figure 4–11. **Rate of lost-workday injuries by type of incident and work location, 1998–2002.** During 1998–2002, miners at underground locations generally had higher nonfatal injury rates than those working on the surface. Injuries to miners at both surface and underground locations were most frequently associated with handling materials and slip or fall of person. Miners working underground also had relatively high rates of injury from fall of ground incidents (caving rock), or in incidents involving powered haulage or machinery. ***(Sources:** MSHA [2003]; NIOSH [2003a].)*



Age

How were injured mine workers distributed by age in 2002?

Figure 4–12. **Distribution of lost-workday injuries by age of worker and type of employer and commodity, 2002.** The proportion of injured workers above age 44 at the time of injury was highest among coal and metal operator workers and lowest among coal—independent contractor workers. Conversely, the proportion of injured workers under age 25 was highest among coal—independent contractor workers, sand and gravel operator workers, and stone operator workers. ***(Sources:** MSHA [2003]; NIOSH [2003a].)*



Sex

How did the proportion of injured male and female mine workers differ by type of employer and commodity in 2002?

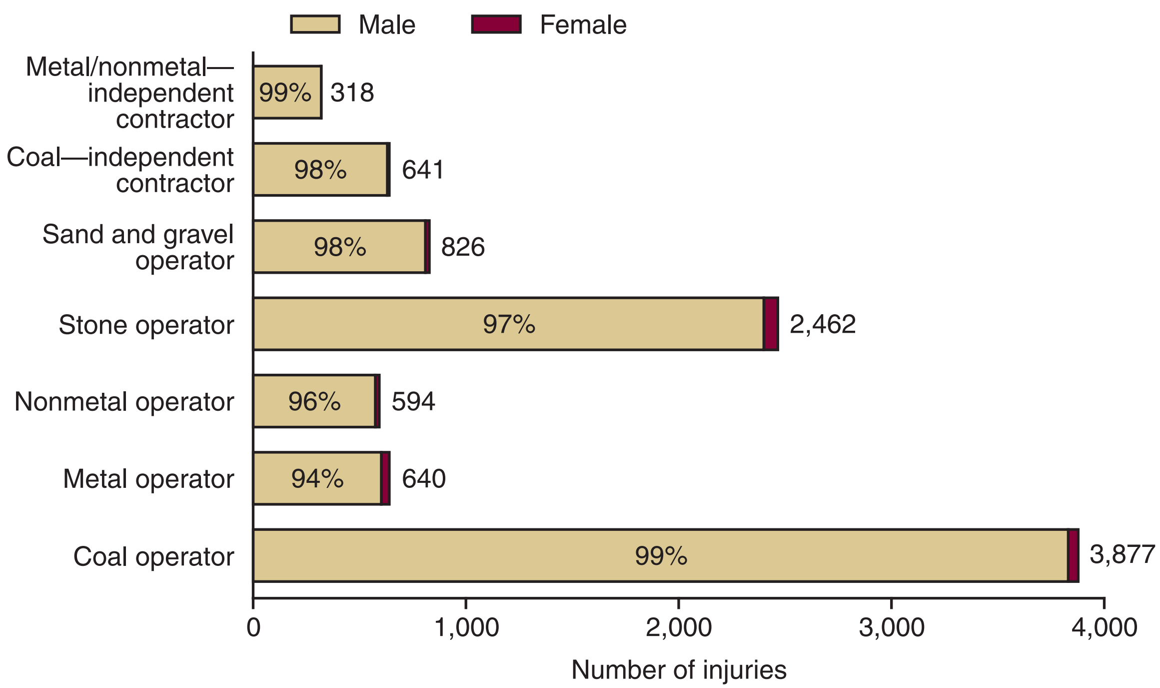


Figure 4–13. Number of lost-workday injuries by sex of worker and type of employer and commodity, 2002. In 2002, only 2% (190) of all nonfatally injured mine workers were female, whereas 14.6% of the entire mining workforce was female (Chapter 1, Table 1–4). The highest proportion of female workers with lost-workday injuries was reported by metal operators (6%), and the lowest proportion was reported by metal/nonmetal—independent contractors (1%) and coal operators (2%). (*Note:* Percentages shown within the bars represent the proportion of male workers with lost-workday injuries.) ***(Sources: MSHA [2003]; NIOSH [2003a].)***

Severity

What was the median number of lost workdays due to nonfatal lost-time mining injuries during 1998–2002?

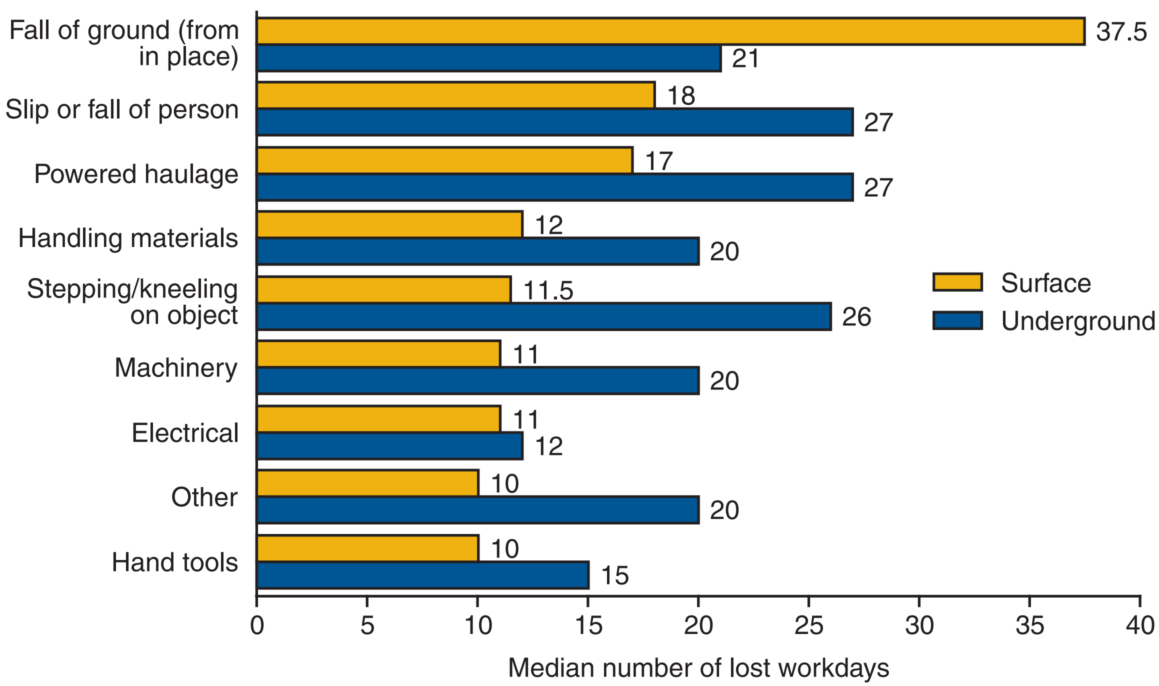


Figure 4–14. Median number of lost workdays due to nonfatal lost-time mining injuries by work location and selected types of incidents, 1998–2002. During 1998–2002, the median number of lost workdays due to nonfatal lost-time mining injuries was 21 for miners injured underground and 14 for miners injured at surface locations. At surface locations, falls of ground (e.g., rock dislodging from a highwall) accounted for the highest median number of lost workdays. At underground locations, powered haulage and slip or fall of person accounted for the highest median number of lost workdays. ***(Sources: MSHA [2003]; NIOSH [2003a].)***

Experience

How were lost-workday injuries distributed among mine workers by years of total mining experience in 2002?

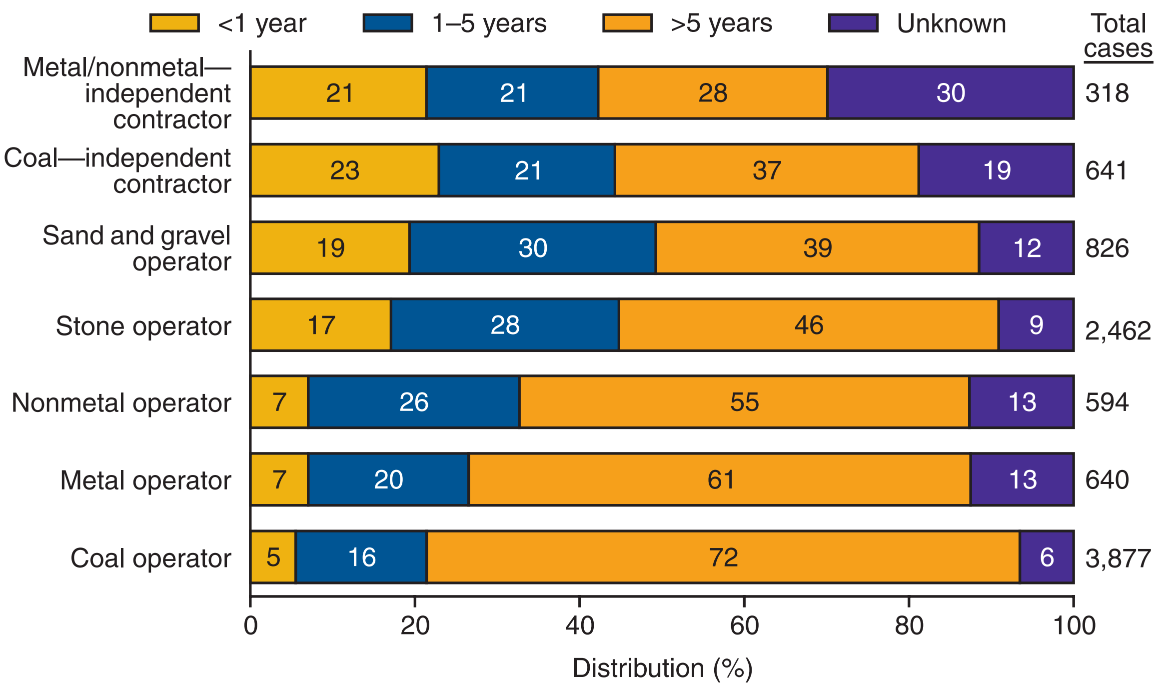
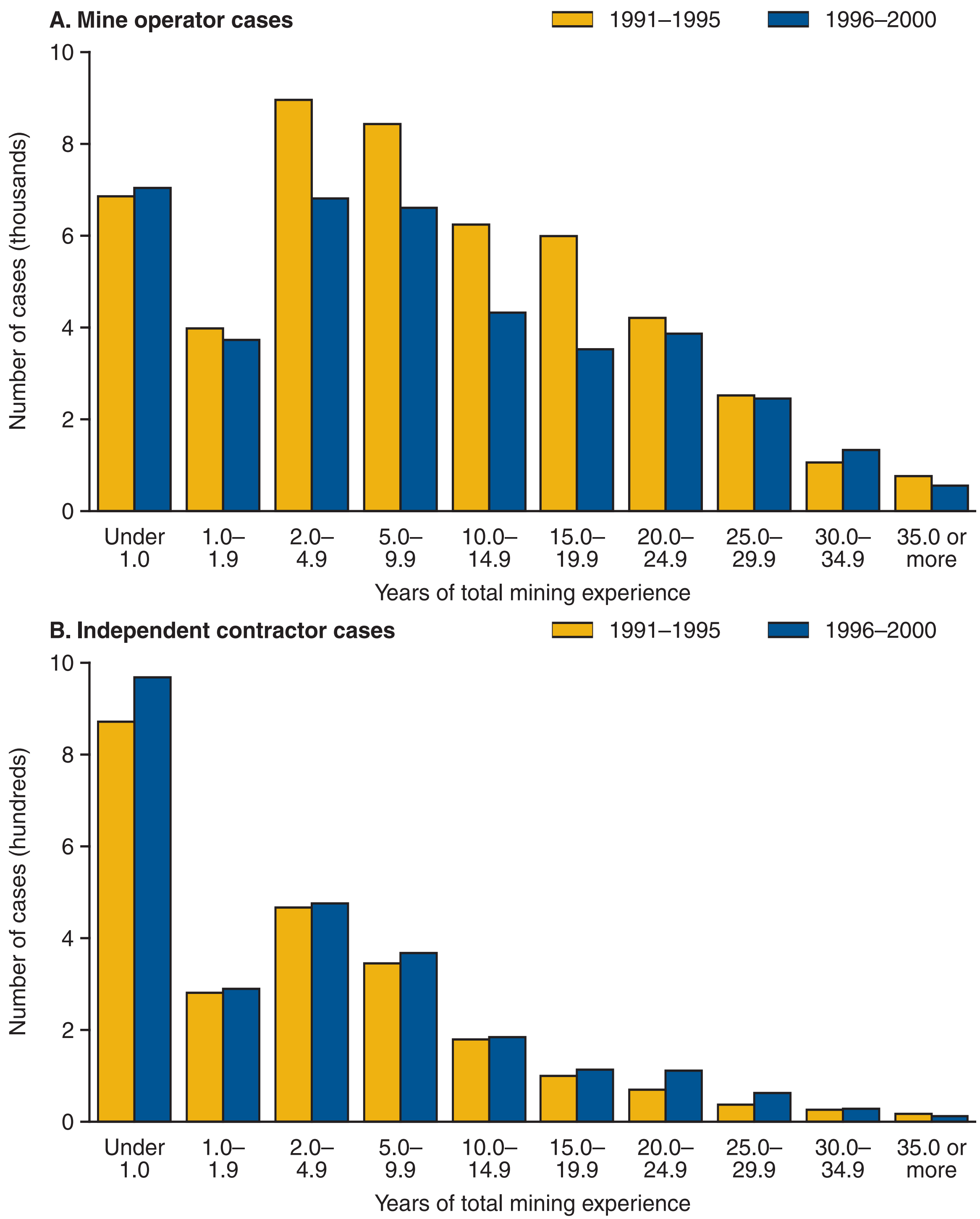


Figure 4–15. **Distribution of lost-workday injuries among miners by type of employer and commodity and years of total mining experience, 2002.** In 2002, the proportion of workers with lost-workday injuries was highest among coal operator workers with more than 5 years of experience, and lowest among coal operator workers with less than 1 year of experience. Of the mine workers with less than 1 year of mining experience, independent contractor workers had the highest proportions of lost-workday injuries. These differences must be interpreted with caution, since years of mining experience were not reported for 10% of cases. ***(Sources: MSHA [2003]; NIOSH [2003a].)***



Metal/Nonmetal Mines

How did the number of nonfatal injuries and illnesses vary in metal/nonmetal mines by years of total mining experience during 1991–2000?

Figure 4–16. **Number of nonfatal injury and illness cases in metal/nonmetal mines by years of total mining experience for 1991–1995 and 1996–2000: (A) mine operator cases, and (B) independent contractor cases.** During 1991–2000, the role of total mining experience was fairly consistent and stable over time among mine operator worker cases of nonfatal injury or illness in metal/nonmetal mines. The number of cases was characteristically reduced during the second year of experience and followed by an upsurge for the next 3 to 4 years. A steady decline thereafter suggests that experience continually reduces risk for miners. The later period (1996–2000) showed some improvement over the early period (1991–1995). Metal/nonmetal—independent contractor cases showed a similar pattern, but with higher case counts for the least experienced miners. ***(Sources: MSHA [2002]; NIOSH [2003b].)***

Coal Mines

How did the number of injuries and illnesses vary in coal mines by years of total mining experience during 1991–2000?

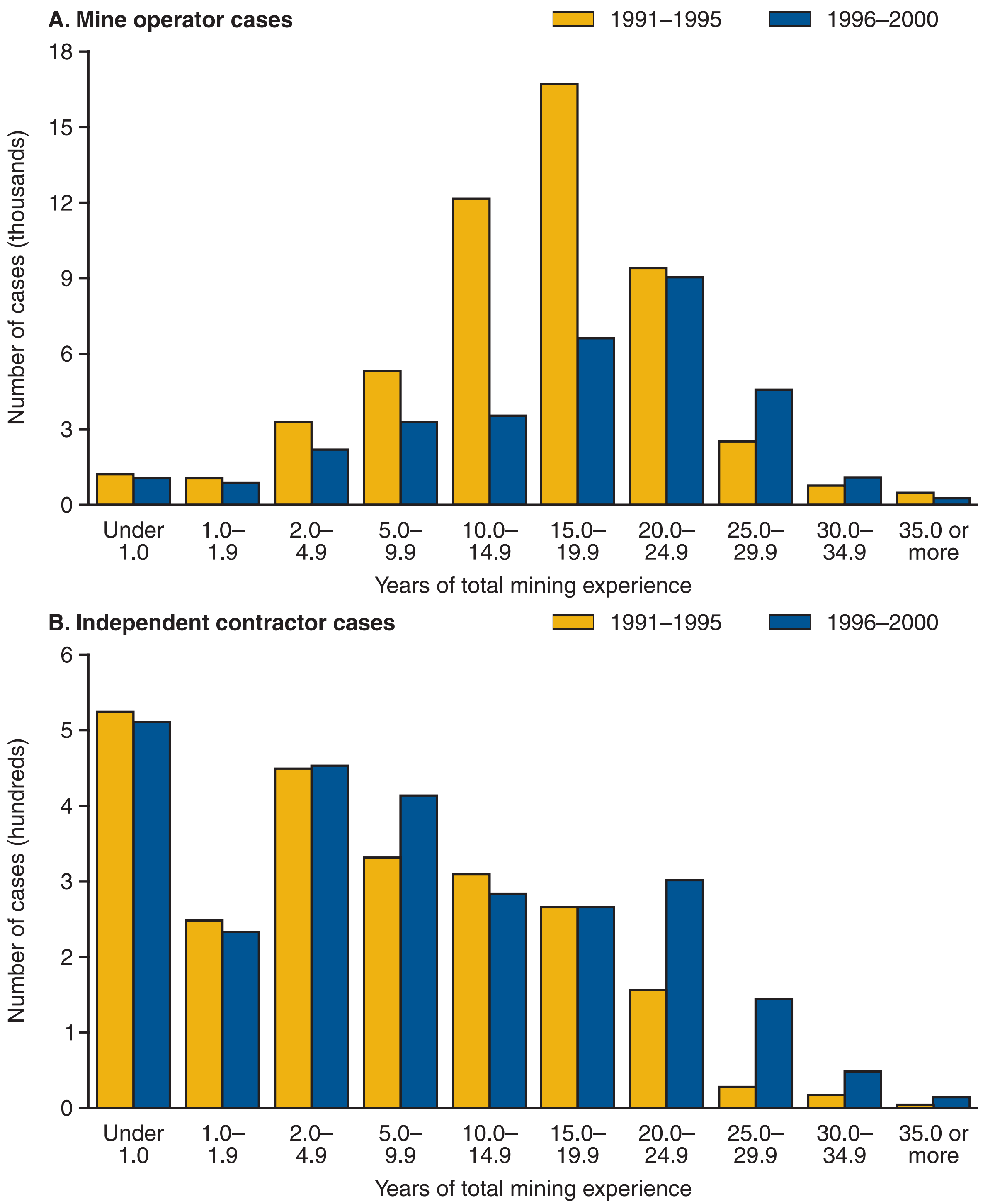
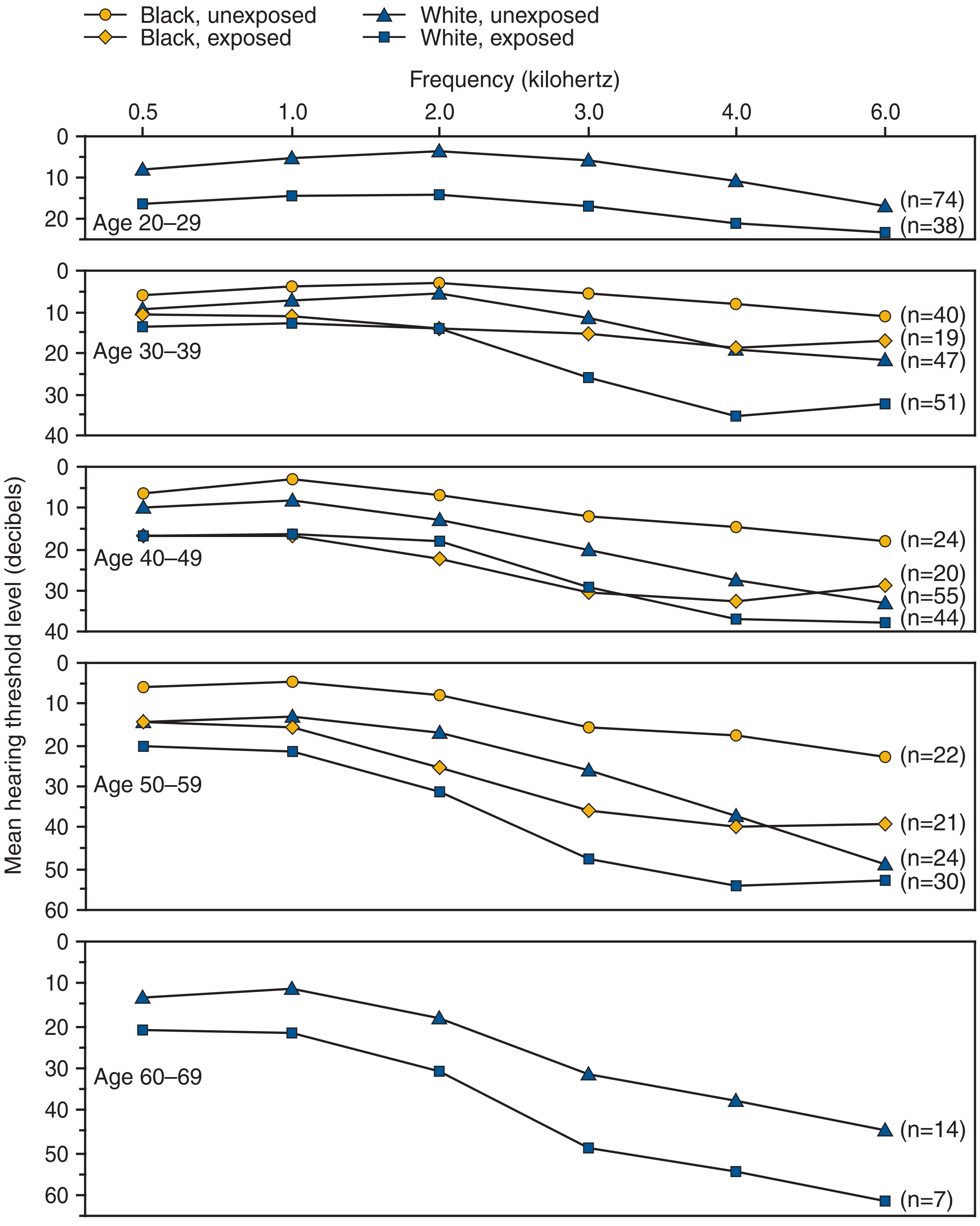


Figure 4–17. **Number of injury and illness cases in coal mines by years of total mining experience for 1991–1995 and 1996–2000: (A) mine operator cases, and (B) independent contractor cases.** Coal mining showed a distinctly different pattern from metal/nonmetal mining for 1991–2000. Mine operators reported increasing numbers of cases with increasing years of mining experience up until 20–24.9 years. As with metal/nonmetal mining, a dramatic drop in overall case count occurred for coal miners between the early and late 1990s. The shift in the experience group with the highest case count may reflect the aging of the mining workforce. The role of experience among independent contractor workers was similar but more pronounced for new miners. Note that case counts alone may be misleading. Incidence rates (cases per 100 full-time equivalent workers) may show different patterns, but they could not be developed because employment by years of experience was not available. ***(Sources: MSHA [2002]; NIOSH [2003b].)***



Hearing Loss

How did the hearing loss of sand and gravel workers compare with that of a group unexposed to workplace noise?

Figure 4–18. Mean hearing thresholds over a range of frequencies (0.5–6.0 kilohertz) among black and white male sand and gravel workers and a population unexposed to workplace noise, by age, 2000. Hearing loss among black and white male sand and gravel workers was greater than hearing loss among a population that was unexposed to workplace noise. Different patterns of hearing loss were observed for black and white workers: Most statistically significant differences in hearing thresholds occurred among the younger white workers (those aged 20–29 and 30–39) and among the older black workers (those aged 40–49 and 50–59). ***(Sources: Royster and Thomas [1979]; Royster et al. [1980]; NIOSH [2003a,c].)***

Fatal Illnesses

Coal Workers' Pneumoconiosis

How did the numbers of deaths and rates of mortality from coal workers' pneumoconiosis change during 1968–1999?

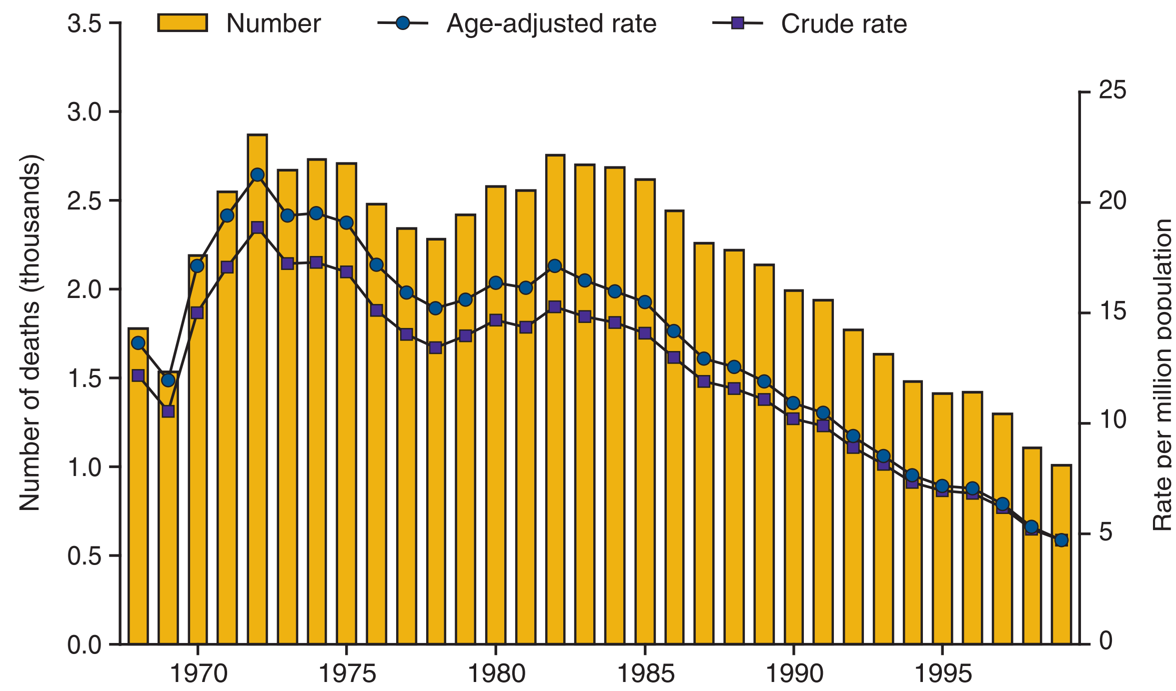


Figure 4–19. **Numbers of deaths, crude mortality rates, and age-adjusted mortality rates for U.S. residents aged 15 or older with coal workers' pneumoconiosis recorded as an underlying or contributing cause on the death certificate, 1968–1999.** After passage of the Federal Coal Mine Health and Safety Act of 1969, an increase occurred in the number and rate of deaths reported with coal workers' pneumoconiosis (black lung) recorded on the death certificate. The number and rate of these deaths were at their lowest in 1999, the last year for which data are currently available. The number decreased from 2,870 in 1972 to 1,003 in 1999. In 1972, the crude and age-adjusted mortality rates were 18.9 and 21.2 per million population, respectively. Both rates declined to 4.7 per million in 1999. (*Note:* Age-adjusted mortality rates are standardized to the year 2000 standard population.) ***(Sources: NCHS [2002]; NIOSH [2002].)***

Construction Trades

This section provides data for tracking trends in fatal and nonfatal occupational injuries and illnesses among workers in the construction trade. An estimated 9.6 million persons were employed in the construction industry in 2001. Most of these workers were aged 25–54 (75.4%), male (90.3%), and white (90.8%) [BLS 2001].

Over the years, construction has ranked among industries with the highest rates of both fatal and nonfatal occupational injuries. BLS reported that the number and rate of fatal occupational injuries in the construction sector in 2001 were the highest recorded since the inception of CFOI (1,225 fatal occupational injuries with an incidence rate of 13.3 per 100,000 employed workers) [BLS 2002b]. For the same year, BLS reported that the construction industry experienced 481,400 nonfatal injuries and illnesses at a rate of 7.9 per 100 full-time workers in the industry [BLS 2002a].

Since the early 1990s, NIOSH has supported extensive extramural surveillance and research on the construction sector of private industry. The Center to Protect Workers' Rights (CPWR) is a principal partner of NIOSH in conducting these activities. Early efforts focused on surveillance data and surveillance research, including the preparation of the first of three chart books focusing on construction safety and health issues [Pollack and Chowdhury 2001].

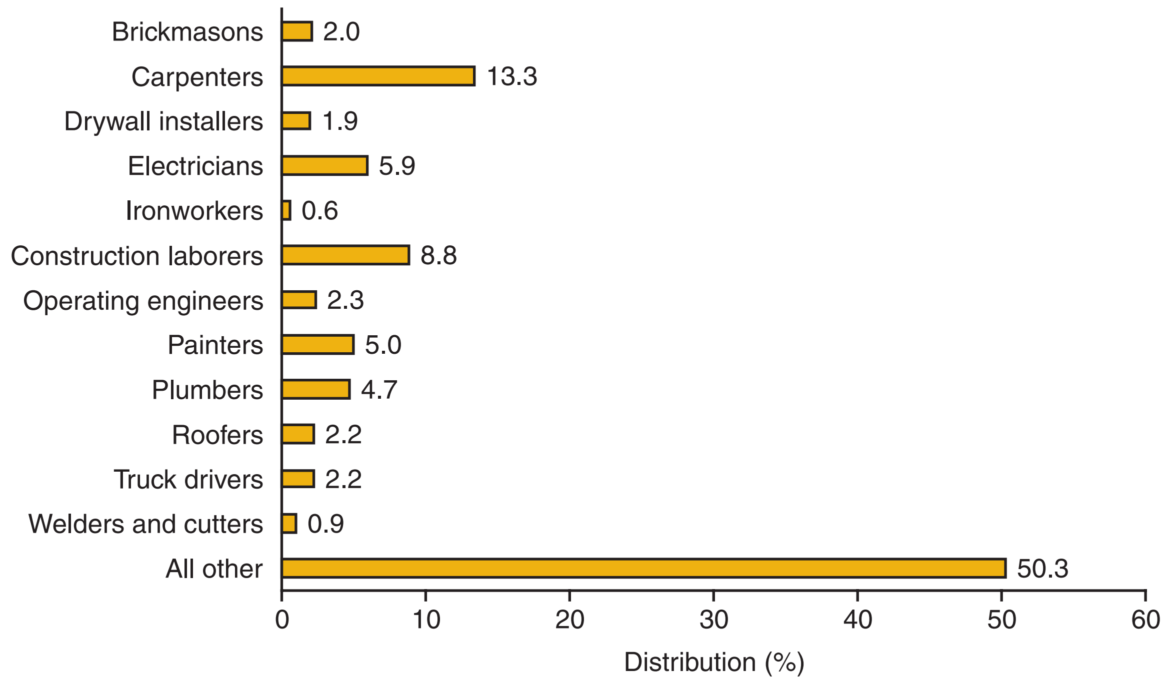
The underlying data for Figures 4–20 through 4–52 come from a number of the BLS statistical programs, including the Current Population Survey (CPS), CFOI, and SOII. The CPS provides data for estimating the construction trade occupation denominators used for many of the rate estimates. The CPWR uses CFOI to characterize occupational fatalities and SOII to characterize nonfatal injuries and illnesses. Twelve construction trade occupations are the principal focus of this section:

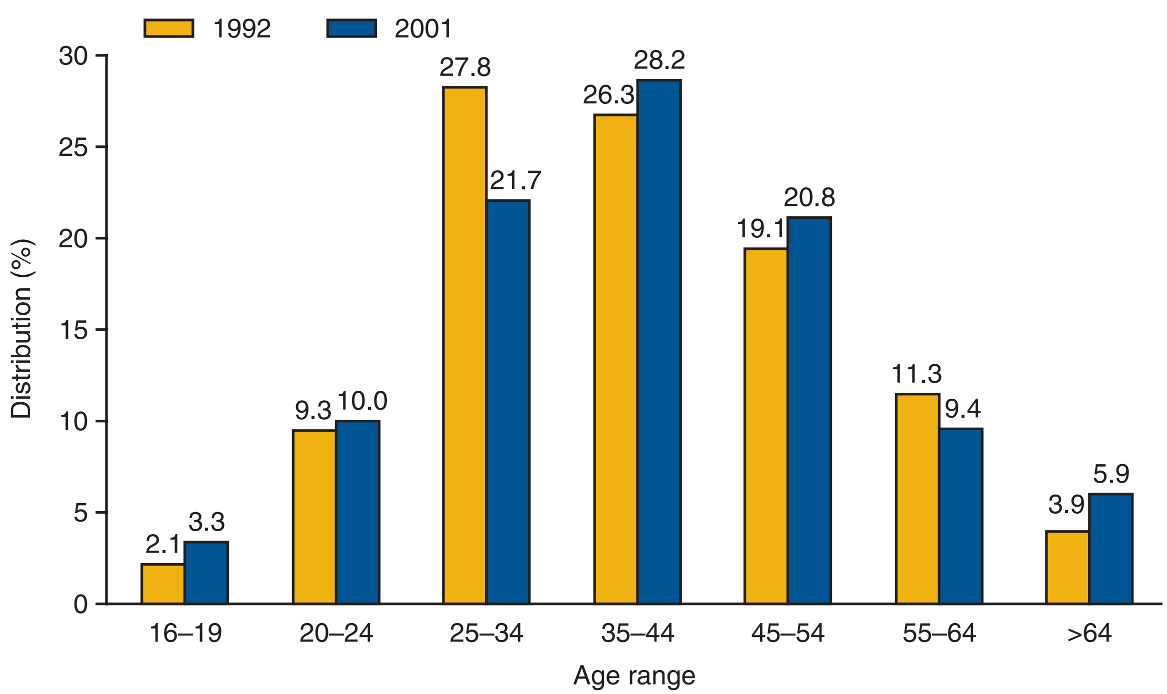
- Brickmasons
- Carpenters
- Drywall installers
- Electricians
- Ironworkers
- Construction laborers
- Operating engineers
- Painters
- Plumbers
- Roofers
- Truck drivers
- Welders and cutters

Among the trades monitored by CPWR, the estimated distribution of employed construction workers by trade ranged from 0.6% to 13.3% during 1992–2001. Carpenters made up the largest proportion of construction workers (13.3%), followed by construction laborers (8.8%) and electricians (5.9%) (Figure 4–20). The construction workforce has been growing older: In 2001, the average age for construction workers was 38.7 (1.5 years older than it was in 1992). In addition, the median age increased from 35 to 39 during this 10-year period. The aging of the construction workforce is reflected in the distribution of fatal occupational injuries in this group by age (Figure 4–21). From 1992 to 2001, the largest proportion of fatal occupational injuries shifted from construction workers aged 25–34 to those aged 35–44. For construction workers aged 25 or 34, the proportion with fatal injuries declined (from 27.8% to 21.7%), whereas it increased for workers aged 65 or older (from 3.9% to 5.9%).

Fatal occupational injury rates in the construction trades for 2001 ranged from 6.0 per 100,000 full-time workers for drywall installers to 75.6 for ironworkers—more than a 12-fold difference (Figure 4–23). Falls to lower level accounted for the highest number of fatal injuries among construction workers (410 or 4.3 per 100,000 full-time workers), and highway accidents accounted for the next highest number (161 or 1.7 per 100,000 full-time workers) (Figure 4–25). This section includes figures that chart fatal injury rates for each of the 12 construction trades that form our focus. For each trade, the figure contrasts fatal occupational injury rates for all construction workers during each year from 1992 through 2001 (Figures 4–29, 4–31, 4–33, 4–35, 4–37, 4–39, 4–41, 4–43, 4–45, 4–47, 4–49, and 4–51).

Rates of nonfatal injuries and illnesses involving days away from work in the construction trades in 2001 ranged from 131.2 per 10,000 full-time workers for painters to 751.8 for ironworkers—nearly a 6-fold difference (Figure 4–27). Injuries and illnesses associated with ergonomic events or exposures made up 26.5% (49,237 of 185,662) of all nonfatal occupational injuries and illnesses involving days away from work in the construction industry in 2001 [BLS 2003c]. The rate of bending, climbing, crawling, reaching, twisting injuries in construction was 15 per 10,000 full-time workers—nearly double the rate of 8 for all private industry that year (Figure 4–28). This section includes figures that chart nonfatal injury and illness rates for each of the 12 construction trades that form our focus. For each trade, the figure contrasts nonfatal injury and illness rates for all construction workers during each year from 1992 through 2001 (Figures 4–30, 4–32, 4–34, 4–36, 4–38, 4–40, 4–42, 4–44, 4–46, 4–48, 4–50, and 4–52).





Distribution of Construction Workers by Trade

How were construction workers distributed by major construction trade during 1992–2001?

Figure 4–20. **Average distribution of full-time construction workers by trade, 1992–2001.** Among the trades monitored by CPWR, the estimated distribution of employed construction workers by trade ranged from 0.6% to 13.3% during 1992–2001. Carpenters made up the largest proportion of construction workers (13.3%), followed by construction laborers (8.8%) and electricians (5.9%). (*Notes:* (1) Apprentices are included for some trades when data were available. (2) *All other* includes managers, professionals, supervisors, clerical workers, sales personnel, and trades that each totaled less than 1% of the industry. (3) Computations were based on a definition of full-time work as 2,000 employee hours per year.) ***(Sources: BLS [2002c]; Dong et al. [2004].)***

Fatal Injuries

Age

How did the numbers and rates of fatal occupational injuries in construction workers vary by age during 1992 and 2001?

Figure 4–21. **Distribution of fatal occupational injuries among construction workers by age, 1992 and 2001.** The construction workforce has been growing older: In 2001, the average age for construction workers was 38.7 (1.5 years older than it was in 1992). In addition, the median age increased from 35 to 39 during this 10-year period. The aging of the construction workforce is reflected in the distribution of fatal occupational injuries in this group by age. From 1992 to 2001, the largest proportion of fatal occupational injuries shifted from construction workers aged 25–34 to those aged 35–44. For construction workers aged 25 or 34, the proportion with fatal injuries declined (from 27.8% to 21.7%), whereas it increased for workers aged 65 or older (from 3.9% to 5.9%). ***(Sources: BLS [2002b,c]; Dong et al. [2004].)***

Race/Ethnicity

How did fatal occupational injury rates differ between Hispanic and non-Hispanic construction workers during 1992–2001?

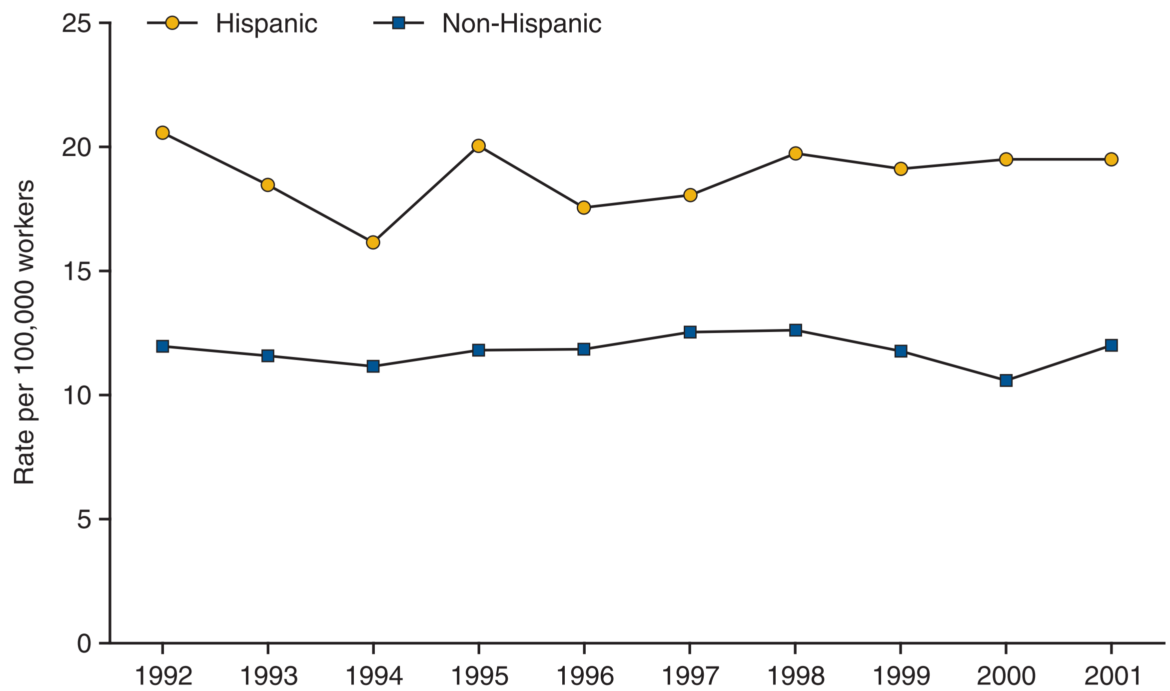


Figure 4–22. **Fatal occupational injury rates among Hispanic and non-Hispanic workers in the construction industry, 1992–2001.** Fatal occupational injuries among Hispanic construction workers increased from 108 in 1992 to 281 in 2001. Since 1992, Hispanic construction workers have had markedly higher fatal occupational injury rates than their non-Hispanic counterparts. In 2001 (the most recent year measured), the rate of work-related deaths from construction injuries for Hispanics was 19.5 per 100,000 full-time workers—62.5% higher than the rate of 12.0 for non-Hispanic construction workers. During 1990–2001, Hispanic employment in the U.S. construction industry increased greatly, from 649,800 in 1990 to 1.5 million (or 15.6% of the construction workforce) in 2001. *(Sources: BLS [2002b,c]; Dong et al. [2004].)*

Occupation

How did the fatal occupational injury rates differ by construction trade in 2001?

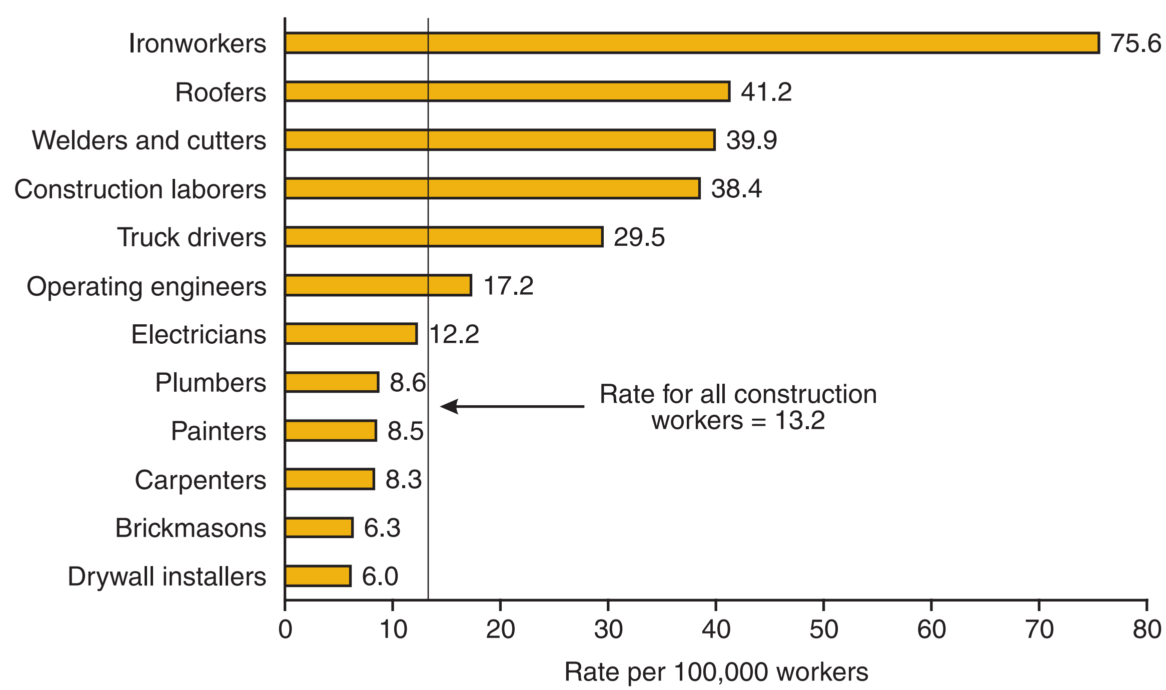
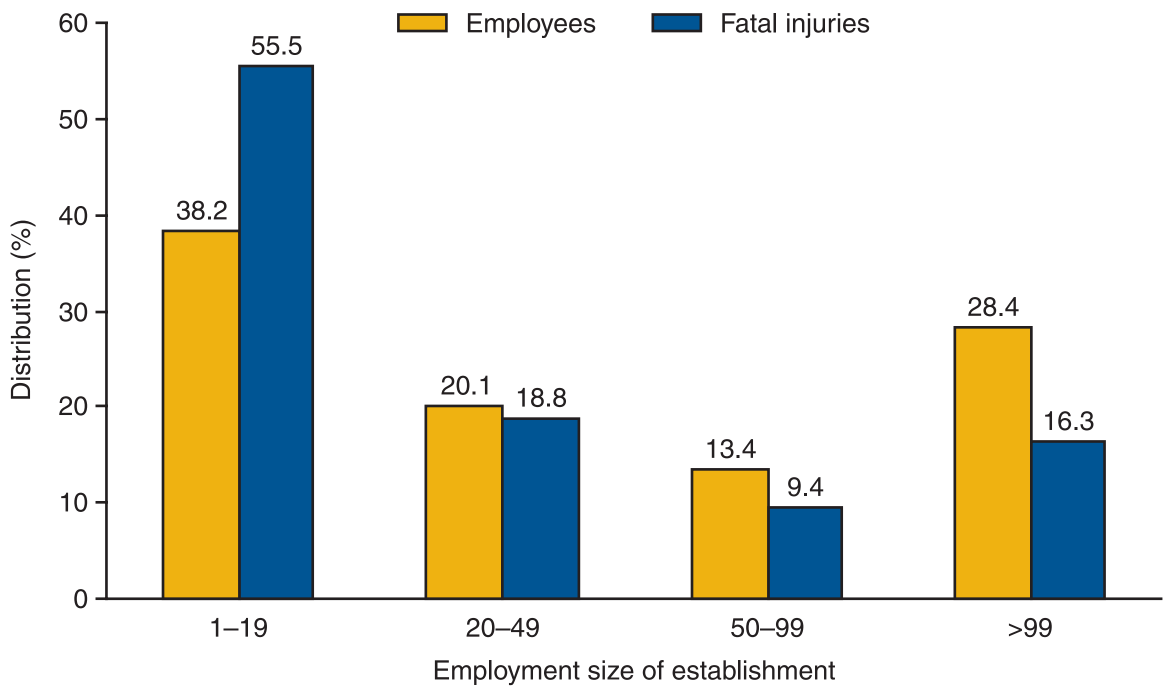


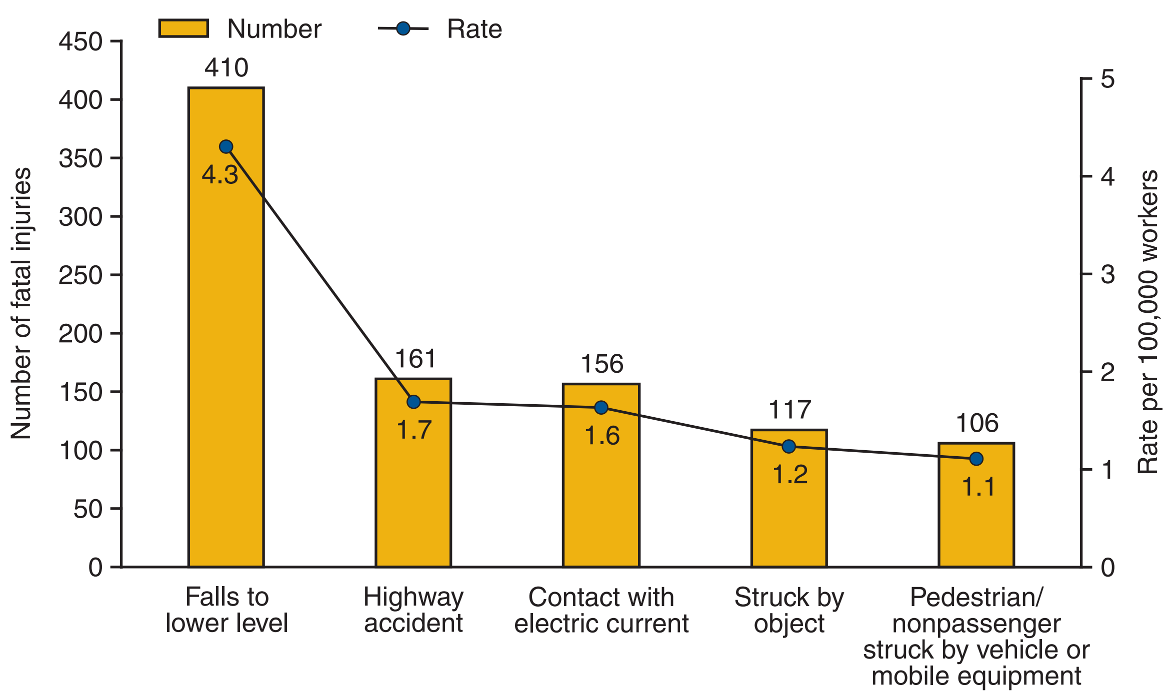
Figure 4–23. **Fatal occupational injury rates by construction trade, 2001.** Fatal occupational injury rates in the construction trades for 2001 ranged from 6.0 per 100,000 full-time workers for drywall installers to 75.6 for ironworkers—more than a 12-fold difference. *(Sources: BLS [2002b,c]; Chowdhury and Dong [2002].)*



Establishment Size

How did fatal occupational injury rates vary by employment size of establishment?

Figure 4–24. **Distribution of construction workers and fatal occupational injuries by employment size of establishment, 2001.** In 2001, more than 80% of construction establishments had fewer than 10 employees, and establishments with fewer than 20 employees employed only 38.2% of the wage-and-salary workforce. However, fatal occupational injuries among these smaller establishments accounted for more than 55.5% of fatal occupational injuries in 2001. (*Note:* The calculation excludes the self-employed workers and deaths reported without establishment-size information.) ***(Sources: BLS [2002b,c]; Census [2003]; Dong et al. [2004].)***



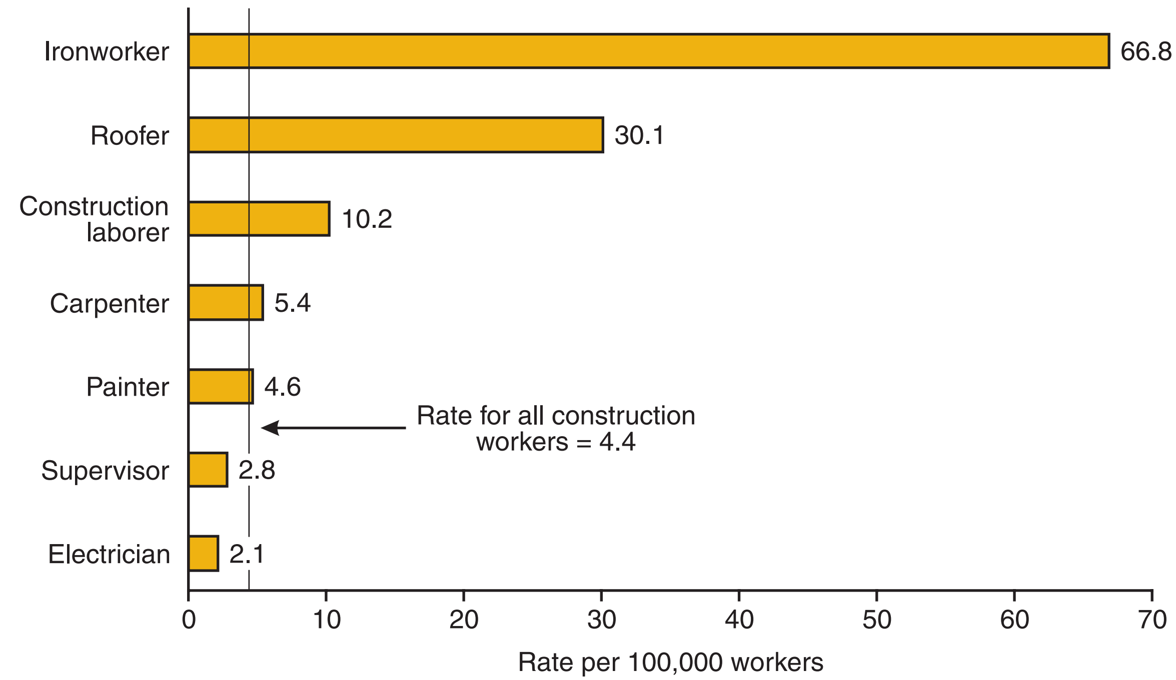
Event or Exposure

How did the numbers and rates of fatal occupational injuries differ by fatal event in 2001?

Figure 4–25. **Numbers and rates of fatal occupational injuries among construction workers by fatal event, 2001.** In 2001, falls to lower level accounted for the greatest number of fatal occupational injuries among construction workers (410 fatalities or 4.3 per 100,000 full-time workers). Highway accidents accounted for 161 deaths, a fatal injury rate of 1.7 per 100,000 full-time workers. ***(Sources: BLS [2002b,c]; Dong et al. [2004].)***

How did fatal fall rates differ by construction trade in 2001?

Figure 4–26. **Fatal occupational fall rates by selected construction trade, 2001.** The 2001 rate for fatal occupational falls among ironworkers was 66.8 per 100,000 workers—15 times the average rate for all construction. For roofers, the fatal fall rate was 30.1, or 7 times the average rate for all construction. *(Sources: BLS [2002b,c]; Dong et al. [2004].)*

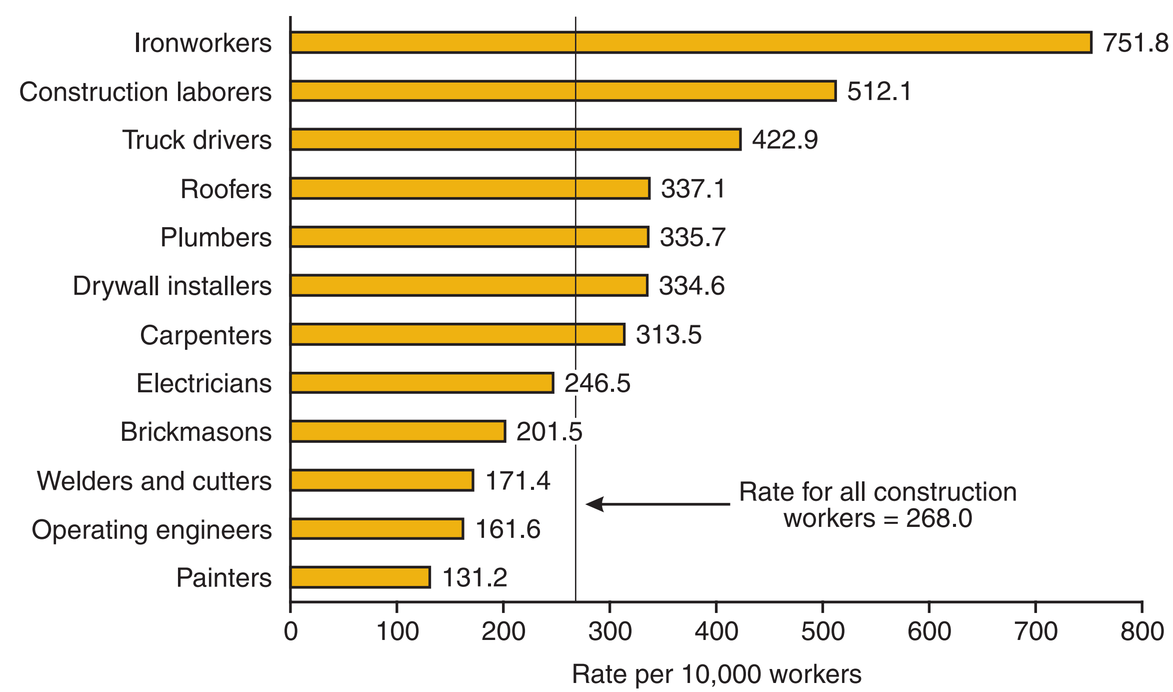


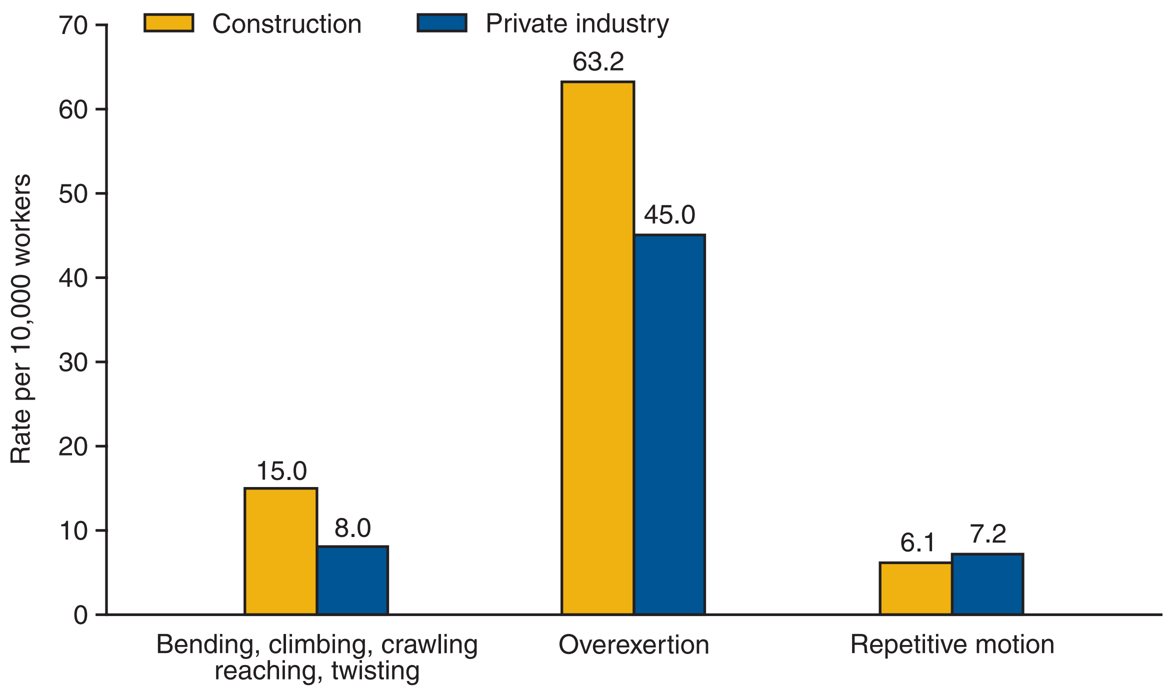
Nonfatal Injuries and Illnesses

Occupation

How did the rate of nonfatal occupational injury and illness differ by construction trade in 2001?

Figure 4–27. **Rate of nonfatal occupational injury and illness cases with days away from work by construction trade, 2001.** In 2001, the rate of nonfatal injuries and illnesses involving days away from work ranged from 131.2 per 10,000 full-time workers among painters to 751.8 for ironworkers—nearly a 6-fold difference. *(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)*





Event or Exposure

How did rates of nonfatal occupational injury and illness differ by type of ergonomic exposure in construction and all private industry in 2001?

Figure 4–28. **Rates of nonfatal occupational injury and illness cases with days away from work in construction and private industry by selected ergonomic events or exposures, 2001.** Injuries and illnesses associated with ergonomic events or exposures made up 26.5% (49,237 of 185,662) of all nonfatal occupational injuries and illnesses involving days away from work in the construction industry in 2001. The rate of bending, climbing, crawling, reaching, twisting injuries in construction was 15 per 10,000 full-time workers—nearly double the rate of 8 for all private industry that year. ***(Sources: BLS [2002c; 2003b,c]; Dong et al. [2004].)***

Brickmasons

Fatal Injuries

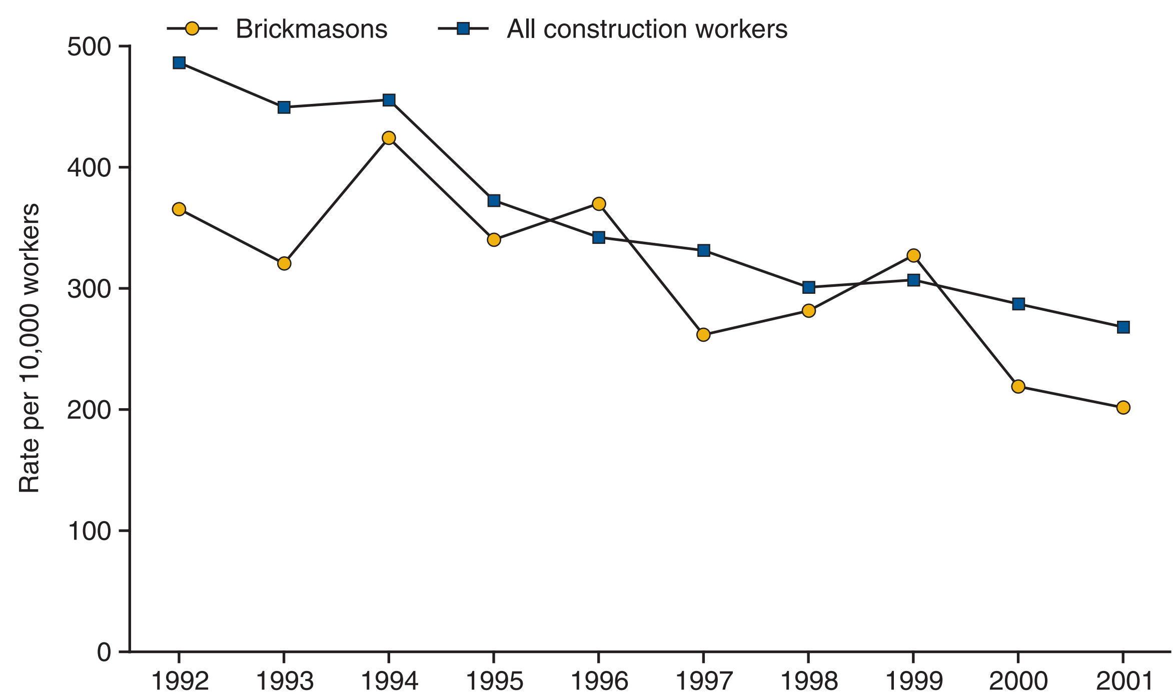
How did the fatal occupational injury rates for brickmasons compare with those for all construction workers during 1992–2001?

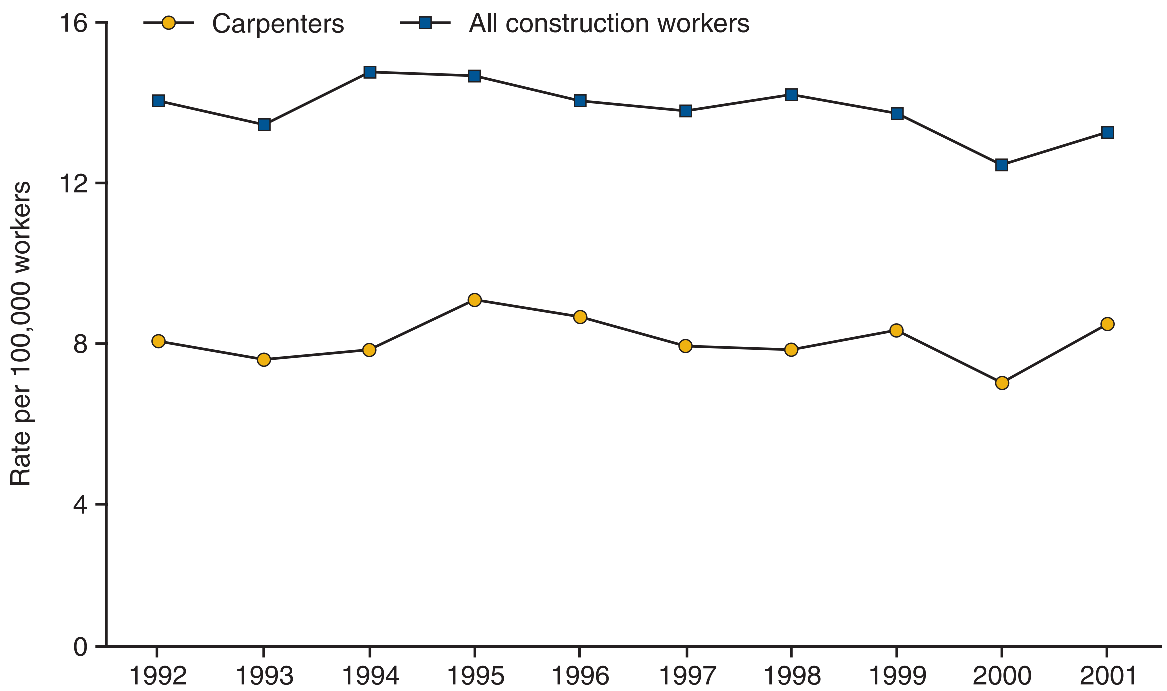
Figure 4–29. **Fatal occupational injury rates for brickmasons and all construction workers, 1992–2001.** During 1992–2001, fatal occupational injury rates for brickmasons were generally lower than those for all construction workers. Rates for brickmasons showed an up-and-down decreasing pattern, varying from 6.3 per 100,000 full-time workers in 2001 to 15.2 in 1995. BLS reported 145 fatal occupational injuries among brickmasons during this 10-year period—an average of 14 fatalities per year. ***(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***

Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for brickmasons compare with those for all construction workers during 1992–2001?

Figure 4–30. **Rates of nonfatal occupational injuries and illnesses involving days away from work for brickmasons and all construction workers, 1992–2001.** During 1992–2001, rates of nonfatal occupational injuries and illnesses involving days away from work were generally lower for brickmasons than for all construction workers. Rates for brickmasons showed a downward trend from a 424 per 10,000 full-time workers in 1994 to 201 in 2001. BLS reported 36,172 nonfatal occupational injuries and illnesses among brickmasons during this 10-year period—an average of 3,617 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***



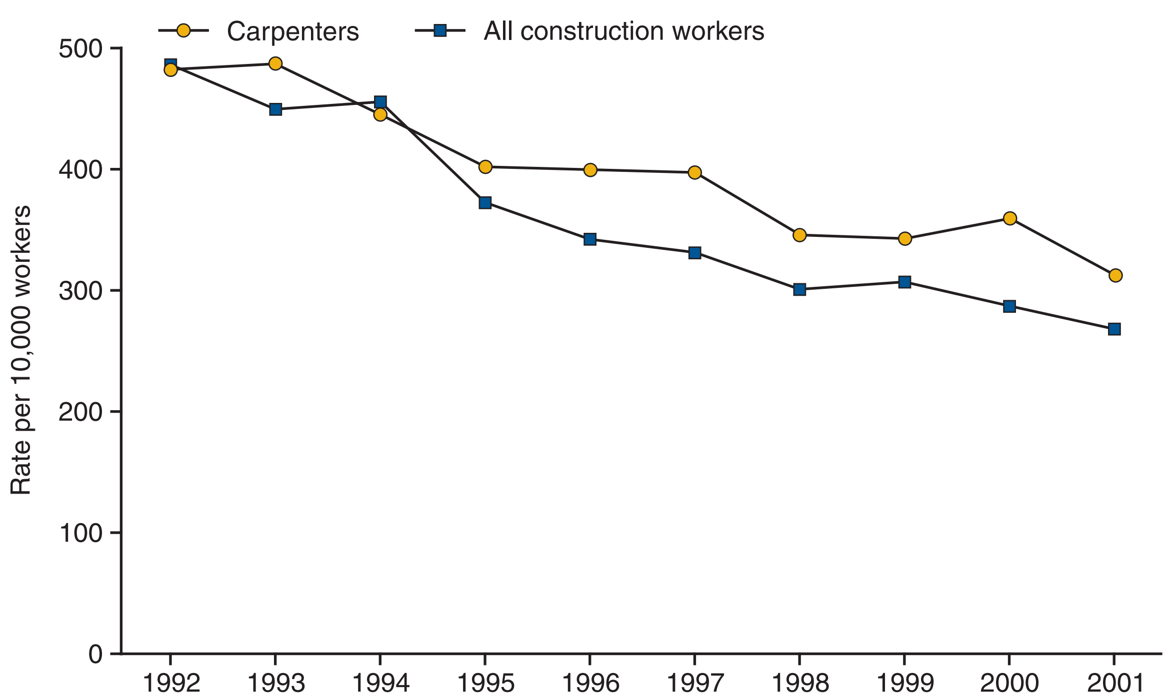


Carpenters

Fatal Injuries

How did the fatal occupational injury rates for carpenters compare with those for all construction workers during 1992–2001?

Figure 4–31. **Fatal occupational injury rates for carpenters and all construction workers, 1992–2001.** During 1992–2001, fatal occupational injury rates for carpenters were parallel to and consistently lower than rates for all construction workers. Rates for carpenters varied within a narrow range, from 8.9 per 100,000 full-time workers in 1995 to 6.7 in 2000. BLS reported 848 fatal occupational injuries among carpenters during this 10-year period—an average of 85 fatalities per year. ***(Sources:** **BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***



Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for carpenters compare with those for all construction workers during 1992–2001?

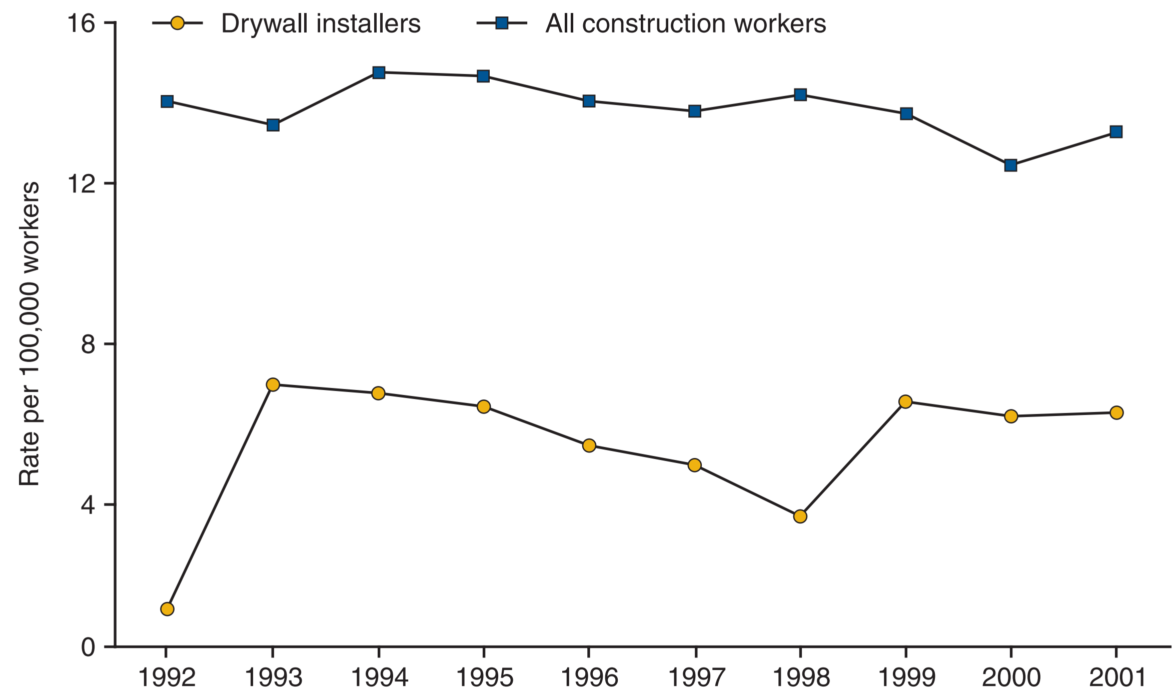
Figure 4–32. **Rates of nonfatal occupational injuries and illnesses involving days away from work for carpenters and all construction workers, 1992–2001.** During 1992–2001, rates of nonfatal occupational injuries and illnesses involving days away from work were slightly higher for carpenters than for all construction workers, but they were comparable in overall magnitude. Rates for carpenters showed a downward trend, from 489 per 10,000 full-time workers in 1993 to 313 in 2001. BLS reported 285,705 nonfatal occupational injuries and illnesses among carpenters during this 10-year period—an average of 28,570 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***

Drywall Installers

Fatal Injuries

How did the fatal occupational injury rates for drywall installers compare with those for all construction workers during 1992–2001?

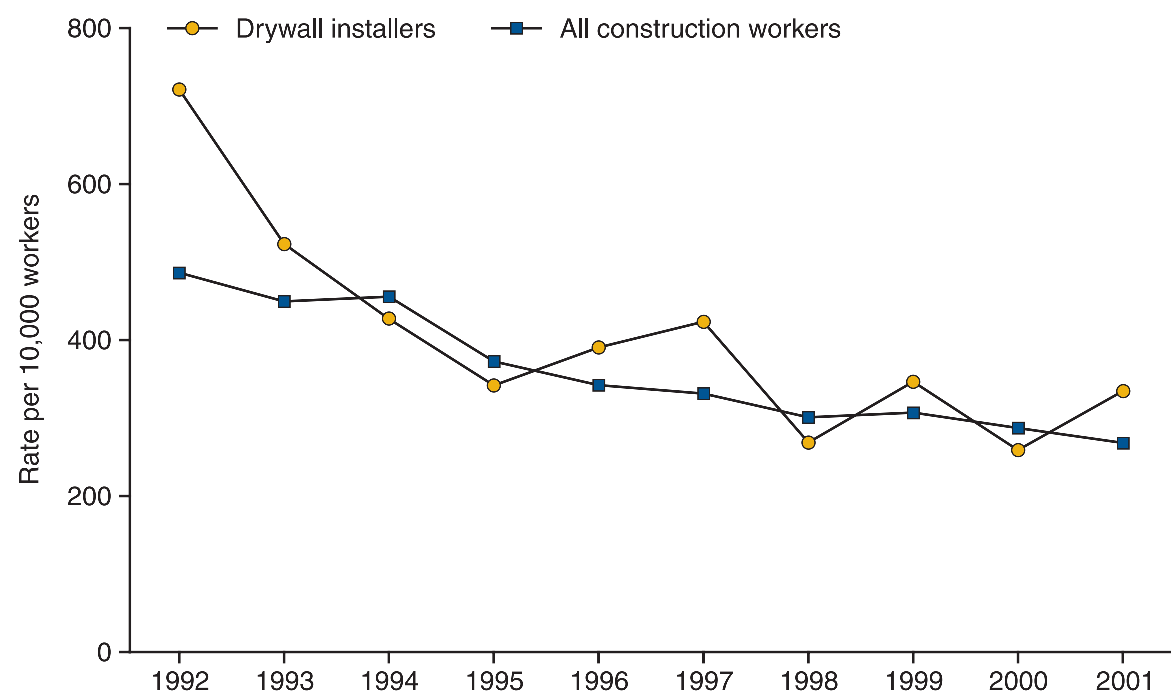
Figure 4–33. **Fatal occupational injury rates for drywall installers and all construction workers, 1992–2001.** Fatal occupational injury rates for drywall installers were consistently lower than those for all construction workers during 1992–2001. Except for 1992, the rates for drywall installers varied within a narrow range, from 6.7 per 100,000 full-time workers in 1993 to 3.4 in 1998. BLS reported 80 fatal occupational injuries among drywall installers during this 10-year period—an average of 10 fatalities per year. ***(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***

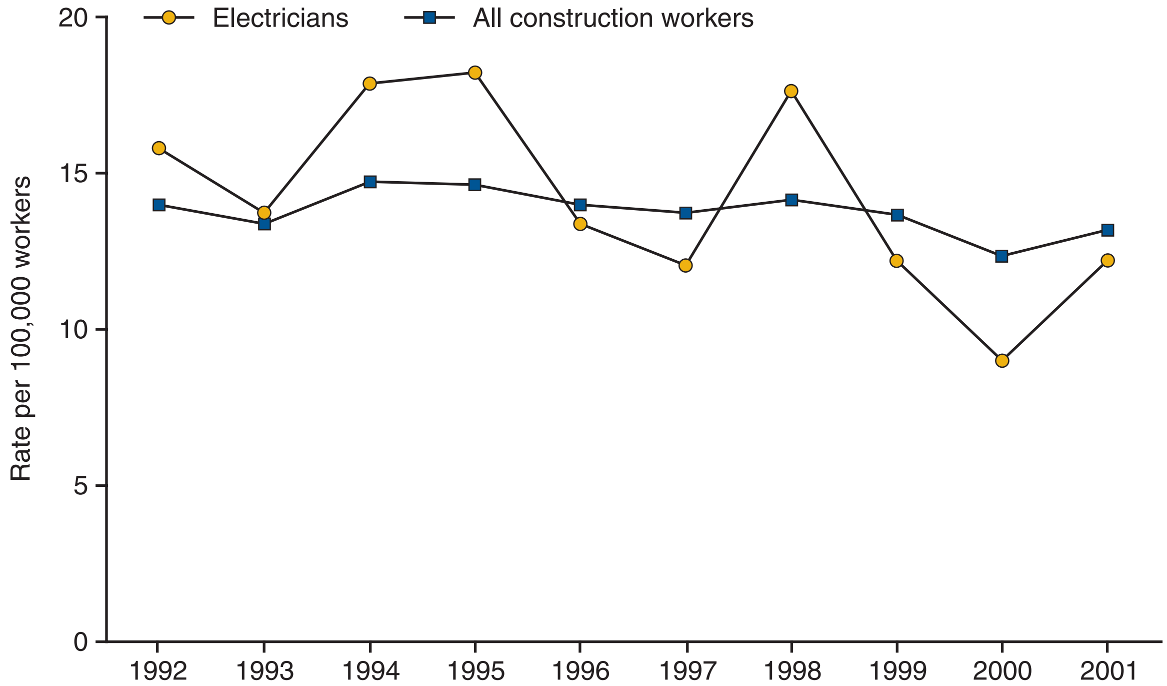


Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for drywall installers compare with those for all construction workers during 1992–2001?

Figure 4–34. **Rates of nonfatal occupational injuries and illnesses involving days away from work for drywall installers and all construction workers, 1992–2001.** Rates of nonfatal occupational injuries and illnesses involving days away from work for drywall installers showed a downward trend during 1992–2001, from 720 per 10,000 full-time workers in 1992 to 259 in 2000. BLS reported 43,575 nonfatal occupational injuries and illnesses among construction workers during this 10-year period—an average of 4,357 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***



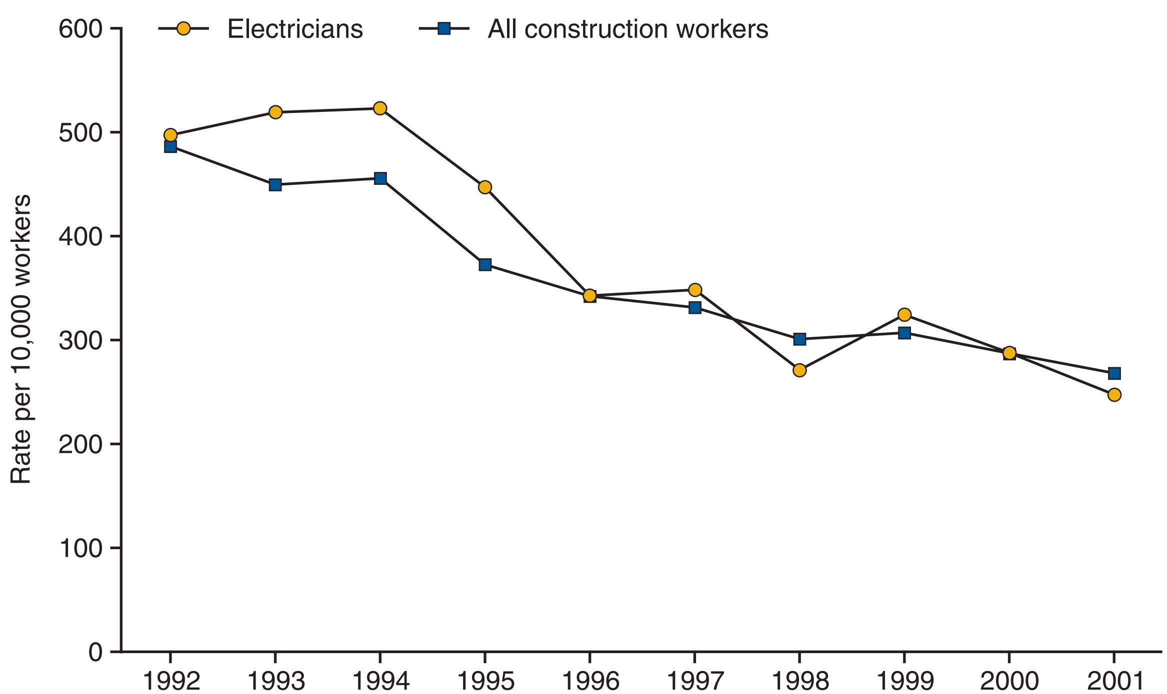


Electricians

Fatal Injuries

How did the fatal occupational injury rates for electricians compare with those for all construction workers during 1992–2001?

Figure 4–35. **Fatal occupational injury rates for electricians and all construction workers, 1992–2001.** Fatal occupational injury rates for electricians during 1992–2001 were comparable with those for all construction workers. Rates for electricians showed an up-and-down decreasing pattern, from 18.3 per 100,000 full-time workers in 1995 to 9.0 in 2000. BLS reported 671 fatal occupational injuries among electricians during this 10-year period—an average of 67 fatalities per year. ***(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***



Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for electricians compare with those for all construction workers during 1992–2001?

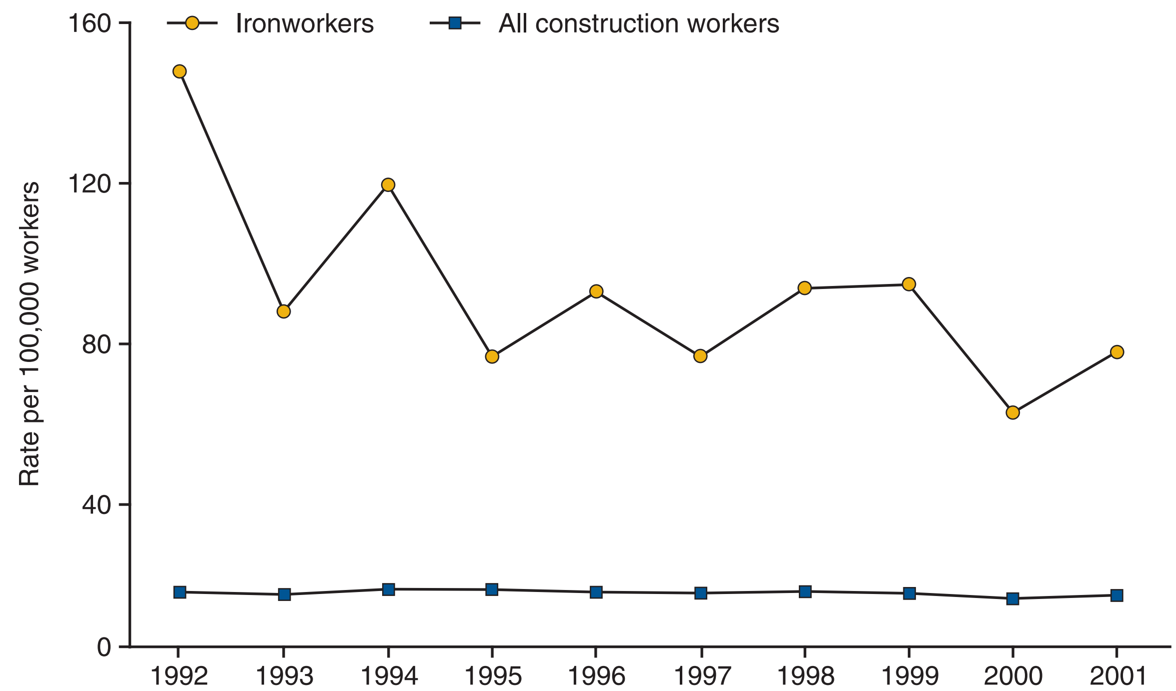
Figure 4–36. **Rates of nonfatal occupational injuries and illnesses involving days away from work for electricians and all construction workers, 1992–2001.** During 1992–2001, rates of nonfatal occupational injuries and illnesses involving days away from work for electricians were slightly higher but comparable with those for all construction workers. Rates for electricians showed a downward trend, from 522 per 10,000 full-time workers in 1994 to 246 in 2001. BLS reported 142,811 nonfatal occupational injuries and illnesses among electricians during this 10-year period—an average of 14,281 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***

Ironworkers

Fatal Injuries

How did the fatal occupational injury rates for ironworkers compare with those for all construction workers during 1992–2001?

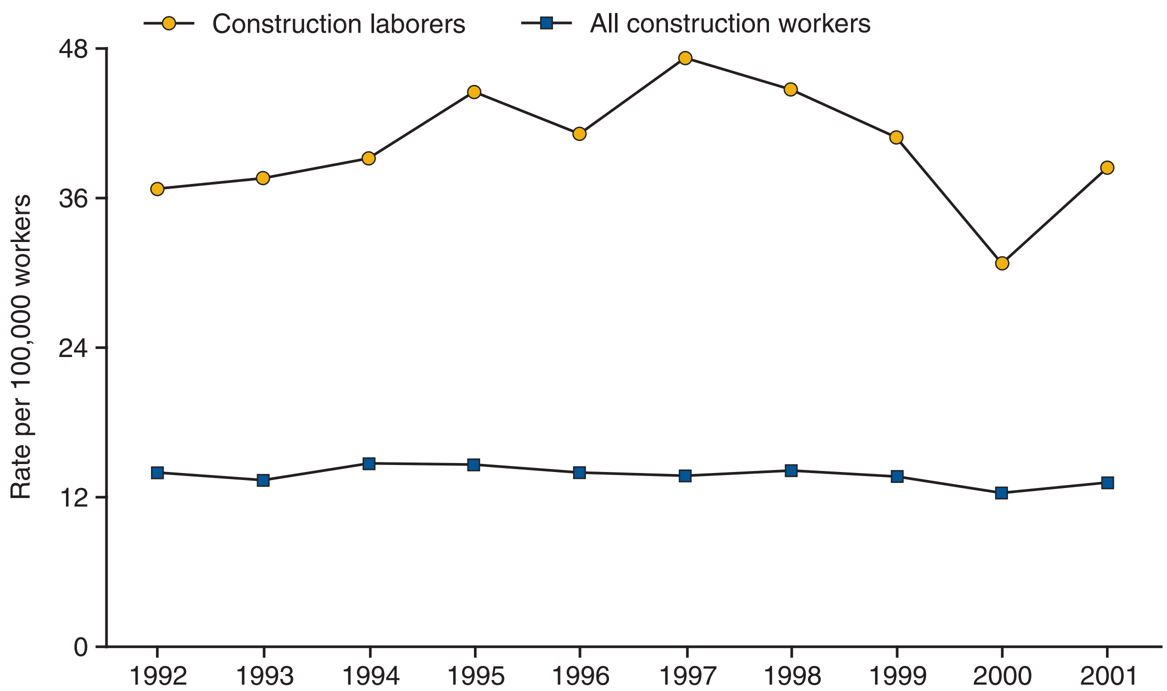
Figure 4–37. **Fatal occupational injury rates for ironworkers and all construction workers, 1992–2001.** Fatal occupational injury rates for ironworkers during 1992–2001 were substantially greater (4.8–10.5 times greater) than those for all construction workers. Rates for ironworkers showed a downward trend, from 147.6 per 100,000 full-time workers in 1992 to 60.0 in 2000. BLS reported 424 fatal occupational injuries among ironworkers during this 10-year period—an average of 42 fatalities per year. ***(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***



Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for ironworkers compare with those for all construction workers during 1992–2001?

Figure 4–38. **Rates of nonfatal occupational injuries and illnesses involving days away from work for ironworkers and all construction workers, 1992–2001.** Rates of nonfatal occupational injuries and illnesses involving days away from work for ironworkers during 1992–2001 were consistently greater (1.7–3.9 times greater) than those for all construction workers. Rates for ironworkers showed a downward trend, from 1,750 per 10,000 full-time workers in 1992 to 550 in 1997. The 2001 rate of 752 per 10,000 full-time workers represents a 57% decrease from the 1992 rate of nonfatal injury and illness for ironworkers. BLS reported 40,173 cases of nonfatal occupational injuries and illnesses among ironworkers during this 10-year period—an average of 4,017 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***



Construction Laborers

Fatal Injuries

How did the fatal occupational injury rates for construction laborers compare with those for all construction workers during 1992–2001?

Figure 4–39. **Fatal occupational injury rates for construction laborers and all construction workers, 1992–2001.** Fatal occupational injury rates for construction laborers during 1992–2001 were substantially greater (2.5–3.4 times greater) than those for all construction workers. Between 1992 and 1997, rates increased from 36.8 per 100,000 full-time workers to 47.3, then decreased to a low of 30.8 in 2000. BLS reported 2,873 fatal occupational injuries among construction laborers during this 10-year period—an average of 287 fatalities per year. ***(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***

Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for construction laborers compare with those for all construction workers during 1992–2001?

Figure 4–40. **Rates of nonfatal occupational injuries and illnesses involving days away from work for construction laborers and all construction workers, 1992–2001.** Rates of nonfatal occupational injuries and illnesses involving days away from work for construction laborers during 1992–2001 were consistently greater (1.8–2.7 times greater) than those for all construction workers. Rates for construction laborers showed a downward trend, from 1,330 per 10,000 full-time workers in 1992 to 512 in 2001. The 2001 rate represents a 62% decrease from the 1992 rate. BLS reported 467,258 nonfatal occupational injuries and illnesses among construction laborers during this 10-year period—an average of 46,726 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***

Operating Engineers

Fatal Injuries

How did the fatal occupational injury rates for operating engineers compare with those for all construction workers during 1992–2001?

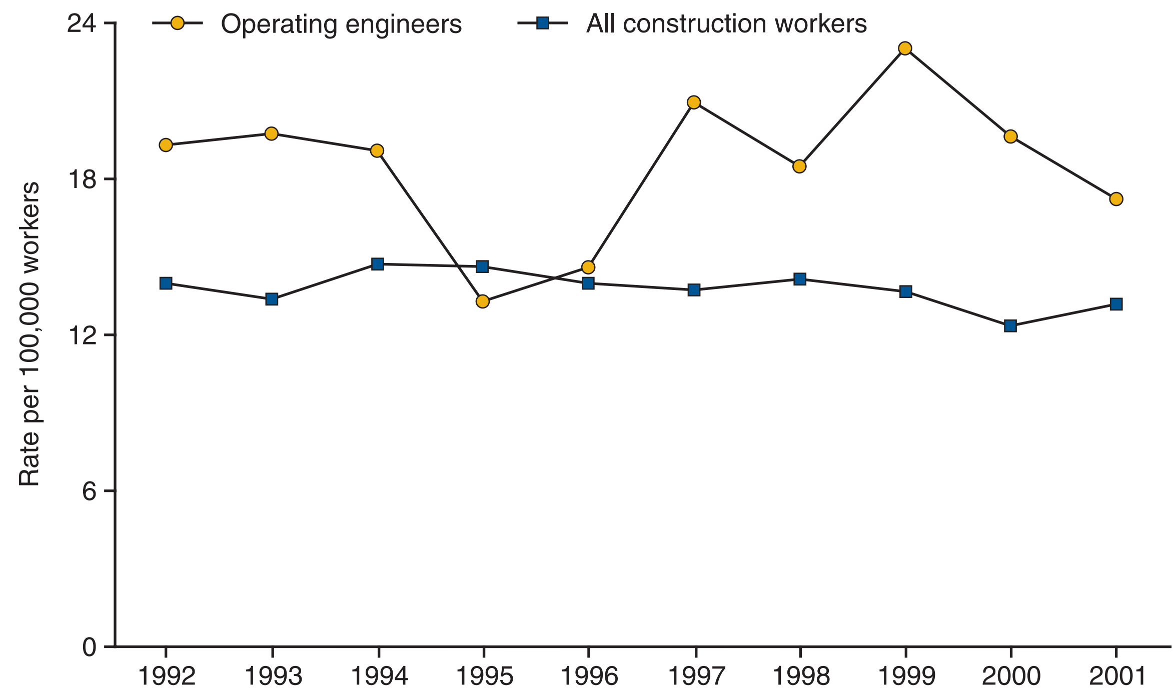


Figure 4–41. Fatal occupational injury rates for operating engineers and all construction workers, 1992–2001. Fatal occupational injury rates for operating engineers during 1992–2001 exceeded those for all construction workers except during 1995. Rates for operating engineers showed an increasing trend, varying between 12.2 per 100,000 full-time workers and 23.0 (compared with 12.4 and 14.8 per 100,000 full-time workers for all construction workers). BLS reported 342 fatal occupational injuries among operating engineers during this 10-year period—an average of 34 fatalities per year. *(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)*

Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for operating engineers compare with those for all construction workers during 1992–2001?

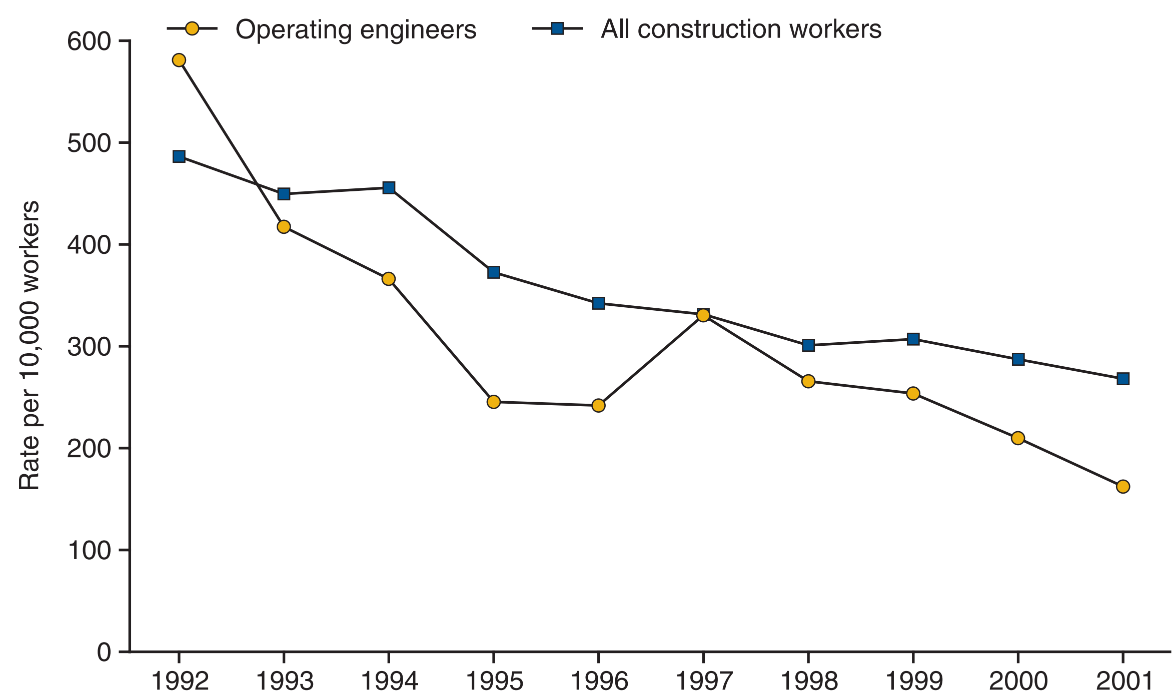
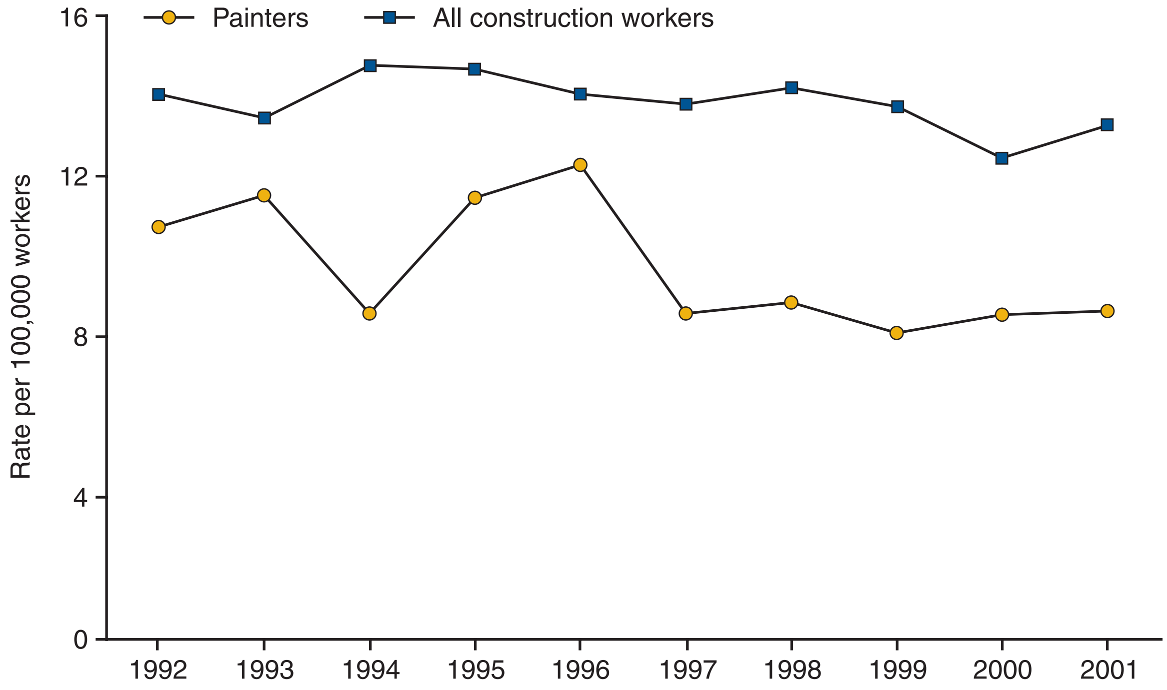


Figure 4–42. Rates of nonfatal occupational injuries and illnesses involving days away from work for operating engineers and all construction workers, 1992–2001. During 1992–2001, rates of nonfatal occupational injuries and illnesses involving days away from work were lower for operating engineers than for all construction workers, but both rates were comparable in overall magnitude. Rates for operating engineers showed a downward trend, from 581 per 10,000 full-time workers in 1992 to 162 in 2001. BLS reported 37,431 nonfatal occupational injuries and illnesses among operating engineers during this 10-year period—an average of 3,743 nonfatal cases per year. *(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)*

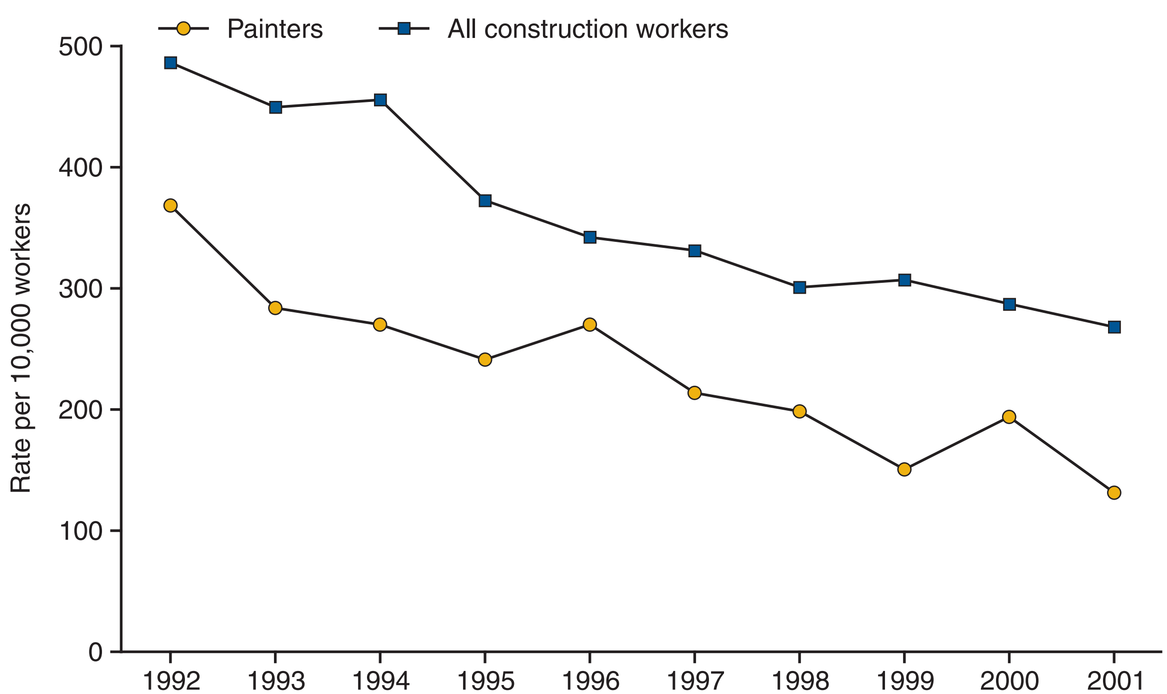


Painters

Fatal Injuries

How did the fatal occupational injury rates for painters compare with those for all construction workers during 1992–2001?

Figure 4–43. **Fatal occupational injury rates for painters and all construction workers, 1992–2001.** During 1992–2001, fatal occupational injury rates for painters were lower than those for all construction workers. Rates for painters showed an up-and-down decreasing pattern, varying from 12.2 per 100,000 full-time workers in 1996 to 7.9 in 1999. BLS reported 384 fatal occupational injuries among painters during this 10-year period—an average of 38 fatalities per year. ***(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***



Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for painters compare with those for all construction workers during 1992–2001?

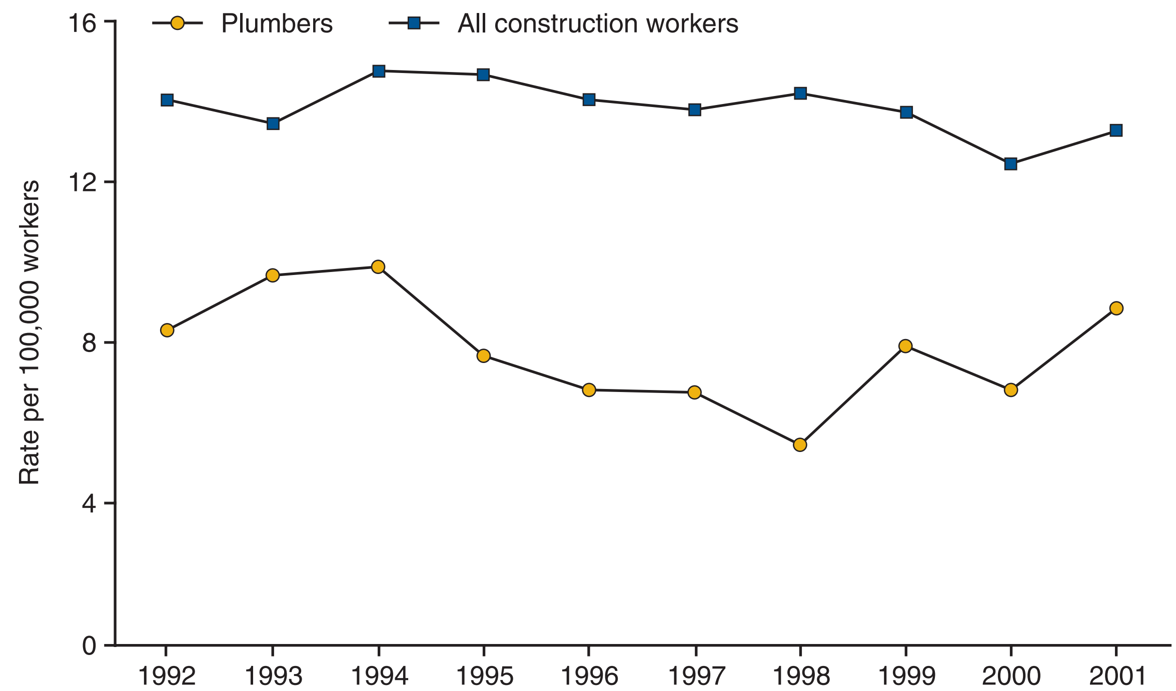
Figure 4–44. **Rates of nonfatal occupational injuries and illnesses involving days away from work for painters and all construction workers, 1992–2001.** During 1992–2001, rates of nonfatal occupational injuries and illnesses involving days away from work for painters were consistently lower (0.5 to 0.8 times lower) than those for all construction workers. Rates showed a downward trend, from 368 per 10,000 full-time workers in 1992 to 131 in 2001. The 2001 rate of 131 per 10,000 full-time workers represents a 64% decrease in rates since 1992. BLS reported 50,264 nonfatal occupational injuries and illnesses among painters during this 10-year period—an average of 5,026 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***

Plumbers

Fatal Injuries

How did the fatal occupational injury rates for plumbers compare with those for all construction workers during 1992–2001?

Figure 4–45. **Fatal occupational injury rates for plumbers and all construction workers, 1992–2001.** During 1992–2001, fatal occupational injury rates for plumbers were lower than those for all construction workers. Rates for plumbers showed a downward trend, from 9.7 per 100,000 full-time workers in 1994 to 5.1 in 1998. BLS reported 284 fatal occupational injuries among plumbers during this 10-year period—an average of 28 fatalities per year. ***(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***



Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for plumbers compare with those for all construction workers during 1992–2001?

Figure 4–46. **Rates of nonfatal occupational injuries and illnesses involving days away from work for plumbers and all construction workers, 1992–2001.** During 1992–2001, rates of nonfatal occupational injuries and illnesses involving days away from work for plumbers were slightly higher than those for all construction workers, though they were comparable in overall magnitude. Rates for plumbers showed a downward trend, from 504 per 10,000 full-time workers in 1992 to 326 in 1998. BLS reported 113,679 nonfatal occupational injuries and illnesses among plumbers during this 10-year period—an average of 11,370 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***

Roofers

Fatal Injuries

How did the fatal occupational injury rates for roofers compare with those for all construction workers during 1992–2001?

Figure 4–47. Fatal occupational injury rates for roofers and all construction workers, 1992–2001. Fatal occupational injury rates for roofers were 1.6–2.8 times greater than those for all construction workers during 1992–2001. Rates followed an up-and-down increasing pattern, with a high of 41.2 per 100,000 full-time workers in 2001 and a low of 22.3 in 1998. BLS reported 569 fatal occupational injuries among roofers during this 10-year period—an average of 57 fatalities per year. *(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)*

Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for roofers compare with those for all construction workers during 1992–2001?

Figure 4–48. Rates of nonfatal occupational injuries and illnesses involving days away from work for roofers and all construction workers, 1992–2001. During 1992–2001, rates of nonfatal occupational injuries and illnesses involving days away from work were consistently greater for roofers (1.1–1.8 times greater) than for all construction workers. Rates for roofers showed a downward trend, from 838 per 10,000 full-time workers in 1994 to 325 in 1998. BLS reported 61,539 nonfatal occupational injuries and illnesses among roofers during this 10-year period—an average of 6,154 nonfatal cases per year. *(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)*

Truck Drivers

Fatal Injuries

How did the fatal occupational injury rates for truck drivers compare with those for all construction workers during 1992–2001?

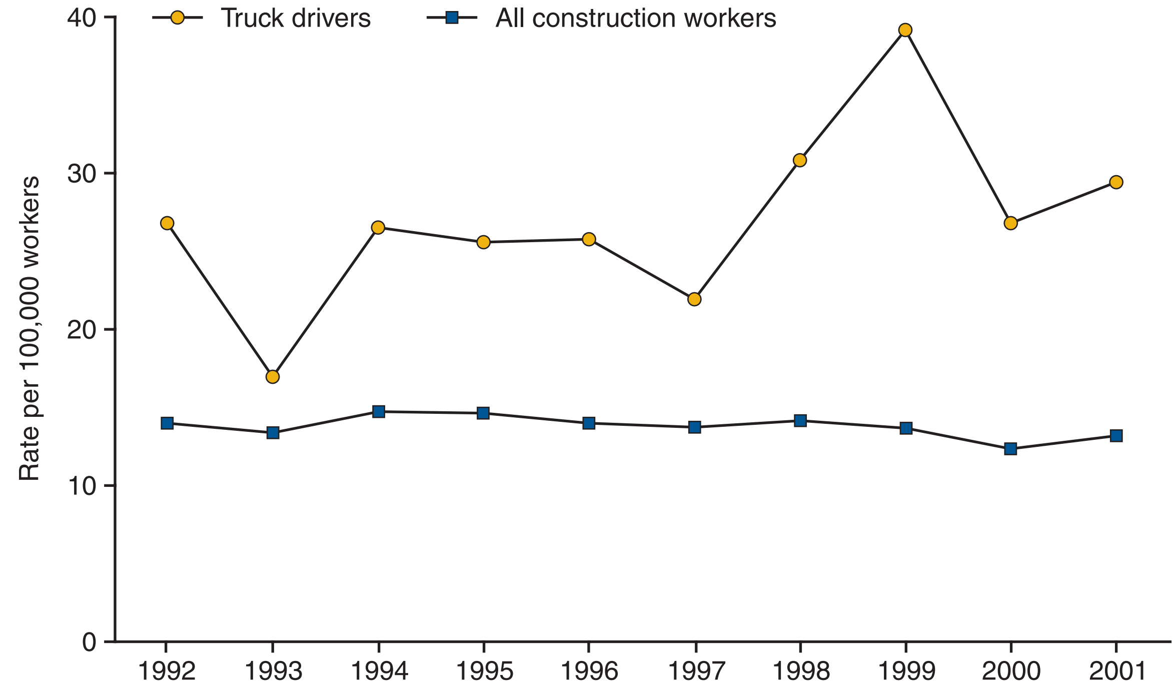


Figure 4–49. Fatal occupational injury rates for truck drivers and all construction workers, 1992–2001. Fatal occupational injury rates for truck drivers were 1.3–2.9 times greater than those for all construction workers during 1992–2001. Rates for truck drivers showed a down-and-up pattern, with a low of 17.0 per 100,000 full-time workers in 1993 and a high of 39.2 in 1999. BLS reported 479 fatal occupational injuries among truck drivers during this 10-year period—an average of 48 fatalities per year. ***(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***

Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for truck drivers compare with those for all construction workers during 1992–2001?

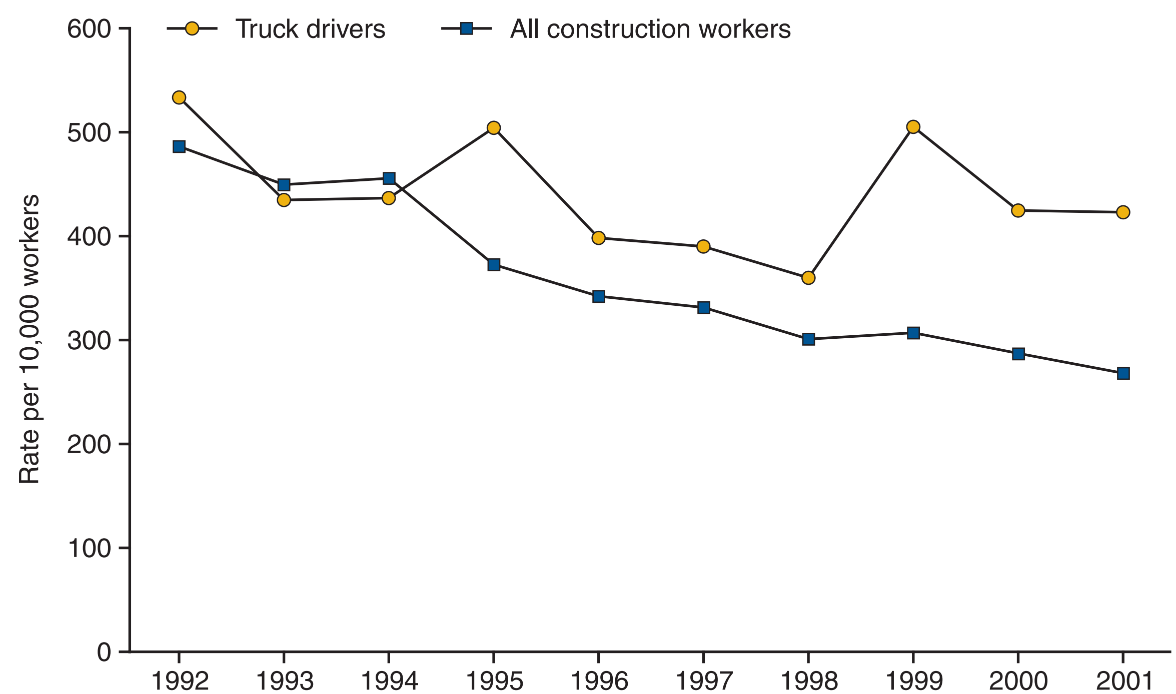
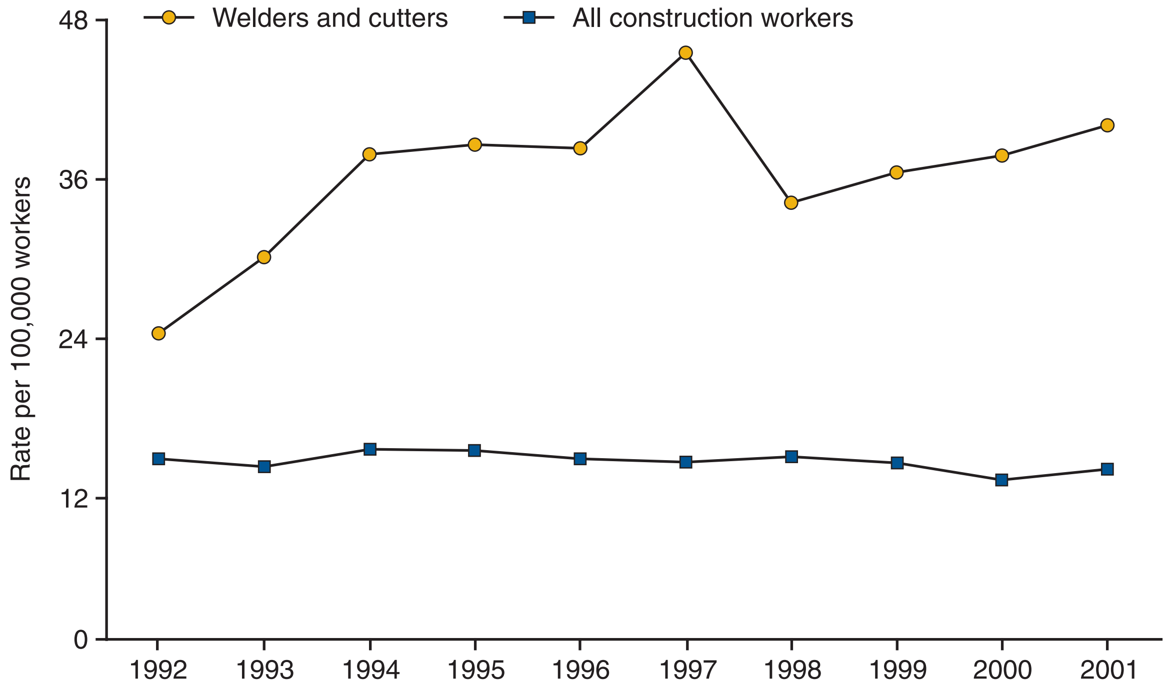
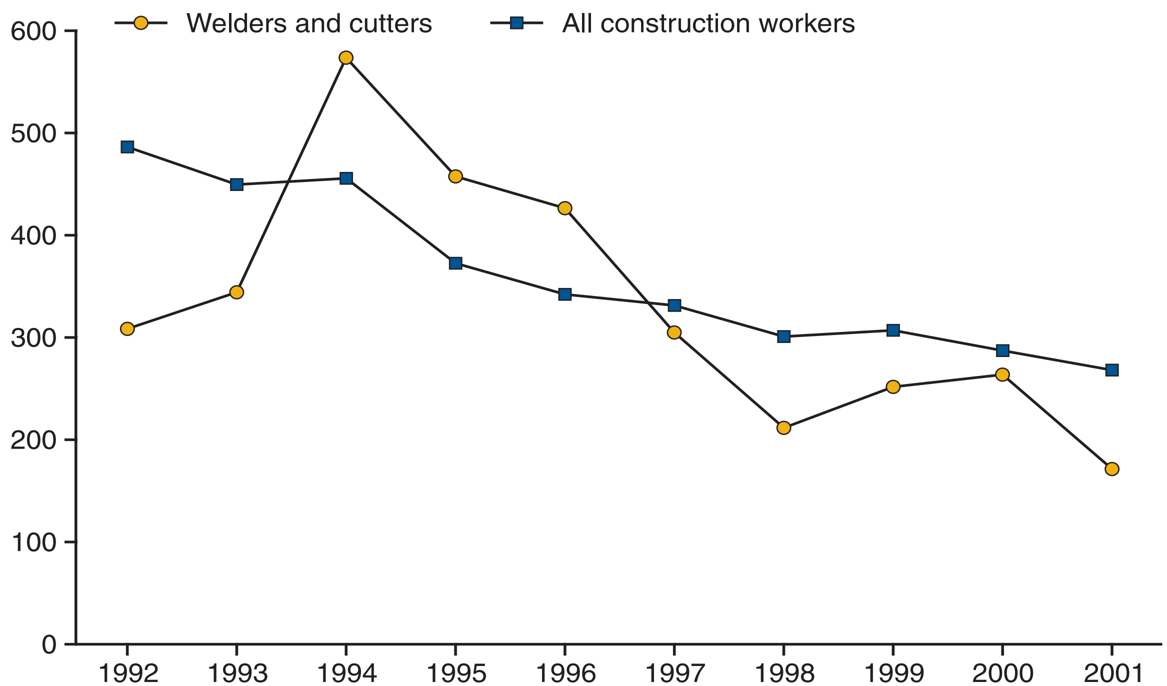


Figure 4–50. Rates of nonfatal occupational injuries and illnesses involving days away from work for truck drivers and all construction workers, 1992–2001. During 1992–2001, rates of nonfatal occupational injuries and illnesses involving days away from work for truck drivers usually exceeded rates for all construction workers. Rates for truck drivers varied from 533 per 10,000 full-time workers in 1992 to 359 in 1998. BLS reported 57,999 nonfatal occupational injuries and illnesses among truck drivers during this 10-year period—an average of 5,800 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***





Welders and Cutters

Fatal Injuries

How did the fatal occupational injury rates for welders and cutters compare with those for all construction workers during 1992–2001?

Figure 4–51. **Fatal occupational injury rates for welders and cutters and all construction workers, 1992–2001.** Fatal occupational injury rates for welders and cutters were 1.7–3.3 times greater than those for all construction workers during 1992–2001. Rates for welders and cutters showed an increasing trend, from 23.7 per 100,000 full-time workers in 1992 to 45.4 in 1997. The 2001 fatal injury rate of 39.9 per 100,000 full-time workers was 3 times the rate for all construction workers and represented a 68% increase from 1992. BLS reported 257 fatal occupational injuries among welders and cutters during this 10-year period—an average of 26 fatalities per year. ***(Sources: BLS [2002b,c]; Pollack and Chowdhury [2001]; Chowdhury and Dong [2003].)***

Nonfatal Injuries and Illnesses

How did the rates of nonfatal occupational injuries and illnesses for welders and cutters compare with those for all construction workers during 1992–2001?

Figure 4–52. **Rates of nonfatal occupational injuries and illnesses involving days away from work for welders and cutters and all construction workers, 1992–2001.** During 1992–2001, rates of nonfatal occupational injuries and illnesses involving days away from work for welders and cutters show an overall decreasing trend, ranging from 573 per 10,000 full-time workers in 1994 to 171 in 2001. BLS reported 21,940 nonfatal occupational injuries and illnesses among welders and cutters during this 10-year period—an average of 2,194 nonfatal cases per year. ***(Sources: BLS [2002c; 2003b]; Pollack and Chowdhury [2001]; Dong et al. [2004].)***

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Chapter 5 • Special Populations

Introduction

This final chapter provides data describing the distribution of fatal occupational injuries and nonfatal occupational injuries and illnesses among selected special populations at risk within the labor force. The chapter focuses on young workers, older workers, and Hispanic workers.

The importance of providing data on special populations is supported by two National Institute for Occupational Safety and Health (NIOSH) surveillance program needs: the National Occupational Research Agenda (NORA) and the NIOSH surveillance strategic plan. NORA emphasizes the need to increase the amount of information available to guide research, and thus it looks to surveillance sources for data on special populations. This NORA priority reflects the view of the public health community that workers with certain biologic, social, or economic characteristics may be at increased risk of occupational injuries and illnesses. The increasing size of the U.S. labor force and its shifts in ethnic and age distributions forecast increasing numbers of workers in these at-risk groups.

The focus on special populations is also supported by the NIOSH surveillance strategic plan. The objective of this plan is to analyze existing sources of data and disseminate findings to add to existing knowledge about the magnitude, circumstances, and trends in injuries among special populations at risk (see Objective 3.5 in NIOSH [2001]). Many of these populations have been underserved within the occupational safety and health community. Many questions exist about these population groups and the prevalence and incidence of fatal occupational injuries and nonfatal injuries and illnesses. This Chartbook represents an attempt to compile and disseminate available information.

Data for the figures come from the Bureau of Labor Statistics (BLS) and the Massachusetts Department of Public Health. BLS data sources include the Census of Fatal Occupational Injuries (CFOI) and the Survey of Occupational Injuries and Illnesses (SOII). CFOI is used to characterize fatal occupational injuries among these special populations at risk, and SOII is used to characterize nonfatal injuries and illnesses among the three groups. The Massachusetts Department of Public Health conducts occupational injury surveillance activities through the NIOSH Sentinel Event Notification System for Occupational Risk (SENSOR) Program to develop model surveillance and related outreach activities for preventing occupational injuries among young workers in the Commonwealth of Massachusetts. Data from this program are included to provide perspective from one of the NIOSH State partners.

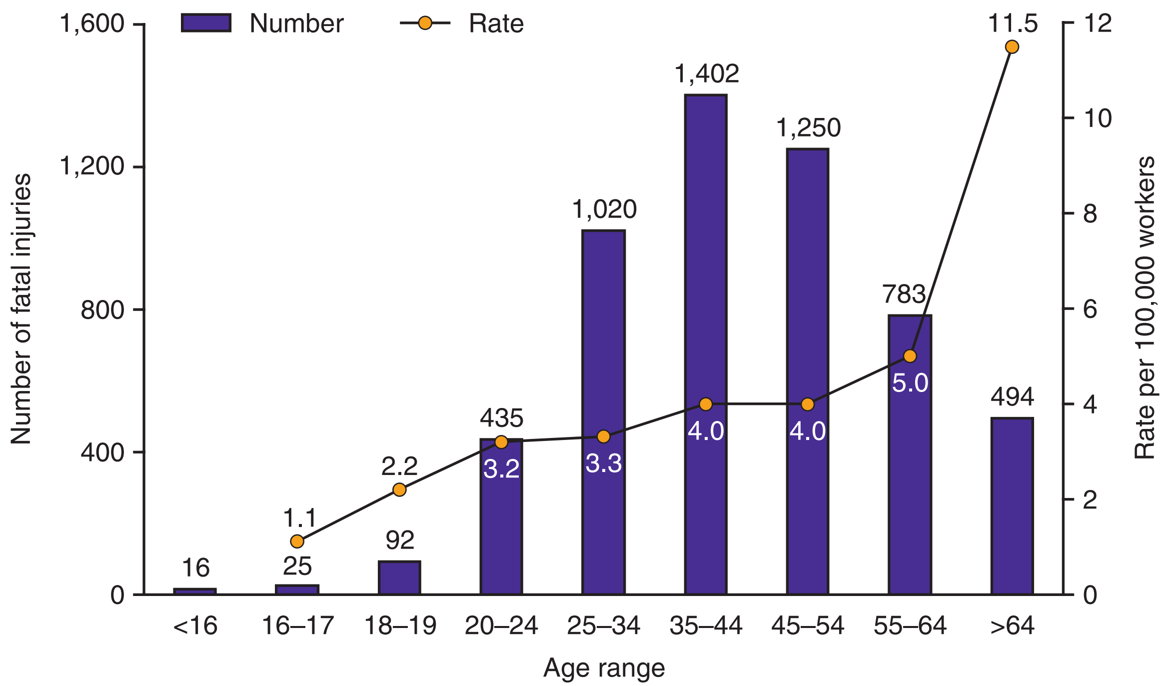
Young workers aged 16–19 accounted for 6.9 million or 5.1% of all employed workers in 2001, and those aged 55 and older accounted for 18.3 million or 13.6%. The wholesale trade, retail trade, and services industry sectors were the major employment sectors for both the younger and older workers (Table 5–1). Fatality rates differed by age group, ranging from a low of 1.1 per 100,000 among workers aged 16–17 to a high of 11.5 per 100,000 among workers aged 65 and older (Figure 5–1). Of the 1.5 million injury and illness cases involving days away from work during 2001, younger workers accounted for 3.0%, and older workers accounted for 10.5% (Figure 5–2). The severity of work loss varied by age group: Workers aged 14–15 and 16–19 had median work losses of 2 and 4 days in 2001, and workers aged 55–64 and 65 and older had median work losses of 10 and 14 days, respectively (Figure 5–3). The severity of work loss varied slightly among racial and ethnic groups, from 5 to 7 days in 2001. Hispanic workers had the highest median work loss of 7 days (Figure 5–4).

Employment and Age

How were employed workers distributed by age and industry in 2001?

Table 5–1. Number and distribution of employed workers in major industry groups by age, 2001. Young workers aged 16–19 accounted for 6.9 million or 5.1% of all employed workers, and those aged 55 and older accounted for 18.3 million or 13.6%. Of the young workers aged 16–19, 54.2% were employed in wholesale and retail trade, and 27.5% in services. Of the employed workers aged 55 and older, 40.0% were employed in services, and 17.5% in wholesale and retail trade. *(Source: BLS [2001].)*

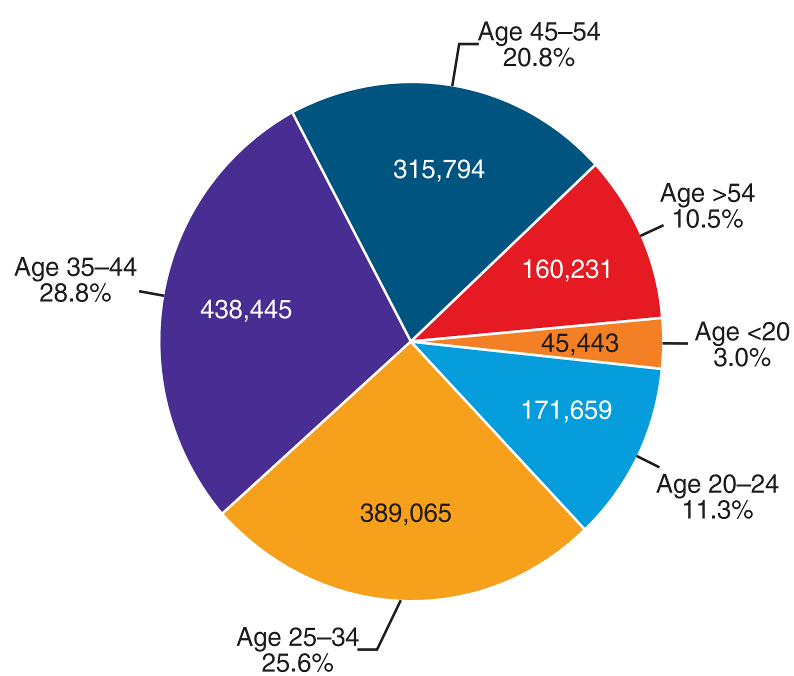
	Age group							
	16 to 19 years		20 to 24 years		25 to 54 years		55 years and older	
Industry	Number (thousands)	Distribution (%)	Number (thousands)	Distribution (%)	Number (thousands)	Distribution (%)	Number (thousands)	Distribution (%)
All	6,889	100.0	13,361	100.0	96,515	100.0	18,307	100.0
Agriculture	225	3.3	302	2.3	1,899	2.0	718	3.9
Mining	8	0.1	38	0.3	450	0.5	71	0.4
Construction	321	4.7	1,040	7.8	7,227	7.5	993	5.4
Manufacturing	335	4.9	1,405	10.5	14,695	15.2	2,535	13.8
Durable goods	202	2.9	840	6.3	9,013	9.3	1,534	8.4
Nondurable goods	133	1.9	565	4.2	5,682	5.9	1,001	5.5
Transportation, communications, and other public utilities	138	2.0	730	5.5	7,663	7.9	1,206	6.6
Wholesale and retail trade	3,735	54.2	4,178	31.3	16,565	17.2	3,195	17.5
Finance, insurance, and real estate	181	2.6	753	5.6	6,517	6.8	1,346	7.4
Services	1,892	27.5	4,650	34.8	36,617	37.9	7,318	40.0
Public administration	54	0.8	265	2.0	4,883	5.1	924	5.0



Fatal Injuries and Age

How did fatal occupational injuries differ by age of worker in 2002?

Figure 5–1. Number and rate of fatal occupational injuries by age of worker, 2002. Workers aged 25–54 accounted for 3,672 or 66.5% of the 5,524 fatal occupational injuries in 2002. Fatality rates ranged from 1.1 per 100,000 among workers aged 16–17 to 11.5 per 100,000 among workers aged 65 and older. Fatalities among workers aged 65 and older accounted for 9% (494 fatalities) of all fatal occupational injuries. (*Note:* Labor force data are unavailable for youths aged 15 and younger. This precludes estimating rates for these workers.) ***(Source:* *BLS [2003a].)***



Nonfatal Injuries and Illnesses

Age

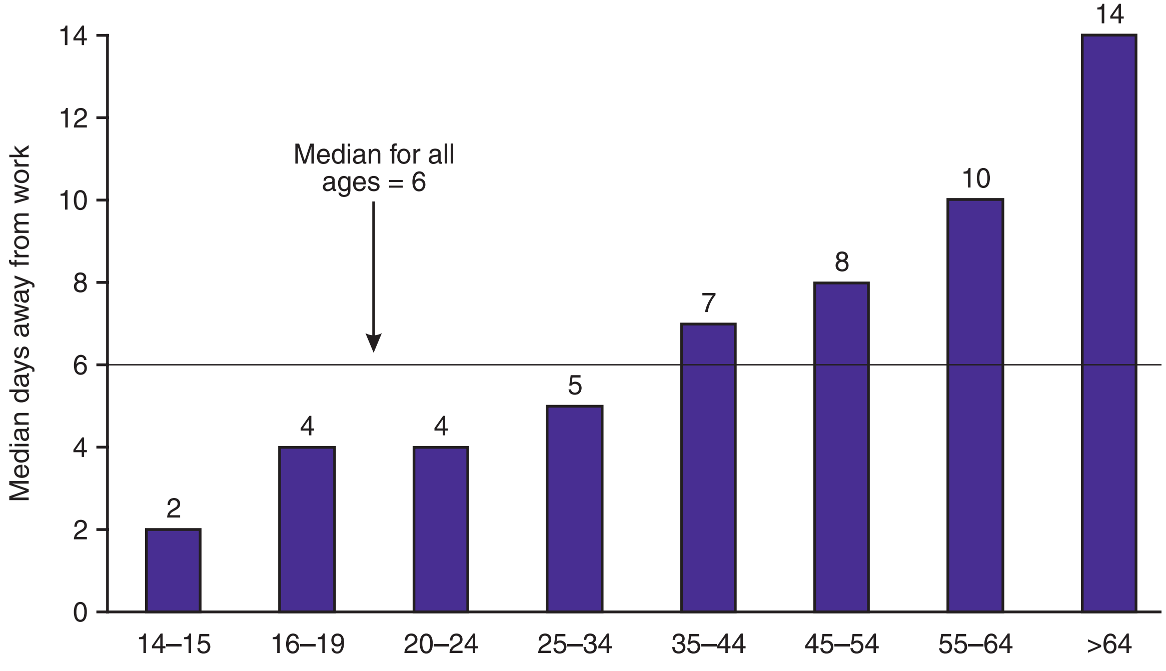
How did nonfatal occupational injuries and illnesses differ by age of worker in 2001?

Figure 5–2. Number and distribution of nonfatal injuries and illnesses involving days away from work in private industry by age of worker, 2001. Younger workers accounted for 45,443 cases or 3.0% of the 1.5 million injury and illness cases involving days away from work for which age was reported. Workers aged 55 and older accounted for 160,231 cases or 10.5%. Age was not reported for 16,930 cases. ***(Source: BLS [2003b,c].)***

Severity

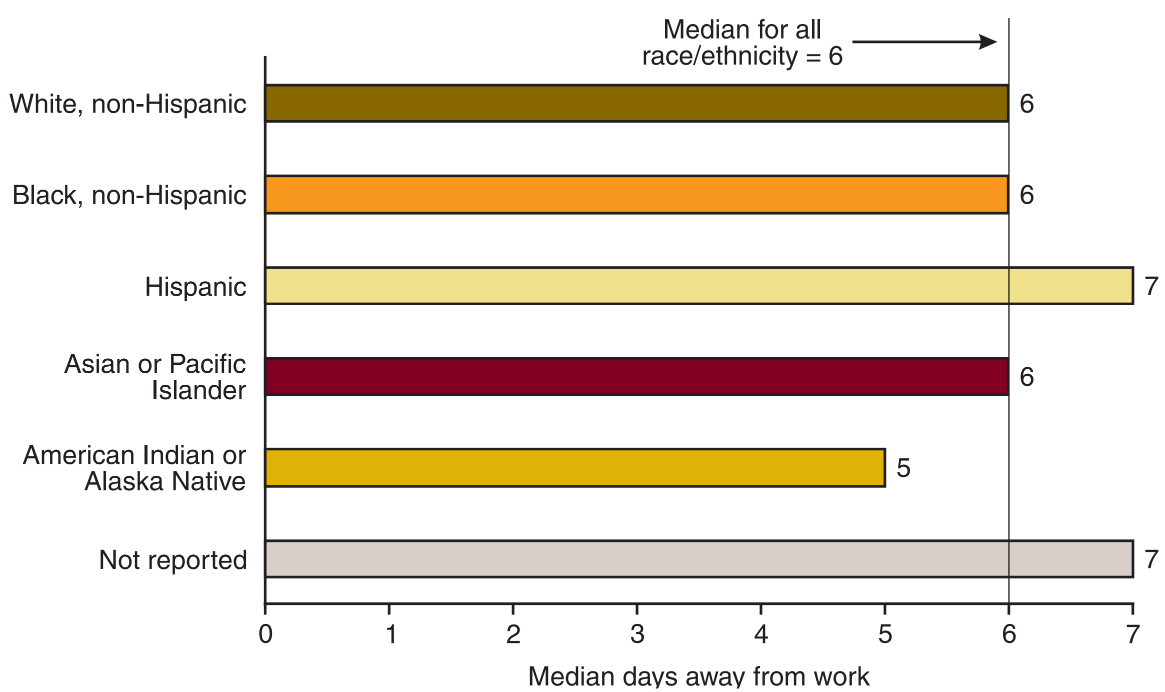
How did the severity of work loss from nonfatal occupational injuries and illnesses vary by age group in 2001?

Figure 5–3. Median days away from work due to occupational injury or illness in private industry by age, 2001. Median days away from work due to injury or illness increased with age. In 2001, workers aged 14–15 and 16–19 had median work losses of 2 and 4 days, respectively. Workers aged 55–64 and 65 and older had median work losses of 10 and 14 days, respectively. *(Sources: BLS [2003b,c].)*



How did the severity of work loss from nonfatal occupational injuries and illnesses vary by race/ethnicity in 2001?

Figure 5–4. Median days away from work due to occupational injury or illness in private industry by race/ethnicity, 2001. Median days of work loss varied from 5 to 7 days in 2001. Hispanic workers had the highest median work loss of 7 days. Race/ethnicity was not reported for 415,616 of the 1.5 million reported injuries and illnesses involving days away from work. *(Sources: BLS [2003b,c].)*



Young Workers

Young workers are generally believed to be at increased risk of occupational injury owing to their limited job knowledge, training, and skills. Physical and psychosocial factors may also place young workers at increased risk of injury, and age-related factors may render youths more susceptible to chemical and other physical exposure risks at work. Every year, about 67 teenage workers die of work injuries [DOL 2000], and NIOSH estimates that 230,000 teenagers suffer from nonfatal occupational injuries. For the year 2010, BLS forecasts that 17.8 million youths aged 16–19 will be in the labor force—up from 16 million in 2000. Labor force data are unavailable for youths aged 15 and younger, though BLS collects occupational fatality data and nonfatal injury and illness data on workers in these age groups.

Data for the figures come from three sources: CFOI, SOII, and the Occupational Health Surveillance (SENSOR) Program within the Massachusetts Department of Public Health [Davis 2002]. The figures in this section illustrate fatal occupational injuries and nonfatal occupational injuries and illnesses among young workers. They are described for the following age groups (data permitting):

Fatal occupational injuries	Nonfatal occupational injuries and illnesses
17 or younger	Younger than 14
16–17	14–15
18–19	16–19

BLS reported that during 1993–2002, the number of fatal injuries ranged from 32 to 46 for workers aged 16–17, and from 92 to 137 for workers aged 18–19. Rates declined during the same period from 2 to 1.1 per 100,000 employed workers aged 16–17 and from 3 to 2.2 per 100,000 employed workers aged 18–19 (Figure 5–5). Most fatalities (60.5%) affect workers aged 16 and 17 (Figure 5–6) and occur among male workers (Figure 5–7) and white, non-Hispanic youths (73.6%) (Figure 5–8). Work in farming, forestry, and fishing accounted for 289 or 42.3% of all fatal occupational injuries among youths aged 17 during 1992–2002 (Figure 5–9). Transportation incidents were responsible for 320 or 45.4% of fatal occupational injuries among youths; incidents on highways, farms, and industrial premises accounted for more than 137 or 74% of all transportation incidents among youths (Figure 5–11).

BLS reports from employers show a consistent downward trend since 1992 in the estimated number of nonfatal injuries and illnesses involving days away from work among workers under age 14 (Figure 5–12), aged 14–15 (Figure 5–13), and aged 16–19 (Figure 5–14). In 2001, workers aged 16–19 accounted for 44,535 or 2.9% of all reported cases of nonfatal occupational injury and illness involving days away from work. Younger workers experienced less severe injuries as measured by median days away from work. Workers aged 14–15 had a median loss of 2 days (62.3% of the cases had a work loss of 1 or 2 days), and workers aged 16–19 had a median loss of 4 days (60.1% of the cases involved a work loss of 5 days or less) (Figure 5–15). During 2001, the highest proportion of nonfatal injury and illness cases among workers aged 16–19 occurred in operators, fabricators, and laborers (37.4% or 16,566 cases) and service (30.8% or 13,640) (Figure 5–16). The wholesale and retail trade and services industry sectors accounted for the highest percentages (45.6% and 21.2%, respectively) of nonfatal occupational injuries and illnesses among workers aged 16–19 (Figure 5–17).

Fatal Injuries

Magnitude and Trend

How did the numbers and rates of fatal occupational injuries change among young workers during 1993–2002?

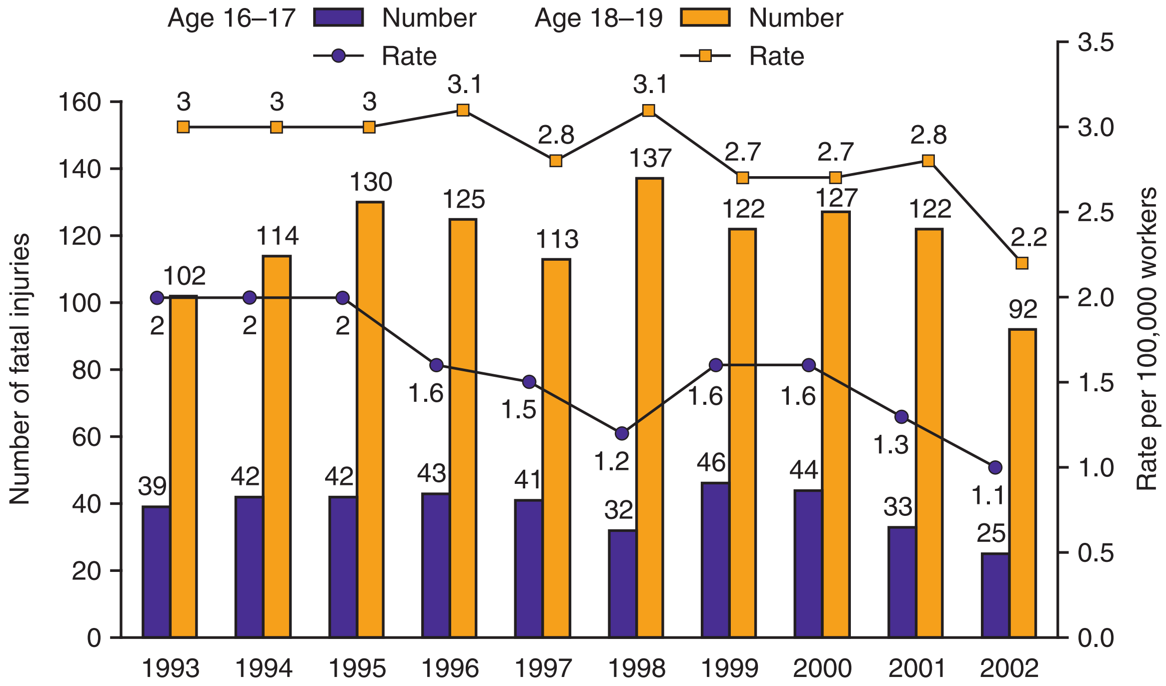


Figure 5–5. Numbers and rates of fatal occupational injuries among workers aged 16–17 and 18–19, 1993–2002. Fatal occupational injury rates declined during this 10-year period from 2 to 1.1 per 100,000 employed workers aged 16–17 and from 3 to 2.2 per 100,000 employed workers aged 18–19. Fatal injury rates were higher each year for workers aged 18–19 compared with workers aged 16–17. The number of fatal injuries ranged from 32 in 1998 to 46 in 1999 for workers aged 16–17, and from 92 in 2002 to 137 in 1998 for workers aged 18–19. (*Note:* BLS rounded rates to whole numbers for 1993–1995.) ***(Source:* BLS *[2003d].)***

Age

How did fatal occupational injuries differ by age of young workers during 1992–2002?

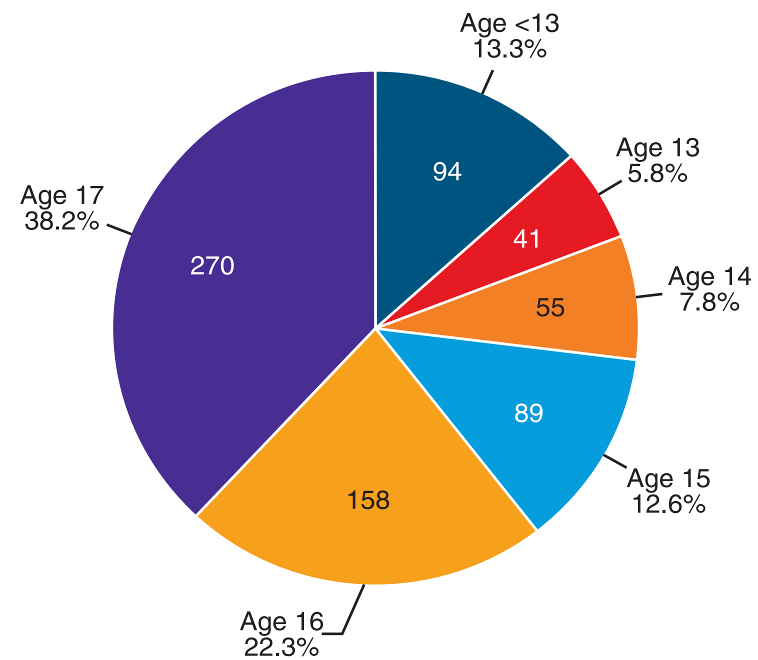
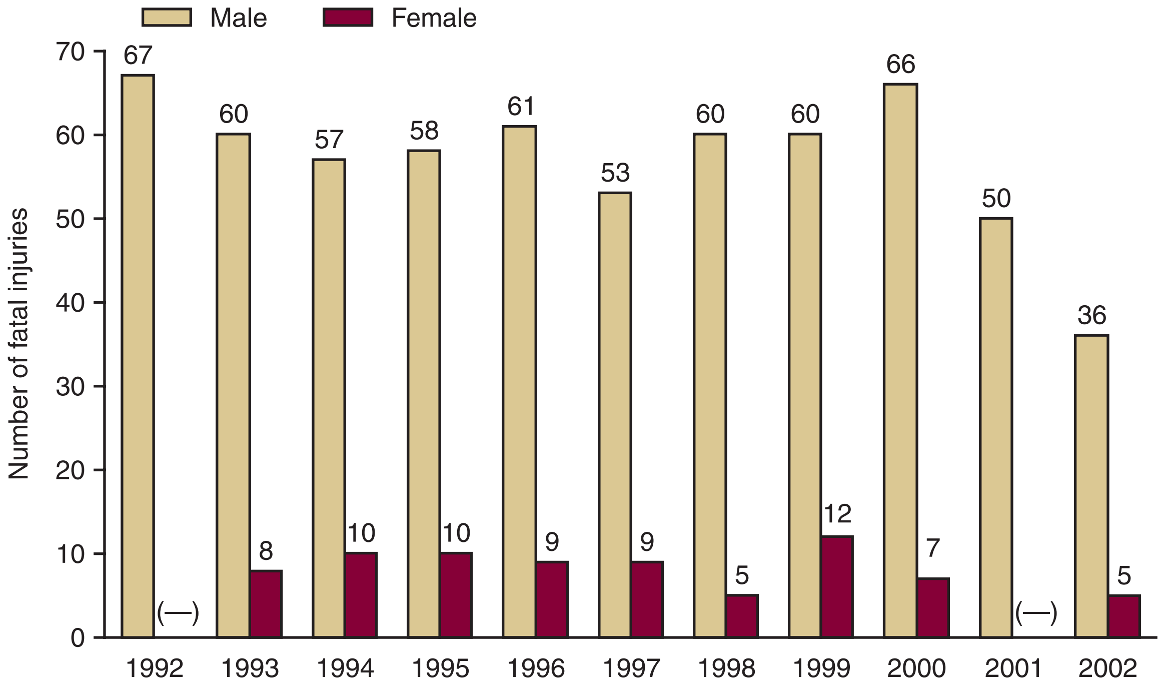


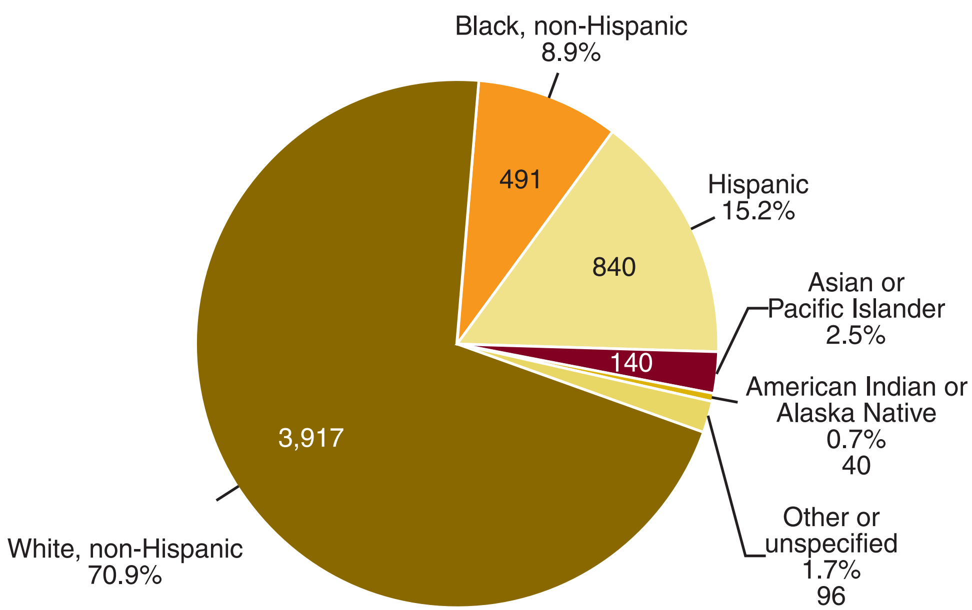
Figure 5–6. Number and distribution of fatal occupational injuries by age among young workers, 1992–2002. Fatal occupational injuries among workers aged 16 and 17 accounted for 158 and 270 fatalities, respectively, or 60.5% of all fatal occupational injuries among workers aged 17 and younger for the period 1992–2002. A significant number of deaths (94 or 13.3% of the total) occurred among youths aged 12 and younger. ***(Source:* BLS *[2003d].)***



Sex

How did the number of fatal occupational injuries differ by sex of worker among young workers during 1992–2002?

Figure 5–7. Number of fatal occupational injuries among workers aged 17 and younger by sex of worker, 1992–2002. For this period, the total number of fatal occupational injuries for workers aged 17 and younger ranged from 41 in 2002 to 73 in 2000. Deaths among male workers predominated, accounting for 89% of the worker deaths reported in this age group during 1992–2002. (*Note:* Dash in parentheses indicates that no data were reported or that data do not meet BLS publication criteria.) ***(Source: BLS [2003d].)***



Race/Ethnicity

How did fatal occupational injuries differ by race/ethnicity among young workers during 1992–2002?

Figure 5–8. Number and distribution of fatal occupational injuries among workers aged 17 and younger by race/ethnicity, 1992–2002. White, non-Hispanic youths accounted for 520 or 73.6% of fatal occupational injuries among workers aged 17 and younger during 1992–2002. In contrast, 39 fatal occupational injuries (5.5%) were reported for black, non-Hispanic youths, and 114 (16.1%) were reported for Hispanic youths during the 11-year period. ***(Source: BLS [2003d].)***

Occupation

How did fatal occupational injuries differ by major occupational group among young workers during 1992–2002?

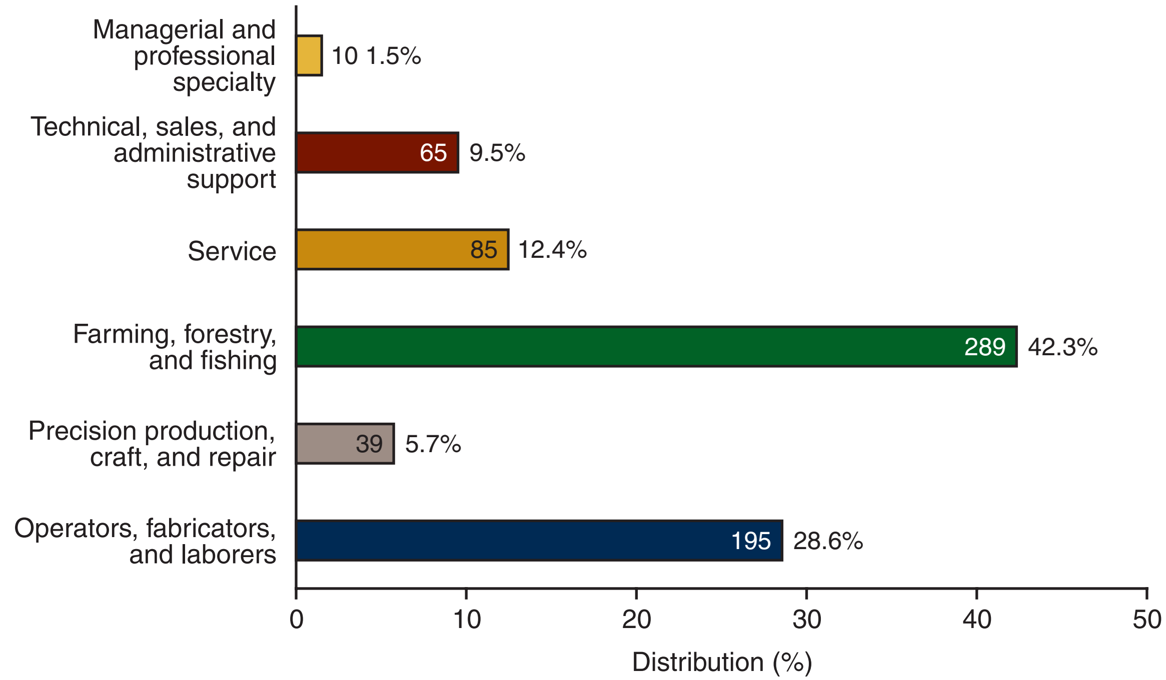


Figure 5–9. Distribution and number of fatal occupational injuries among workers aged 17 and younger by occupation, 1992–2002. Work in farming, forestry, and fishing accounted for 289 or 42.3% of all fatal occupational injuries among youths aged 17 and younger during 1992–2002. Youths employed as operators, fabricators, and laborers accounted for 195 or 28.6% of the fatal injuries. ***(Source: BLS [2003d].)***

Industry

How did fatal occupational injuries vary by private industry sector among young workers during 1992–2002?

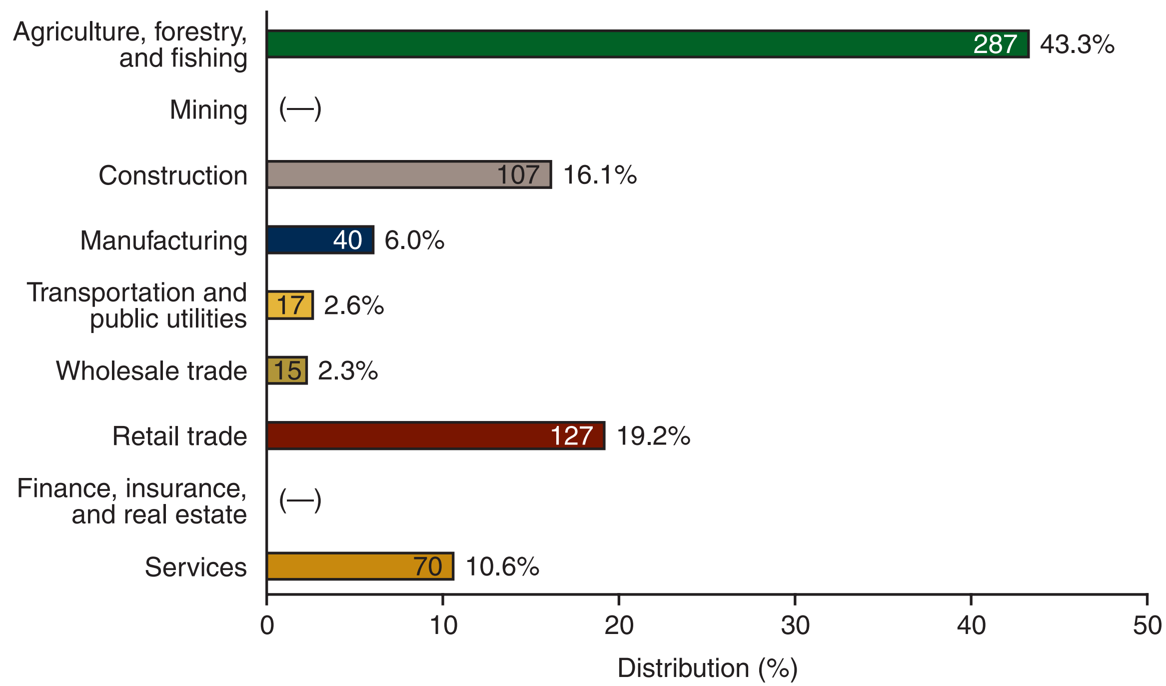
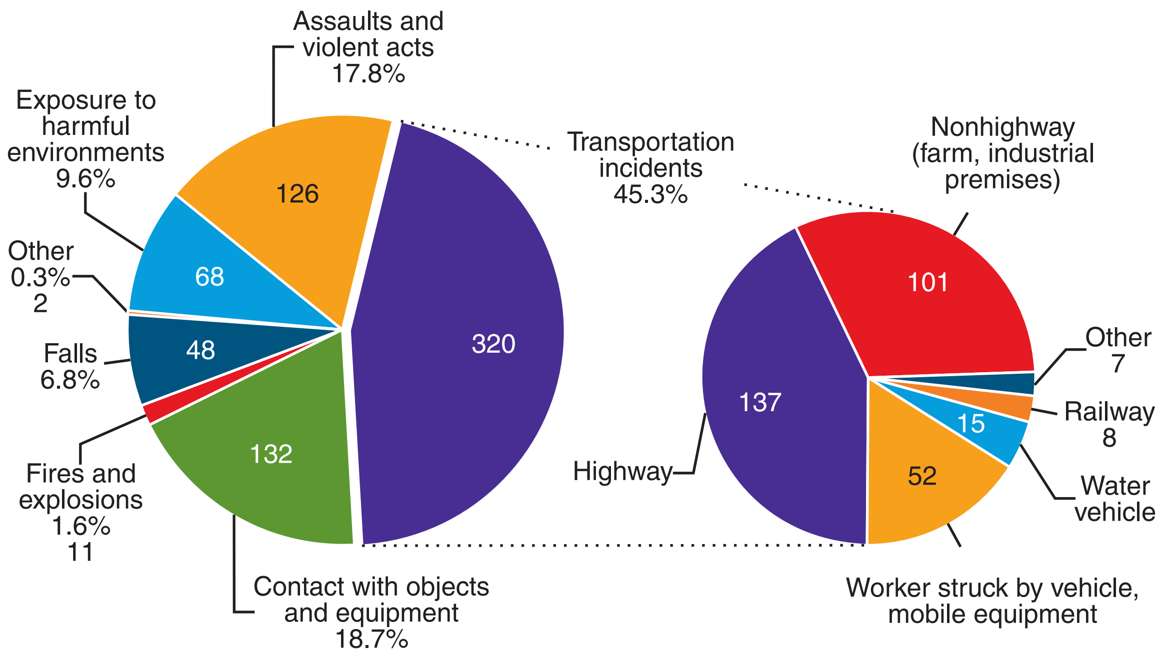


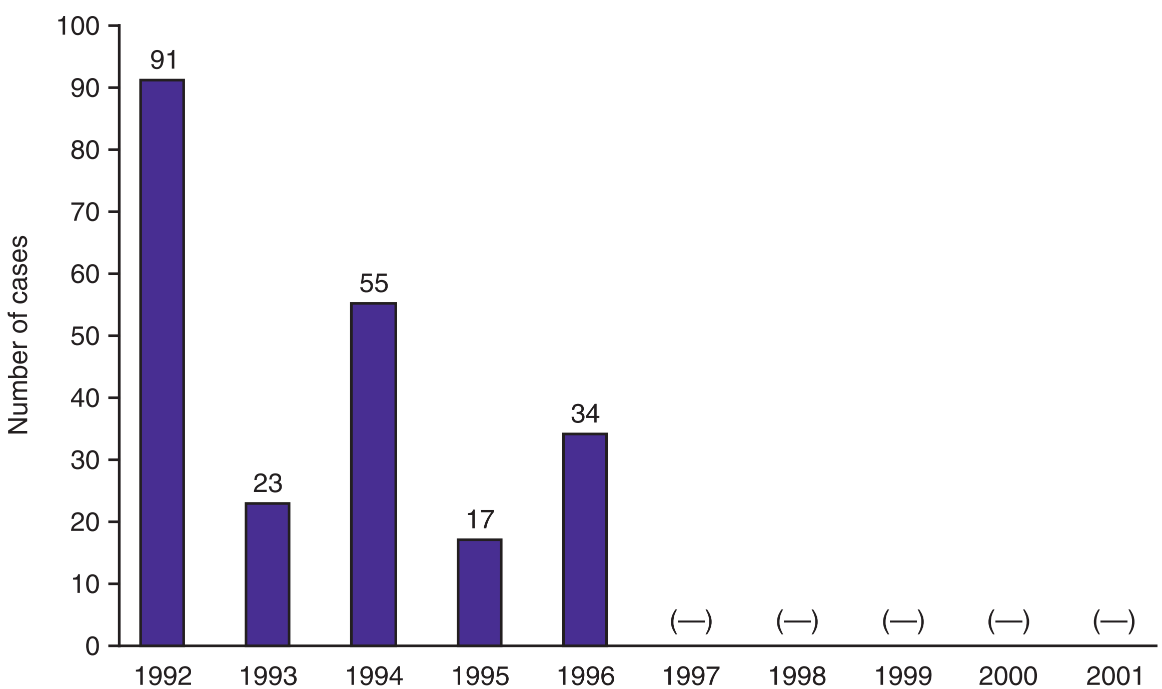
Figure 5–10. Distribution and number of fatal occupational injuries among workers aged 17 and younger by industry, 1992–2002. During 1992–2002, young workers in agriculture, forestry, and fishing accounted for 287 or 43.3% of all fatal occupational injuries among workers aged 17 or younger. Workers in retail trade and construction had the next largest numbers of fatal injuries among young workers (127 fatal injuries [or 19.2%] and 107 fatal injuries [or 16.1%], respectively). (*Note:* Dash in parentheses indicates that no data were reported or that data do not meet BLS publication criteria.) ***(Source: BLS [2003d].)***



Event or Exposure

How did fatal occupational injuries differ by event or exposure among young workers during 1992–2002?

Figure 5–11. Distribution and number of fatal occupational injuries among workers aged 17 and younger by event or exposure, 1992–2002. Transportation incidents accounted for 45.4% (320) of fatal occupational injuries among youths. These incidents are further described by the smaller pie chart, which shows incidents on highways, farms, and industrial premises accounting for more than 74% of all transportation incidents among youths. Overall, assaults and violent acts accounted for 126 or 17.8% of all fatal occupational injuries among youths. ***(Source: BLS [2003d].)***



Nonfatal Injuries and Illnesses

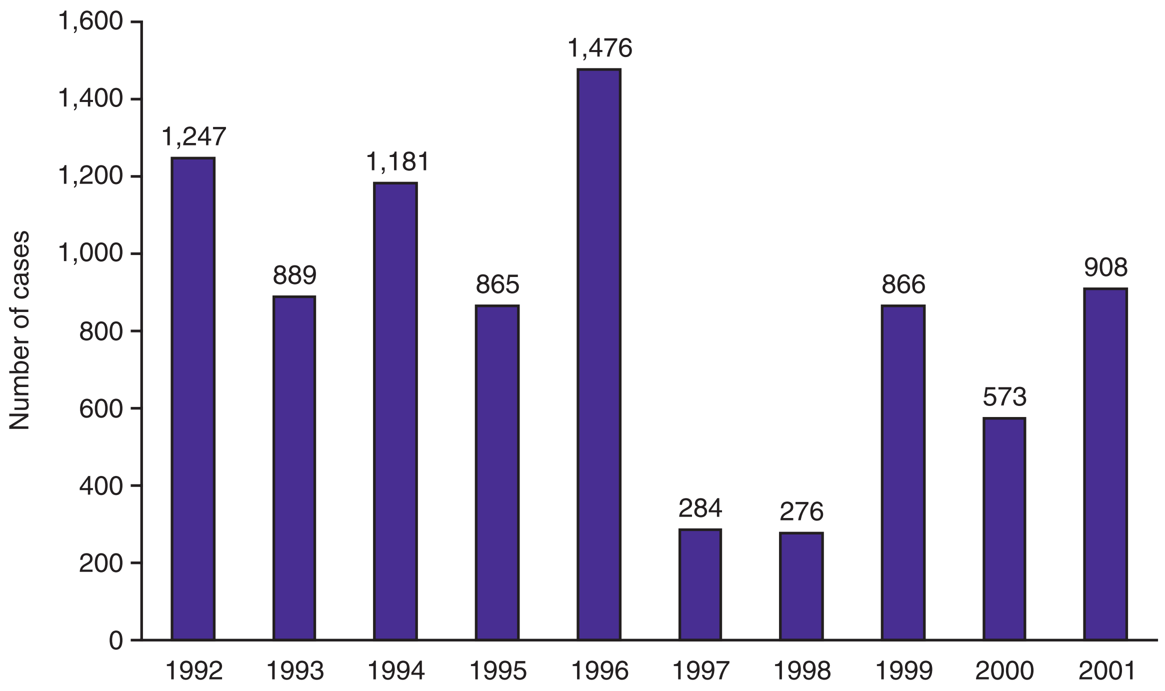
Magnitude and Trend

How did nonfatal occupational injuries and illnesses involving days away from work change among workers under age 14 during 1992–2001?

Figure 5–12. Number of nonfatal occupational injuries and illnesses among workers under age 14 involving days away from work in private industry, 1992–2001. Reported cases of nonfatal occupational injury and illness involving days away from work are very rare among workers younger than 14. No cases are reported by BLS for 1997–2001, and relatively few cases are reported for 1992–1996. The highest estimated count of 91 cases was reported in 1992 (compared with an estimated 2.3 million for all age groups). (*Note:* Dash in parentheses indicates that no data were reported or that data do not meet BLS publication criteria.) ***(Sources: BLS [2003b,c].)***

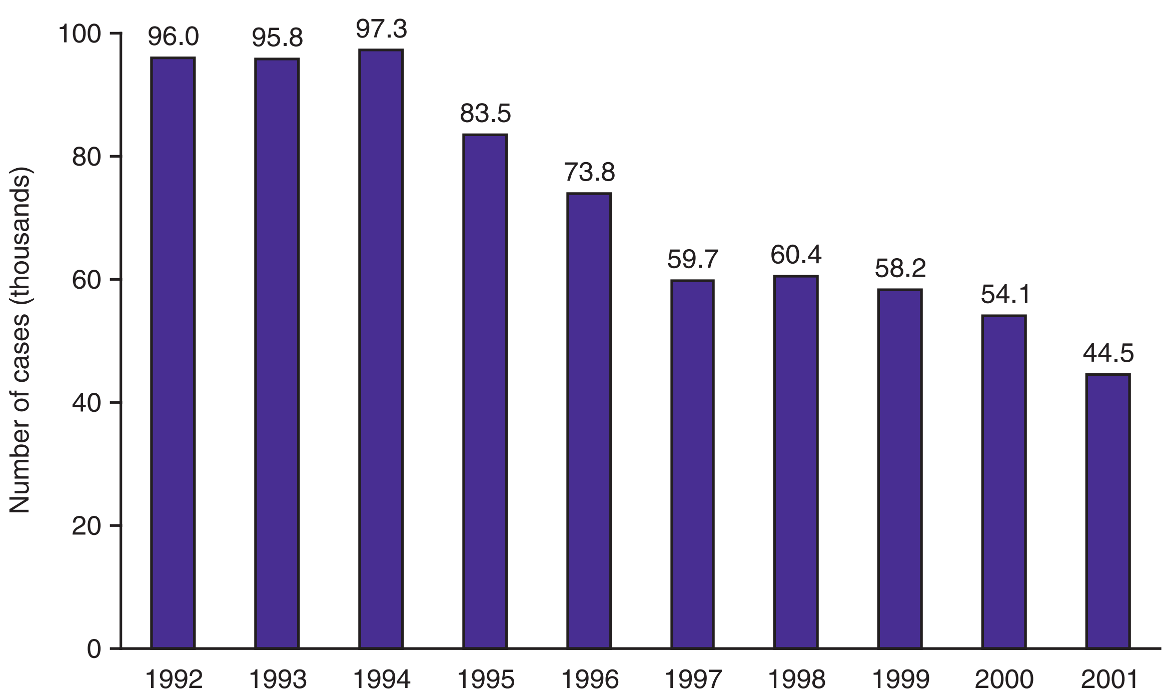
How did nonfatal occupational injuries and illnesses involving days away from work change among workers aged 14–15 during 1992–2001?

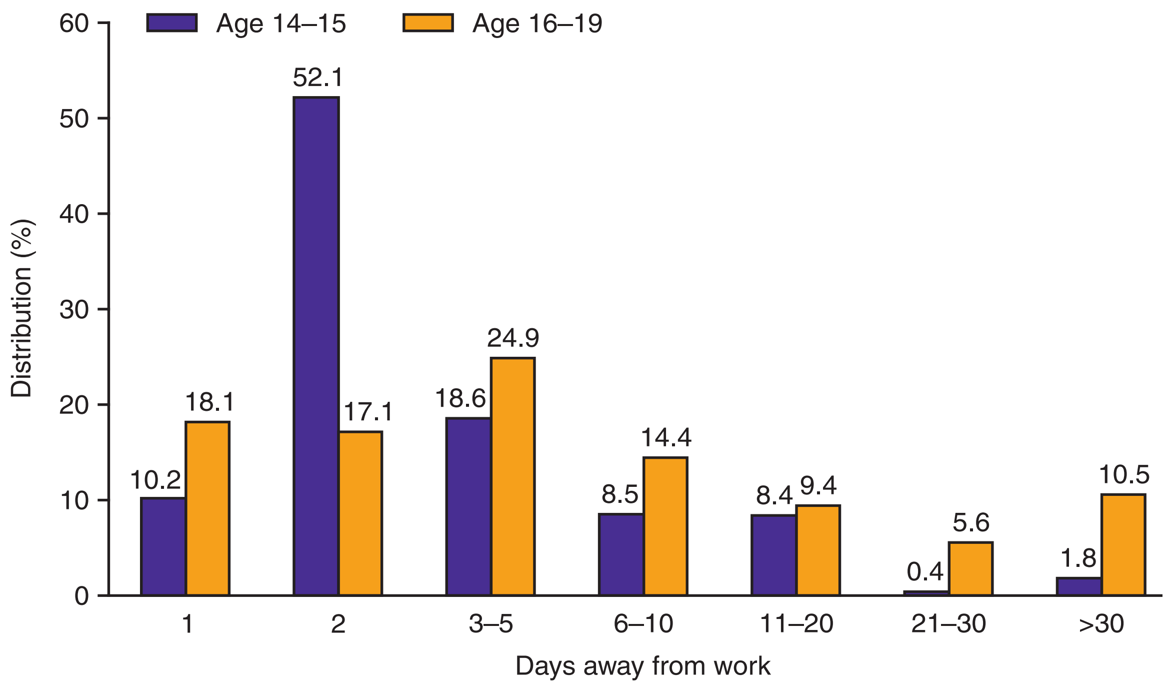
Figure 5–13. Number of nonfatal occupational injuries and illnesses involving days away from work among workers aged 14–15 in private industry, 1992–2001. Among workers aged 14–15, reported cases of nonfatal occupational injury and illness involving days away from work ranged from 1,476 in 1996 to 276 in 1998. ***(Sources: BLS [2003b,c].)***



How did nonfatal occupational injuries and illnesses involving days away from work change among workers aged 16–19 during 1992–2001?

Figure 5–14. Number of nonfatal occupational injuries and illnesses involving days away from work among workers aged 16–19 in private industry, 1992–2001. Among workers aged 16–19, reported cases of nonfatal occupational injury and illness involving days away from work ranged from 97,262 in 1994 to 44,535 in 2001. Overall, this age group accounts for 2.9% of all reported cases of nonfatal occupational injury and illness. Data for 1992–2001 show a consistently decreasing trend in reported cases. ***(Sources: BLS [2003b,c].)***

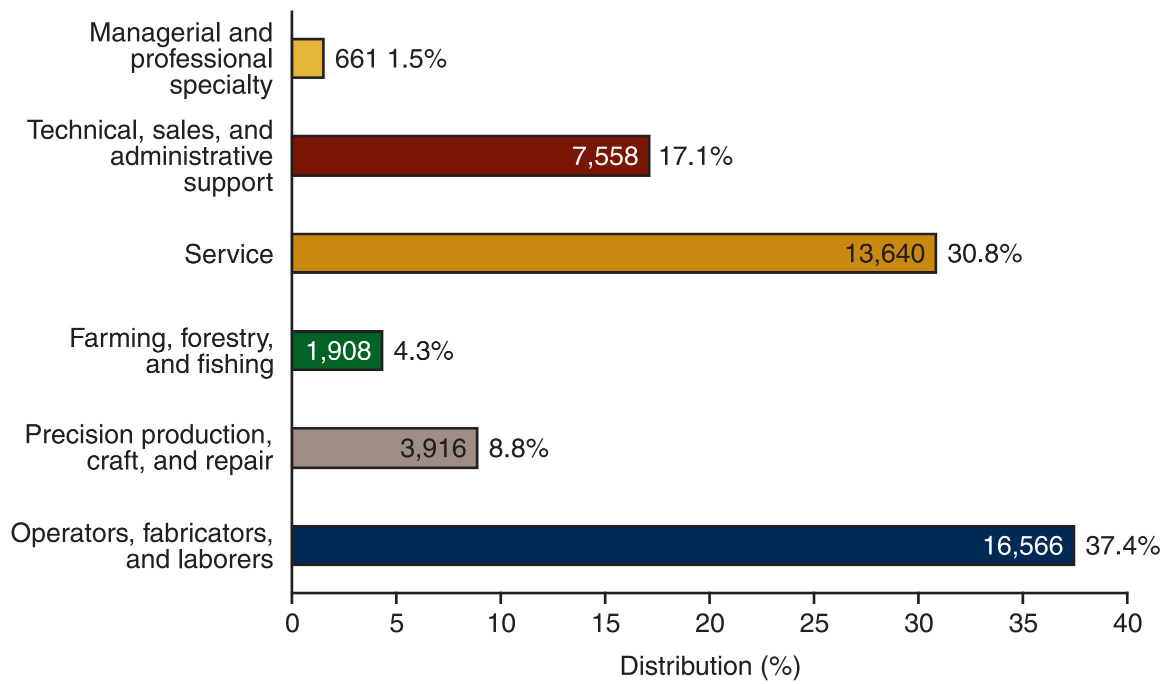




Severity

How did nonfatal occupational injuries and illnesses involving days away from work vary by severity of work loss for young workers in 2001?

Figure 5–15. Distribution of nonfatal occupational injuries and illnesses involving days away from work among workers aged 14–15 and 16–19 in private industry by number of days away from work, 2001. Young workers tended to experience more short-term than long-term work loss. For workers aged 14–15, 62.3% of the cases had a work loss of 1 or 2 days. For workers aged 16–19, 60.1% of the cases involved work loss of 5 days or less. Workers aged 14–15 had a median loss of 2 days, and workers aged 16–19 had a median loss of 4 days. Overall, private sector workers had a median of 6 days away from work. ***(Sources: BLS [2003b,c].)***



Occupation

How did nonfatal occupational injuries and illnesses involving days away from work differ by major occupational group among young workers in 2001?

Figure 5–16. Distribution and number of occupational injuries and illnesses involving days away from work among workers aged 16–19 in private industry by occupation, 2001. BLS estimates that 44,249 cases of occupational injury and illness involving days away from work occurred among workers aged 16–19 during 2001. The highest proportions of these cases occurred in operators, fabricators, and laborers (37.4% or 16,566 cases) and service (30.8% or 13,640). ***(Sources: BLS [2003b,c].)***

Industry

How did nonfatal occupational injuries and illnesses involving days away from work differ by industry among young workers in 2001?

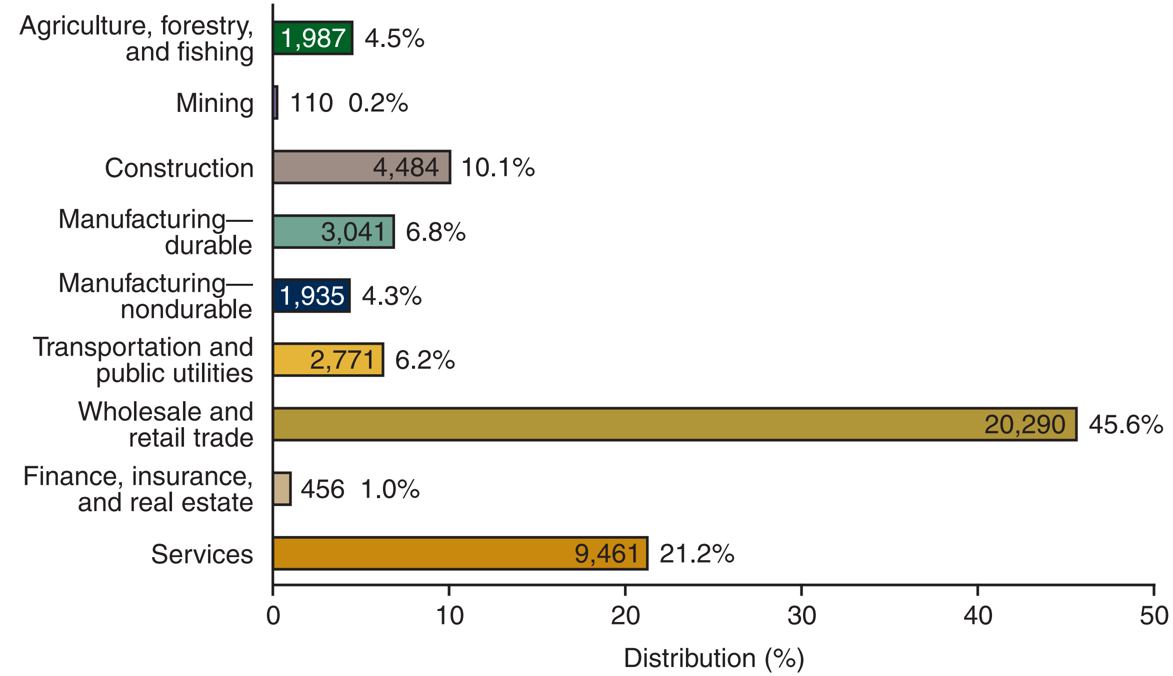


Figure 5–17. Distribution and number of nonfatal occupational injuries and illnesses involving days away from work among workers aged 16–19 in private industry by industry, 2001. Wholesale and retail trade and services accounted for the highest percentages (45.6% and 21.2%, respectively) of nonfatal occupational injuries and illnesses among workers aged 16–19. ***(Sources: BLS [2003b,c].)***

Case-Based Reporting of Work-Related Injuries to Adolescents in Massachusetts (SENSOR)

Work is part of life for millions of adolescents throughout the United States. Working adolescents are exposed to a variety of health hazards at work, and many are injured at work each year. Employment data for working youths under age 16 are not published routinely. A recent Department of Labor report estimates that 2.9 million youths aged 15–17 worked during school years, and 4 million worked during the summer months [DOL 2000].

The Massachusetts Occupational Health Surveillance Program has been conducting surveillance of occupational injuries to adolescents since 1992. The program collects data about occupational injuries to youths under age 18. The Massachusetts public health code mandates that physicians and hospitals report cases of occupational injuries among adolescents. These data are used for surveillance and prevention purposes. Workers' compensation claims and hospital emergency room data are also used to identify cases. Cases identified through workers' compensation claims are limited to injuries resulting in 5 or more lost workdays. Not all emergency rooms report injuries to the surveillance program (14 hospitals report regularly). The actual number of occupational injuries requiring medical treatment of an adolescent worker is believed to be much higher than the number reported by the Massachusetts surveillance program.

Of the 3,389 cases of injuries among young workers during 1993–1999, 2,391 cases were identified solely from workers' compensation claims (Figure 5–18). Workers aged 16 and 17 accounted for 30.0% and 58.3%, respectively, of occupational injuries among adolescents. Male workers accounted for 62.5% of the adolescents injured (Figure 5–19). Most cases identified through emergency department reports involved cuts, lacerations, and punctures (46.8%), followed by heat burns and scalds (14.0%). These data contrast with the data for workers' compensation claims, which report that the majority of cases involved strains and sprains (35.5%), followed by cuts, lacerations, and punctures (23.8%) (Figure 5–20). The largest numbers of occupational injury cases identified among young workers in Massachusetts through workers' compensation claims occurred in restaurants (25.6%), grocery stores (15.0%), retail bakeries (6.7%), and nursing homes (5.8%) (Figure 5–21).

Data Sources

What data sources were used in Massachusetts for the surveillance of occupational injuries among young workers during 1993–1999?

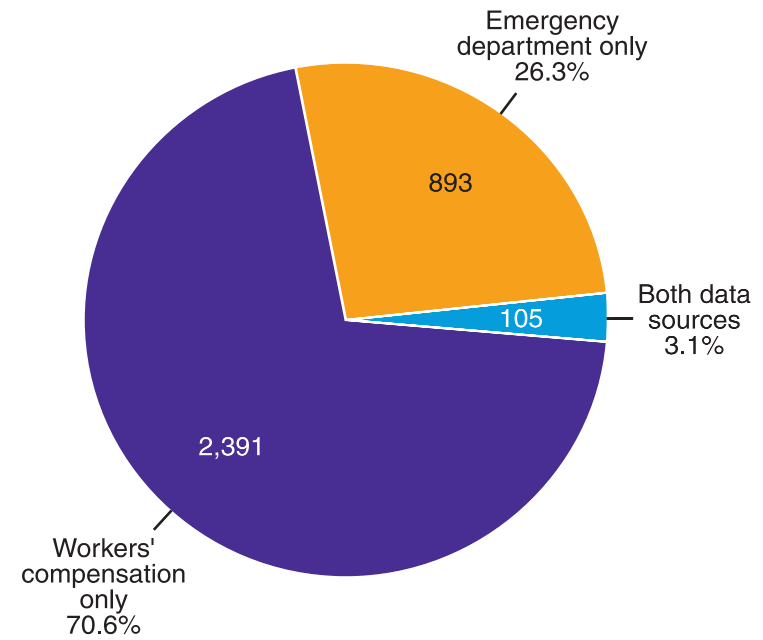


Figure 5–18. Occupational injuries among young workers in Massachusetts by data source, 1993–1999. Cases are identified from two sources—workers' compensation claims resulting in 5 or more lost workdays and reports from emergency departments. Of the 3,389 cases identified, 2,391 were identified solely from workers' compensation claims. ***(Source: Davis [2002].)***

Age and Sex

How did occupational injuries differ by age and sex among young workers in Massachusetts during 1993–1999?

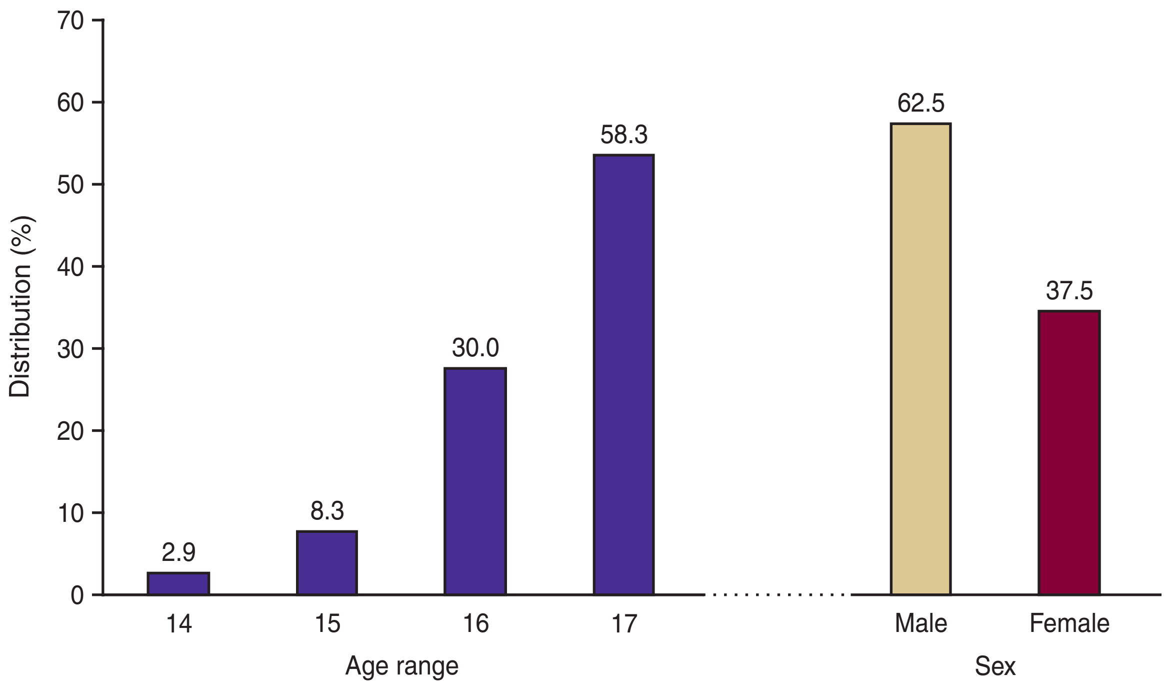
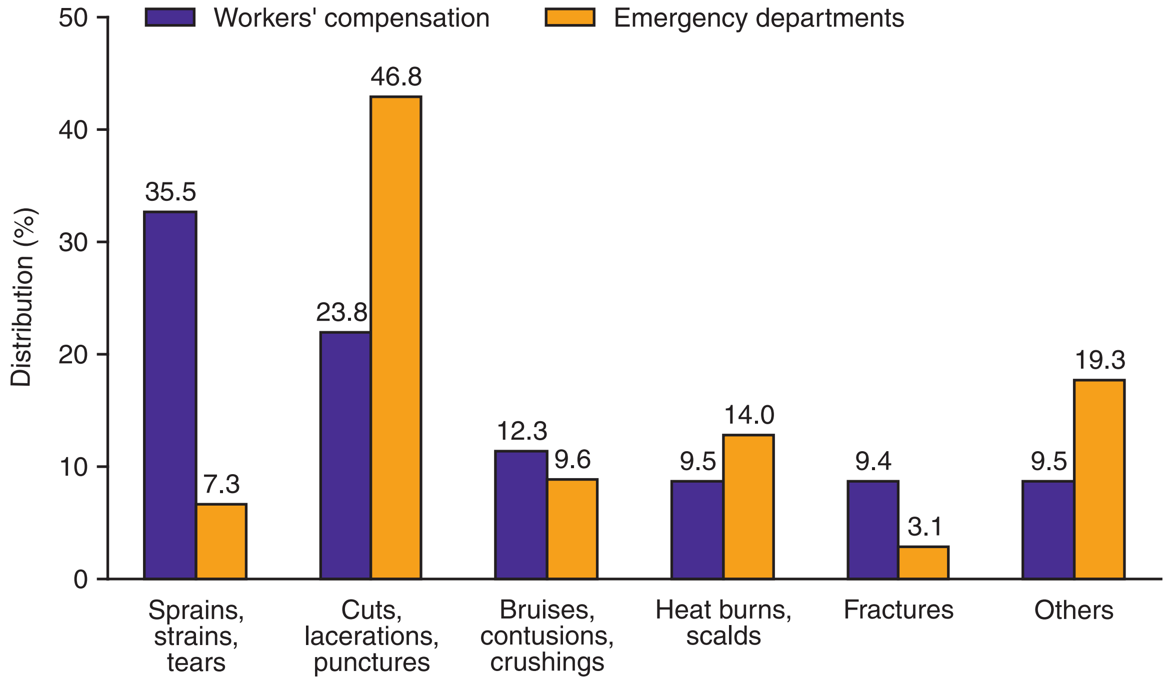


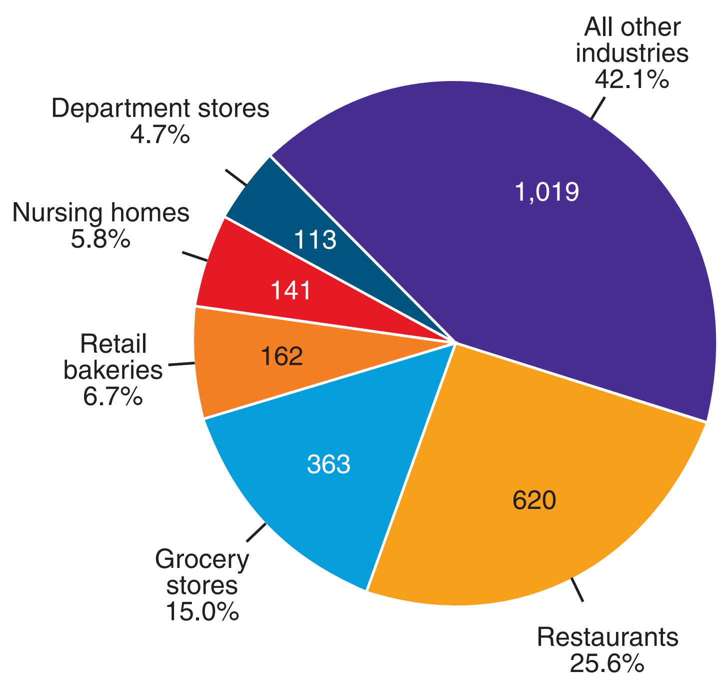
Figure 5–19. Occupational injuries among young workers in Massachusetts by age and sex, 1993–1999. Workers aged 16 accounted for 30.0% of occupational injuries among adolescents, and workers aged 17 accounted for 58.3%. Male workers accounted for 62.5% of the adolescents injured. ***(Source: Davis [2002].)***



Type of Injury

How did occupational injuries differ by type of injury among young workers in Massachusetts during 1993–1999?

Figure 5–20. Occupational injuries among young workers aged 14–17 in Massachusetts by injury type and data source, 1993–1999. Of the 945 cases of occupational injury among young workers in Massachusetts who were identified through emergency department reports, the majority involved cuts, lacerations, and punctures (46.8%), followed by heat burns and scalds (14.0%). These data contrast with the data for workers' compensation claims, which report that most cases involved strains and sprains (35.5%), followed by cuts, lacerations, and punctures (23.8%). ***(Source: Davis [2002].)***



Industry

How did occupational injuries differ by private industry sector among young workers in Massachusetts during 1993–1999?

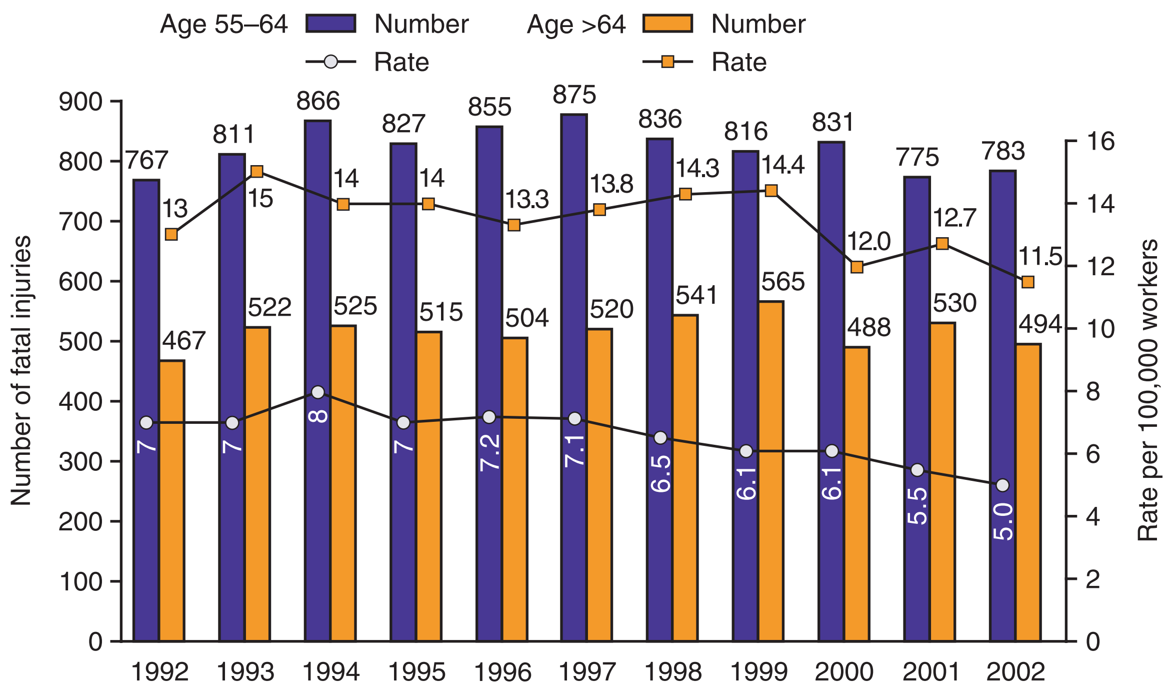
Figure 5–21. Occupational injuries identified by workers' compensation data among young workers aged 14–17 in Massachusetts by selected industry, 1993–1999. The largest numbers of occupational injury cases identified among young workers in Massachusetts through workers' compensation claims occurred in restaurants (25.6%), grocery stores (15.0%), retail bakeries (6.7%), and nursing homes (5.8%). ***(Source: Davis [2002].)***

Older Workers

As the U.S. labor force grows, it becomes markedly older. As illustrated in Chapter 1, the age distribution of the labor force is shifting. Employment data for 2001 show that workers aged 55 and older represented 22.9% of the workers employed in agriculture versus 10%–15% in the other major industry sectors [BLS 2001]. By 2010, middle-aged and older workers will outnumber younger workers (see Figure 1–1). For the year 2010, BLS projects employment of 21.2 million workers aged 55–64 (compared with 13.9 million in 2000) and 5.4 million workers aged 65 and older (compared with 4.2 million in 2000) (see Figure 1–1). Older workers are known to experience high rates of traumatic fatalities and are also more susceptible to chronic disease and related conditions.

BLS reported that the number of fatal injuries during 1992–2002 ranged from 767 in 1992 to 875 in 1997 for workers aged 55–64, and from 467 in 1992 to 565 in 1999 for workers aged 65 and older. Rates varied from 8 per 100,000 workers in 1994 to 5 per 100,000 workers aged 55–64 in 2002. For workers aged 65 and older, rates declined from 15 per 100,000 workers in 1993 to 11.5 in 2002 (Figure 5–22). Most fatalities (94% during the 11-year period) occurred among male workers (Figure 5–23), and white, non-Hispanic workers (82.1% among workers aged 55 and older) (Figure 5–24). During 1992–2002, slightly more than half of all fatal occupational injuries among workers aged 55 and older occurred among operators, fabricators, and laborers (4,075 or 28.0%) and workers in farming, forestry, and fishing (3,880 or 26.7%) (Figure 5–25). The agriculture, forestry, and fishing industry experienced the largest share of fatal occupational injuries (3,629 or 27.1%) (Figure 5–26). Transportation incidents accounted for 6,737 or 45.8% of fatal occupational injuries among workers aged 55 and older during 1992–2002 (Figure 5–27). Among transportation incidents, highway, nonhighway (farm and industrial), and being struck by vehicle or mobile equipment were principal sources of fatal occupational injuries (Figure 5–27).

BLS reports from employers show that cases of nonfatal occupational injury and illness involving days away from work among workers aged 55 and older ranged from 148,249 cases in 1993 to 126,494 cases in 1996 (Figure 5–28). The number of cases in 2001 (135,690 cases) is consistent with a slight increase in reported cases since 1996. Older workers experience more severe injuries as measured by the median number of days away from work. Workers aged 55–64 had a median of 10 days away from work, and those aged 65 and older had a median of 14 days. Overall, private sector workers had a median of 6 days away from work (Figure 5–29). During 2001, the highest proportions of cases occurred among operators, fabricators, and laborers for workers aged 55–64 (34.8% or 47,095 cases) and 65 and older (31.5% or 7,704 cases) (Figure 5–30). Services, manufacturing (durable), and wholesale and retail trade together account for 67% of all nonfatal occupational injuries and illnesses involving days away from work among workers aged 55–64. The same industry sectors predominated for workers aged 65 and older, accounting for nearly 75% of all cases (Figure 5–31).

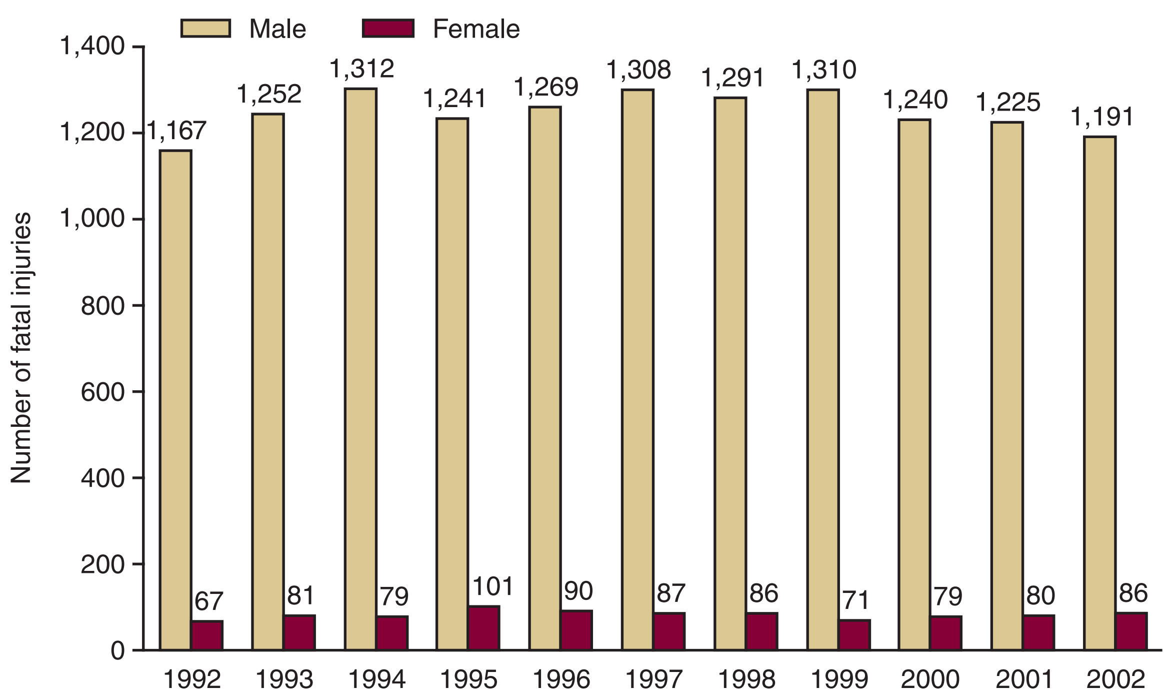


Fatal Injuries

Magnitude and Trend

How did the numbers and rates of fatal occupational injuries change among older workers during 1992–2002?

Figure 5–22. Numbers and rates of fatal occupational injuries among workers aged 55–64 and older, 1992–2002. Rates of fatal occupational injuries among older workers declined during 1992–2002. For workers aged 55–64, rates varied from 8 per 100,000 workers in 1994 to 5 in 2002. The number of fatal occupational injuries ranged from 767 in 1992 to 875 in 1997. For workers aged 65 and older, rates declined from 15 per 100,000 workers in 1993 to 11.5 in 2002. The number of fatal occupational injuries in this group ranged from 467 in 1992 to 565 in 1999. (*Note:* BLS rounded rates to whole numbers for 1992–1995.) ***(Source: BLS [2003d].)***



Sex

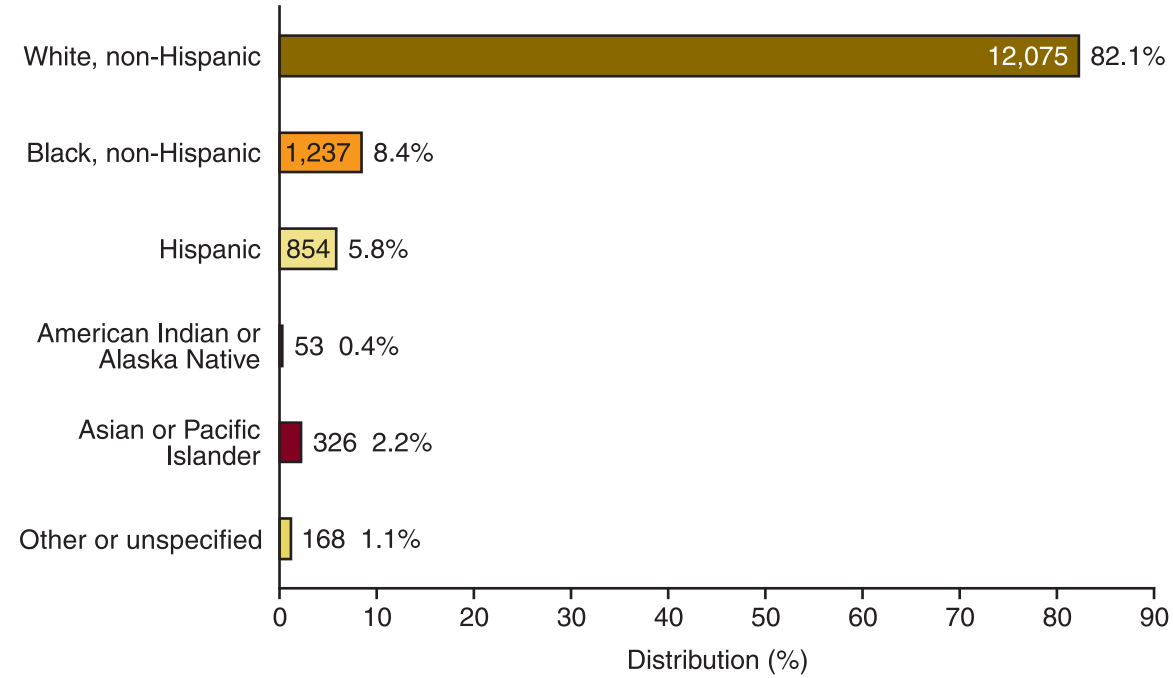
How did fatal occupational injuries vary by sex of worker among workers aged 55 and older during 1992–2002?

Figure 5–23. Number of fatal occupational injuries among workers aged 55 and older by sex, 1992–2002. Male workers accounted for most fatal occupational injuries among older workers (94% during the 11-year period). From year to year, small differences occur in the number of fatal injuries among women, ranging from 67 in 1992 to 101 in 1995. ***(Source: BLS [2003d].)***

Race/Ethnicity

How did fatal occupational injuries vary by race/ethnicity among workers aged 55 and older during 1992–2002?

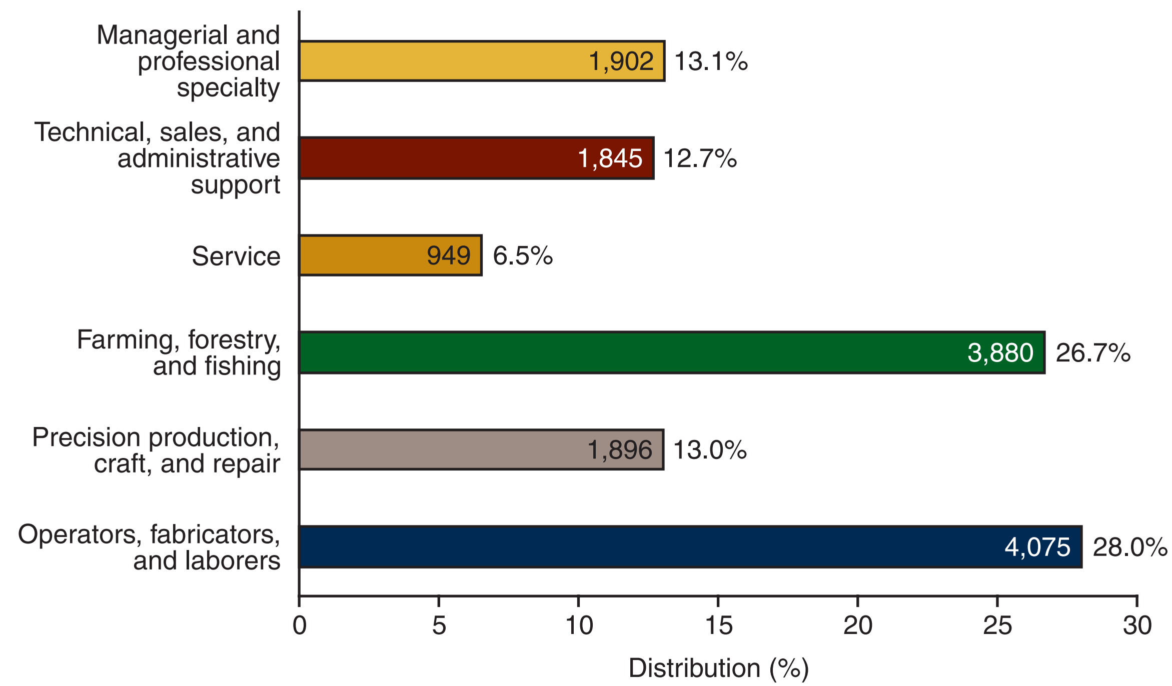
Figure 5–24. Distribution and number of fatal occupational injuries among workers aged 55 and older by race/ethnicity, 1992–2002. White, non-Hispanic workers accounted for 12,075 or 82.1% of fatal occupational injuries among workers aged 55 and older. Black, non-Hispanic workers in this age group accounted for 1,237 fatal occupational injuries or 8.4% of the total. Hispanic workers suffered 854 fatal occupational injuries or 5.8%. *(Source: BLS [2003d].)*

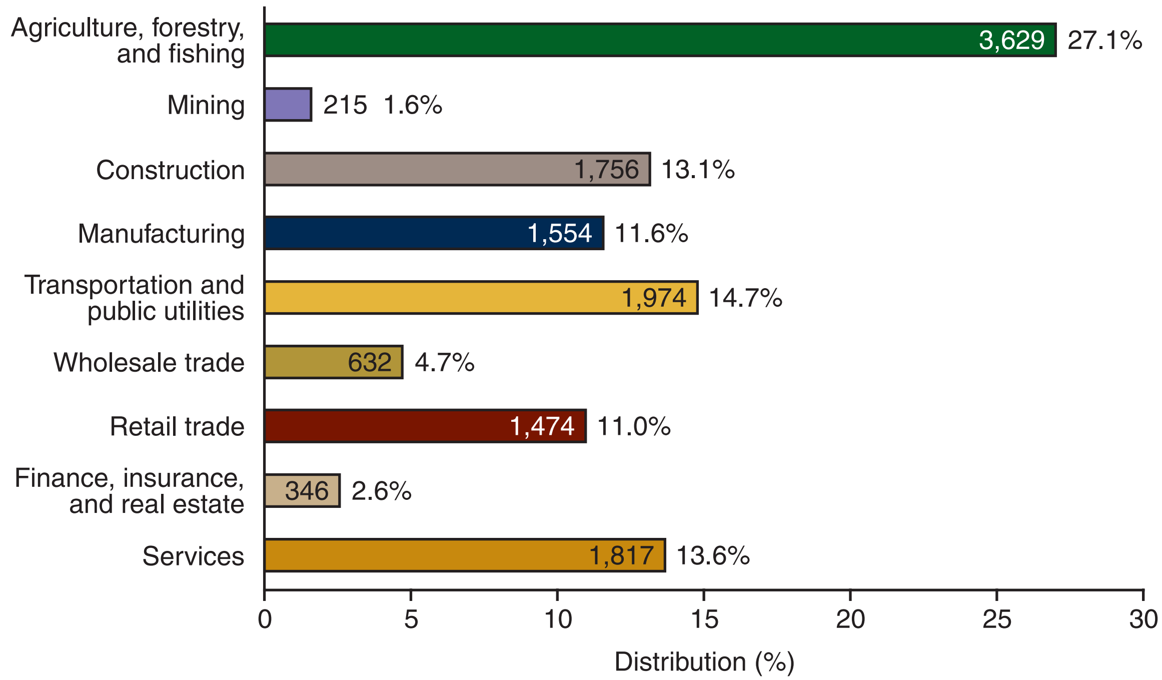


Occupation

How did fatal occupational injuries differ by major occupational group among workers aged 55 and older during 1992–2002?

Figure 5–25. Distribution and number of fatal occupational injuries among workers aged 55 and older by occupation, 1992–2002. Two groups accounted for slightly more than half of fatal occupational injuries among workers aged 55 and older: operators, fabricators, and laborers (4,075 or 28.0%) and farming, forestry, and fishing (3,880 or 26.7%). Three occupations each accounted for approximately 13% of the fatal injuries: managerial and professional specialty; technical, sales, and administrative support; and precision production, craft, and repair. *(Source: BLS [2003d].)*

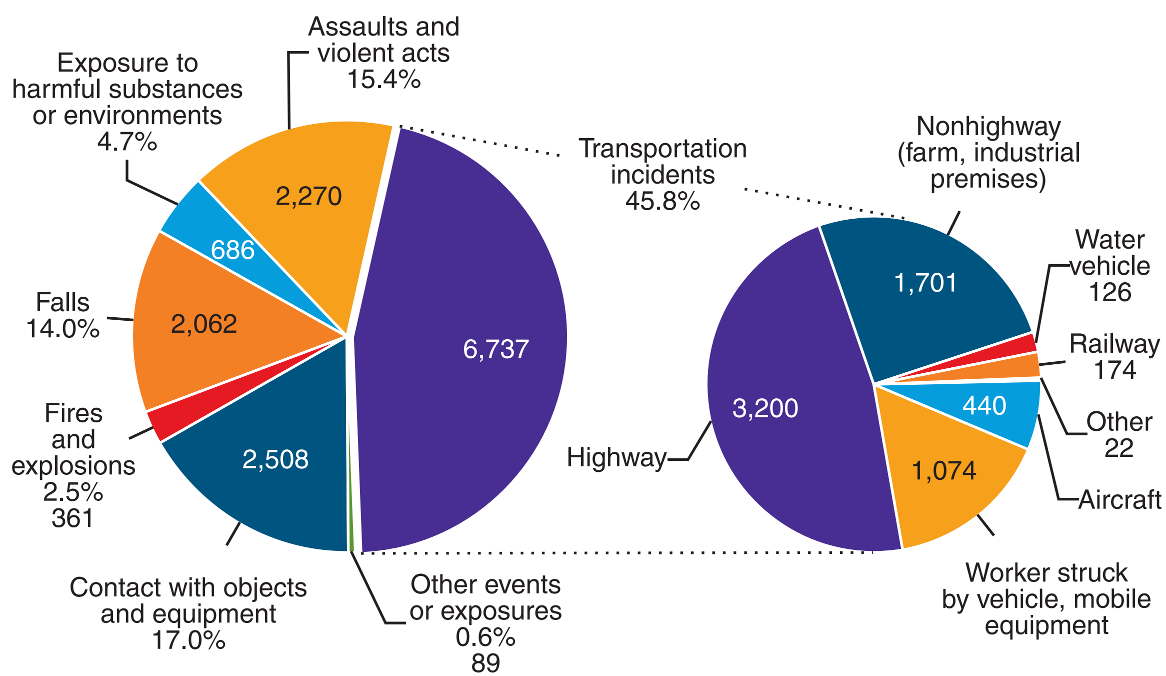




Industry

How did fatal occupational injuries differ by major private industry sector among workers aged 55 and older during 1992–2002?

Figure 5–26. Distribution and number of fatal occupational injuries among workers aged 55 and older by industry, 1992–2002. Among workers aged 55 and older, those in agriculture, forestry, and fishing experienced the largest share of fatal occupational injuries (3,629 or 27.1%) during 1992–2002. Five industries accounted for nearly 64% of these fatalities: transportation and public utilities (1,974 or 14.7%), services (1,817 or 13.6%), construction (1,756 or 13.1%), manufacturing (1,554 or 11.6%), and retail trade (1,474 or 11.0%). ***(Source: BLS [2003d].)***



Event or Exposure

How did fatal occupational injuries differ by event or exposure among workers aged 55 and older during 1992–2002?

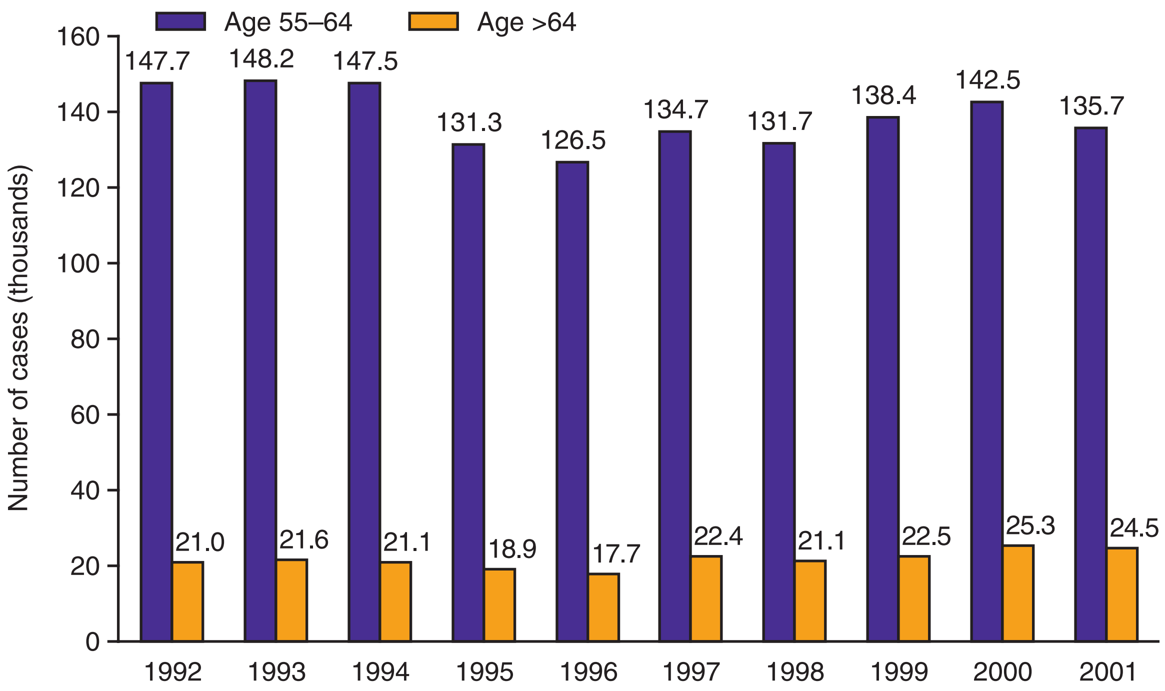
Figure 5–27. Distribution and number of fatal occupational injuries among workers aged 55 and older by event or exposure, 1992–2002. Transportation incidents (6,737 or 45.8%), contacts with objects and equipment (2,508 or 17.0%), and assaults and violent acts (2,270 or 15.4%) were major types of fatal occupational injuries during this 11-year period. Among the transportation incidents, highway (3,200), nonhighway (farm and industrial) (1,701), and being struck by a vehicle or mobile equipment (1,074) were principal sources of fatal occupational injuries. ***(Source: BLS [2003d].)***

Nonfatal Injuries and Illnesses

Magnitude and Trend

How did nonfatal occupational injuries and illnesses involving days away from work change among workers aged 55 and older during 1992–2001?

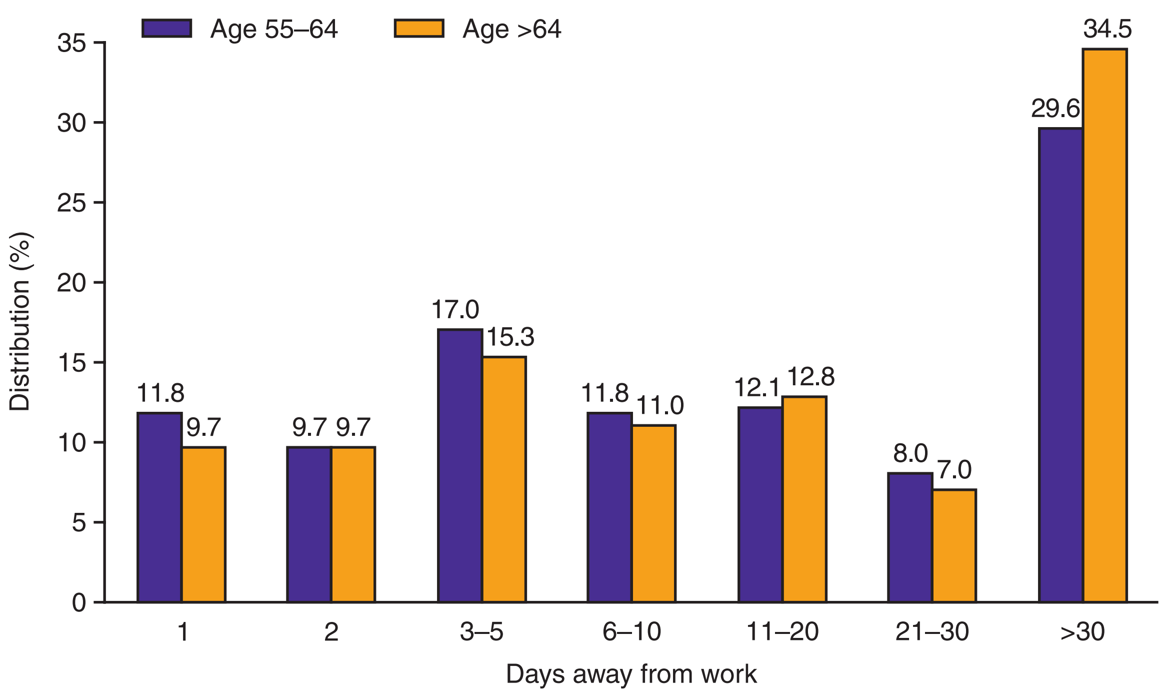
Figure 5–28. Number of nonfatal occupational injuries and illnesses involving days away from work among workers aged 55 and older in private industry, 1992–2001. Recorded cases of nonfatal occupational injury and illness involving days away from work among workers aged 55 and over ranged from 148,249 cases in 1993 to 126,494 cases in 1996. The number of cases in 2001 (135,690 cases) is consistent with a slight increase in reported cases since 1996. Data for workers aged 65 and older show a similar pattern (a decrease in the first half of the decade followed by an increase in the second half), with numbers ranging from 17,664 in 1996 to 25,334 in 2000. ***(Sources: BLS [2003b,c].)***

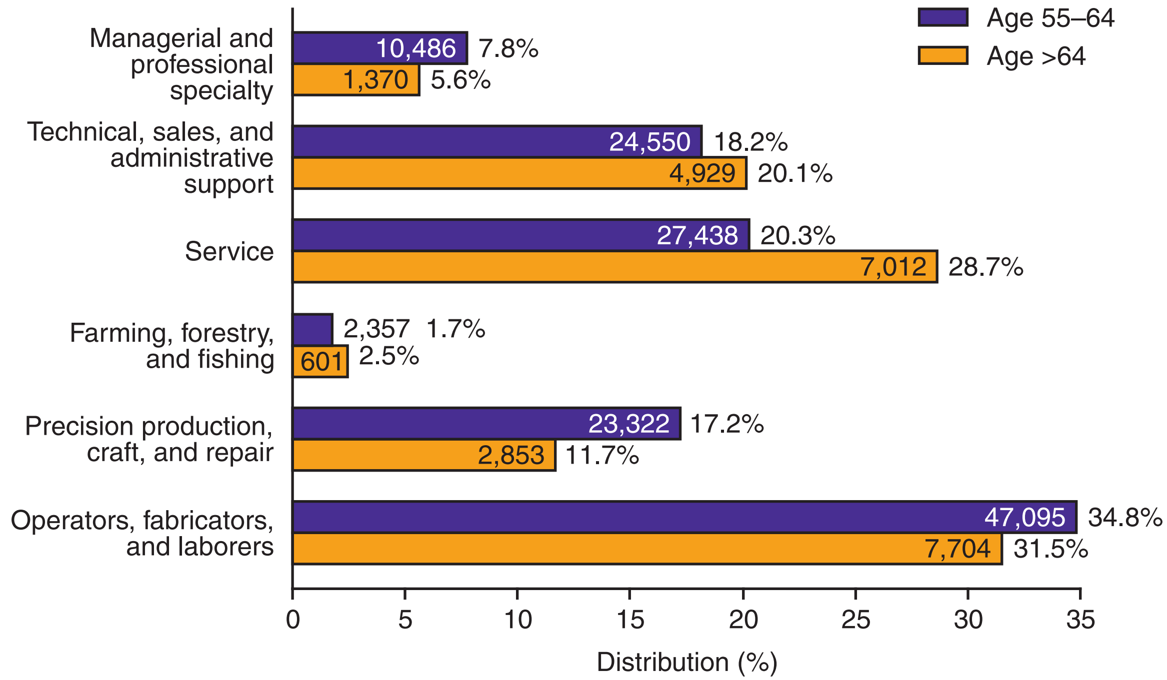


Severity

How did nonfatal occupational injuries and illnesses involving days away from work vary by severity for workers aged 55 and older in 2001?

Figure 5–29. Distribution of nonfatal occupational injuries and illnesses involving days away from work among workers aged 55 and older in private industry by days away from work, 2001. Workers aged 65 and older tended to experience lower percentages of short-term work loss (1 and 3–5 days) and a substantially higher percentage of long-term work losses of 31 days or more (29.6% for workers aged 55–64, and 34.5% for those aged 65 and older). Workers aged 55–64 had a median loss of 10 days away from work, and those aged 65 and older had a median of 14 days. Overall, private sectors workers had a median of 6 days away from work. ***(Sources: BLS [2003b,c].)***

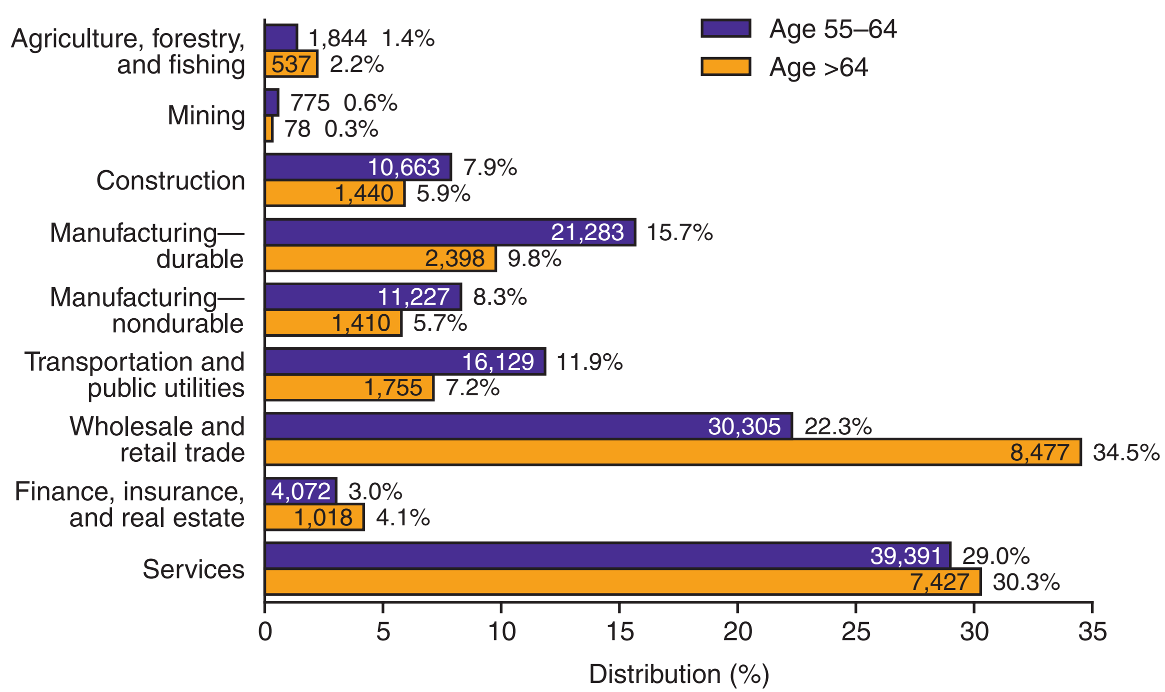




Occupation

How did nonfatal occupational injuries and illnesses differ by major occupational group among workers aged 55 and older in 2001?

Figure 5–30. Distribution and number of nonfatal occupational injuries and illnesses involving days away from work among workers aged 55 and older in private industry by occupation, 2001. The distribution of cases by occupation for workers aged 55 and older shows the highest proportions of cases among operators, fabricators, and laborers aged 55–64 (34.8% or 47,095 cases) and those aged 65 and older (31.5% or 7,704 cases). Service has the next highest proportions of cases for workers aged 55–64 (20.3% or 27,438 cases) and those aged 65 and older (28.7% or 7,012 cases). ***(Sources: BLS [2003b,c].)***



Industry

How did nonfatal occupational injuries and illnesses involving days away from work vary by major private industry sector among workers aged 55 and older in 2001?

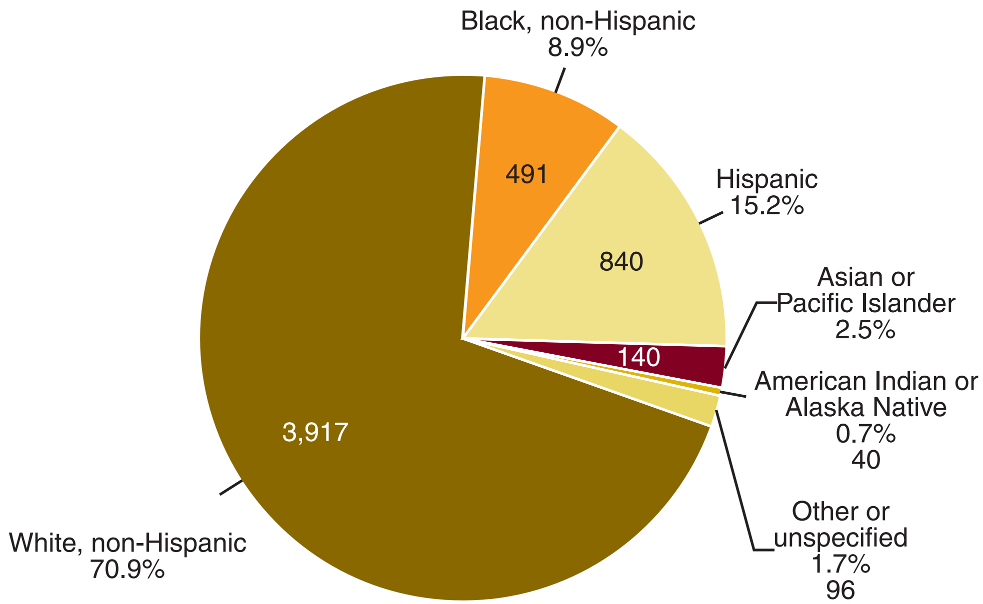
Figure 5–31. Distribution and number of nonfatal occupational injuries and illnesses involving days away from work among workers aged 55 and older by major private industry sector, 2001. Services, manufacturing (durable), and wholesale and retail trade together account for 67% of all nonfatal occupational injuries and illnesses involving days away from work among workers aged 55–64. The same industry sectors predominate for workers aged 65 and older, accounting for nearly 75% of all cases. ***(Sources: BLS [2003b,c].)***

Hispanic Workers

As the U.S. labor force grows, the number and proportion of Hispanic workers increase. Hispanic workers accounted for 10.9% of the 135 million workers employed in 2001 (Tables 1–3 and 1–4). But BLS projects that by 2010, the Hispanic labor force will number 30.3 million—up from 22.4 million in 2000. This figure represents a 3.1% annual growth rate. In 2001, Hispanic workers exceeded 10.9% of those employed in four occupational groups (service occupations, 16.3%; precision production, craft, and repair, 14.7%; operators, fabricators, and laborers, 17.7%; and farming, forestry, and fishing, 21.5%) and in two industries (agriculture, 20.3%; and construction, 15.8%) (Tables 1–3 and 1–4). Limited data are available on occupational injury and disease risks among Hispanic workers.

During 1992–2002, BLS reported that the number of fatal injuries ranged from 533 to 895 among Hispanic workers. Rates varied from 5 to 6 per 100,000 employed (Figure 5–33). Most fatalities (4,239 or 55.2%) affect workers aged 25–44 (Figure 5–34) and occur among male workers (94%) (Figure 5–35). Work as operators, fabricators, and laborers accounted for the most fatalities (41.4% or 3,128 cases) (Figure 5–36). The largest proportion of fatal occupational injuries among Hispanic workers was in the construction industry (27.7% of the total, or 1,994 cases) (Figure 5–37). Transportation incidents accounted for 2,593 or 33.7% of fatal occupational injuries among Hispanic workers (Figure 5–38).

Cases of nonfatal occupational injury and illness with days away from work among Hispanic workers ranged from 198,022 in 1992 to 169,300 in 1996. When presented as a percentage of all nonfatal occupational injuries and illnesses with days away from work, the cases among Hispanic workers show a fairly consistent upward trend, from 8.5% in 1992 to 12.5% in 2001 (Figure 5–40). Hispanic workers had the highest median work loss (7 days) (Figure 5–41). Compared with white or black workers, Hispanic workers had the lowest percentages of short-term work loss (1 or 2 days) and the highest percentage of long-term work loss (31 days or more) (Figure 5–41). Among Hispanic workers, the distribution of nonfatal occupational injury and illness cases involving days away from work by occupation shows the highest proportion of cases (43.5% or 83,319 cases) among operators, fabricators, and laborers (Figure 5–42). Wholesale and retail trade and services accounted for the largest percentages of Hispanic cases (22.3% and 21.4%, respectively) (Figure 5–43).

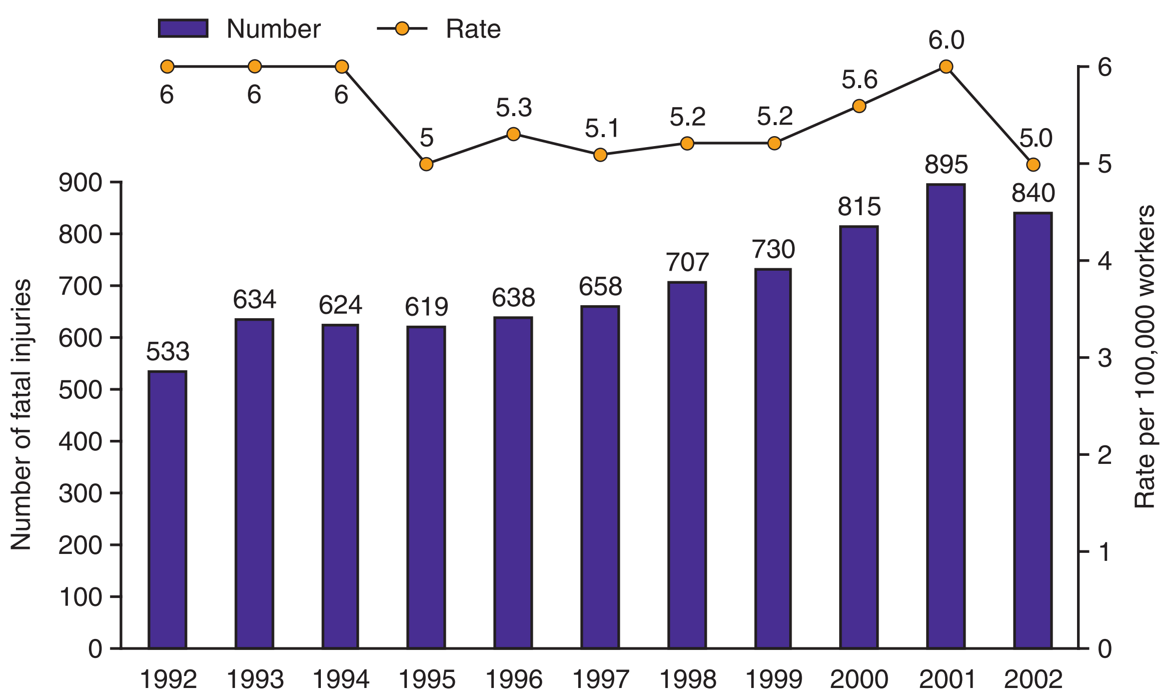


Fatal Injuries

Magnitude and Trend

How were fatal occupational injuries distributed by race/ethnicity among Hispanic and non-Hispanic workers in 2002?

Figure 5–32. Number and distribution of fatal occupational injuries by race/ethnicity among Hispanic and non-Hispanic workers, 2002. The 840 fatal occupational injuries among Hispanic workers (15.2% of the total) represented a 5.7% decrease from the 891 fatal occupational injuries reported in 2001. The 3,917 fatal injuries among white, non-Hispanic workers represented 70.9% of all fatal occupational injuries in 2002. ***(Source: BLS [2003a].)***



How did the number and rate of fatal injuries change among Hispanic workers during 1992–2002?

Figure 5–33. Number and rate of fatal occupational injuries among employed Hispanic workers, 1992–2002. During the 11-year period 1992–2002, the number of fatal occupational injuries among Hispanic workers ranged from 533 in 1992 to 895 in 2001. The fatal occupational injury rates varied from 5 to 6.0 per 100,000 employed workers during this 11-year period. (*Note:* BLS rounded rates to whole numbers for 1992–1995.) ***(Sources: BLS [2003a,d].)***

Age

How did fatal occupational injuries differ by age among Hispanic workers during 1992–2002?

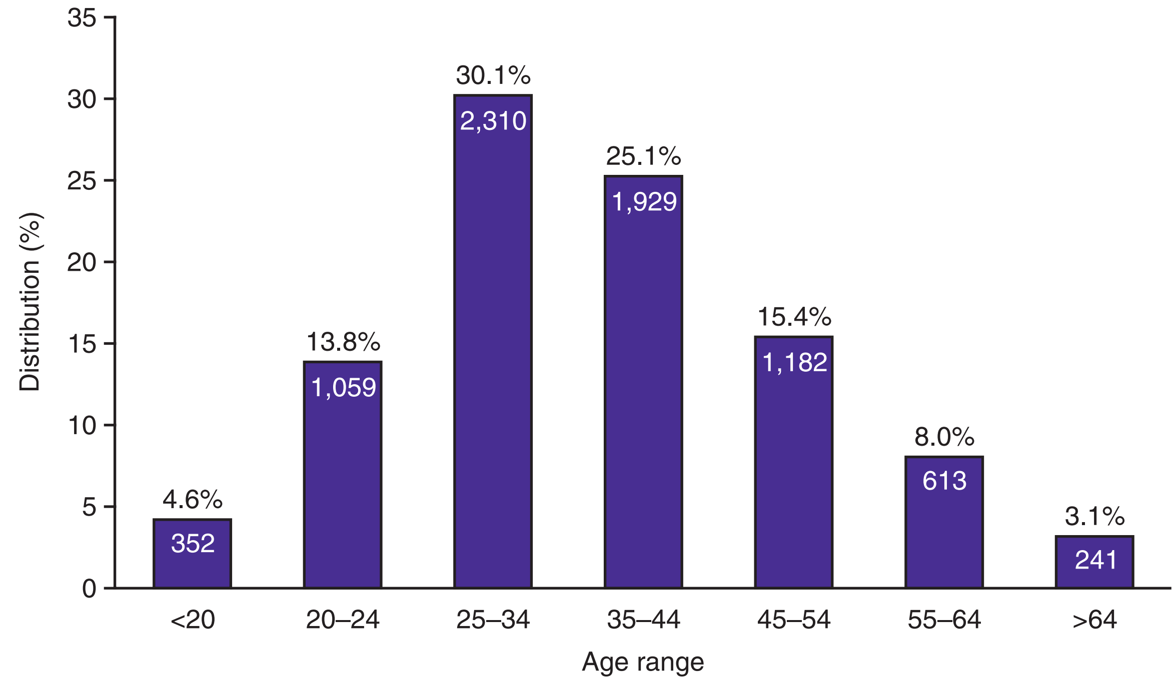


Figure 5–34. Distribution and number of fatal occupational injuries among Hispanic workers by age, 1992–2002. During 1992–2002, workers aged 25–34 had the most fatal occupational injuries (2,310 or 30.1%), followed by workers aged 35–44 (1,929 or 25.1%). ***(Source: BLS [2003d].)***

Sex

How did fatal occupational injuries differ by sex among Hispanic workers during 1992–2002?

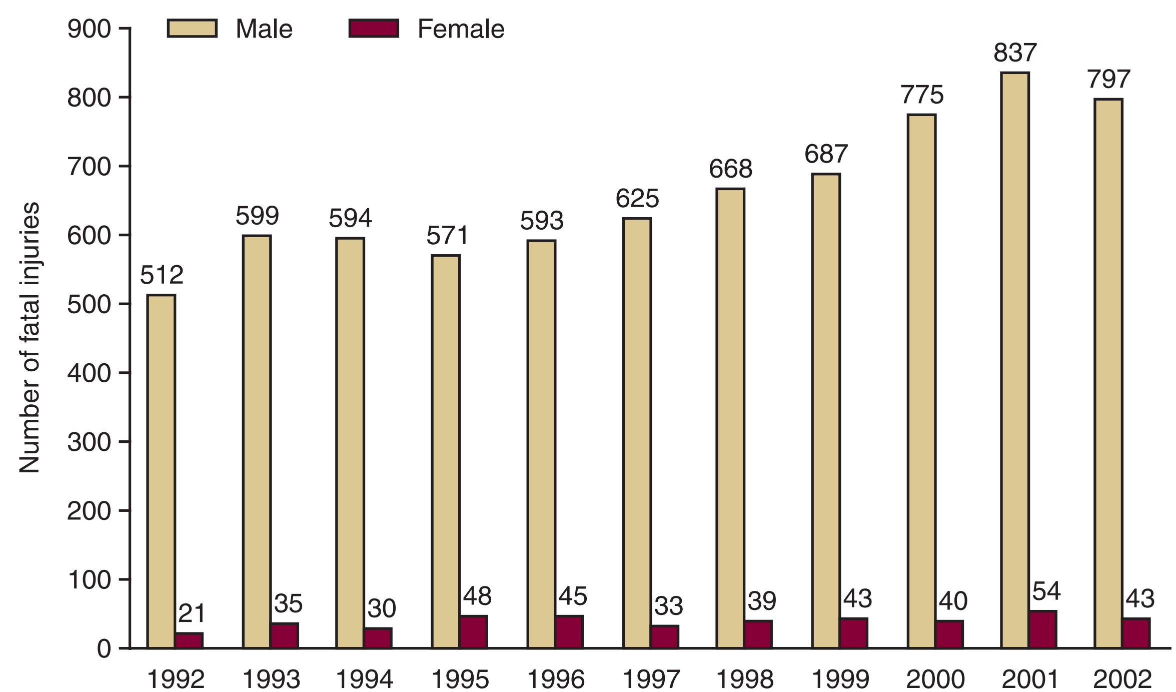


Figure 5–35. Number of fatal occupational injuries among Hispanic workers by sex, 1992–2002. In 2002, male workers accounted for about 94% of all fatal occupational injuries among Hispanic workers. During this period, fatal occupational injuries among Hispanic female workers ranged from 21 in 1992 to 54 in 2001. ***(Source: BLS [2003d].)***

Occupation

How did fatal occupational injuries differ by major occupational group among Hispanic workers during 1992–2002?

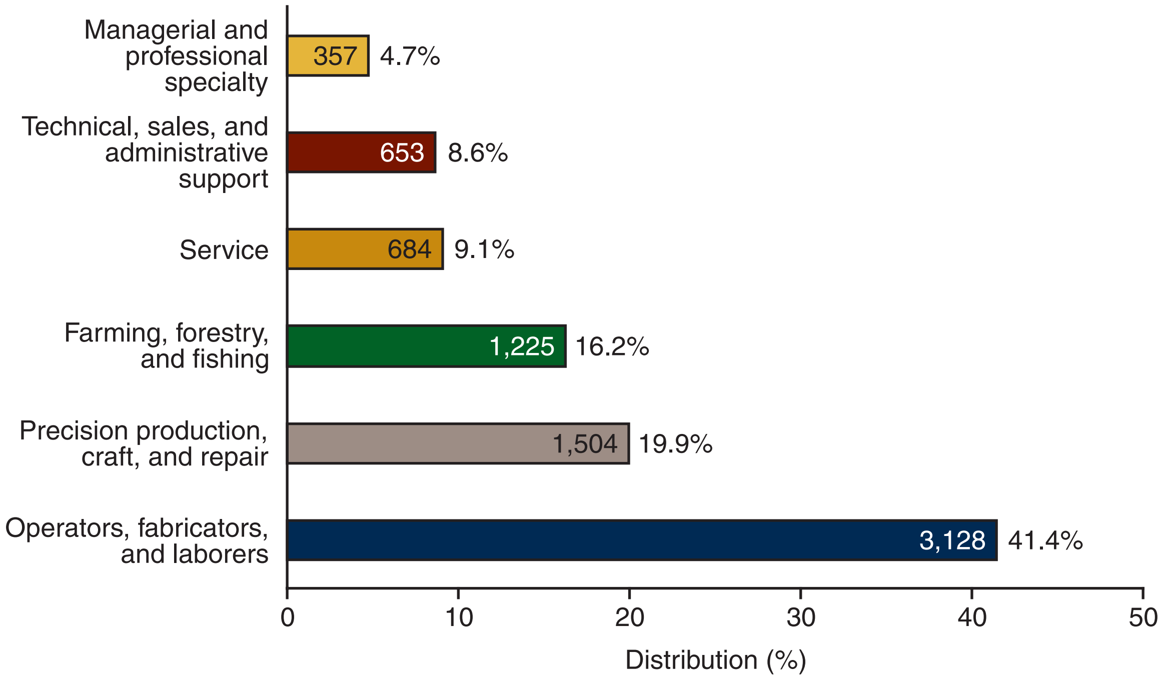


Figure 5–36. Distribution and number of fatal occupational injuries among Hispanic workers by occupation, 1992–2002. During this period, three occupational groups accounted for nearly 77% of all fatal occupational injuries among Hispanic workers: operators, fabricators, and laborers (41.4% or 3,128 cases), precision production, craft, and repair occupations (19.9% or 1,504 cases), and farming, forestry, and fishing (16.2% or 1,225 cases). ***(Source: BLS [2003d].)***

Industry

How did fatal occupational injuries differ by major private industry sector among Hispanic workers during 1992–2002?

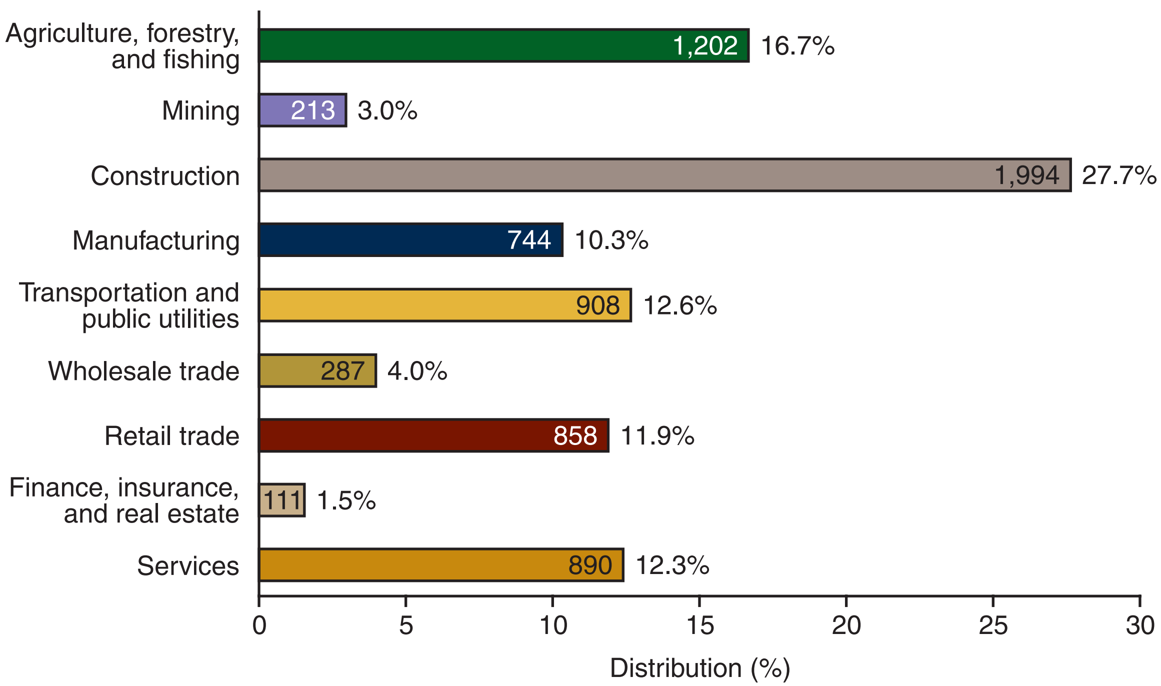
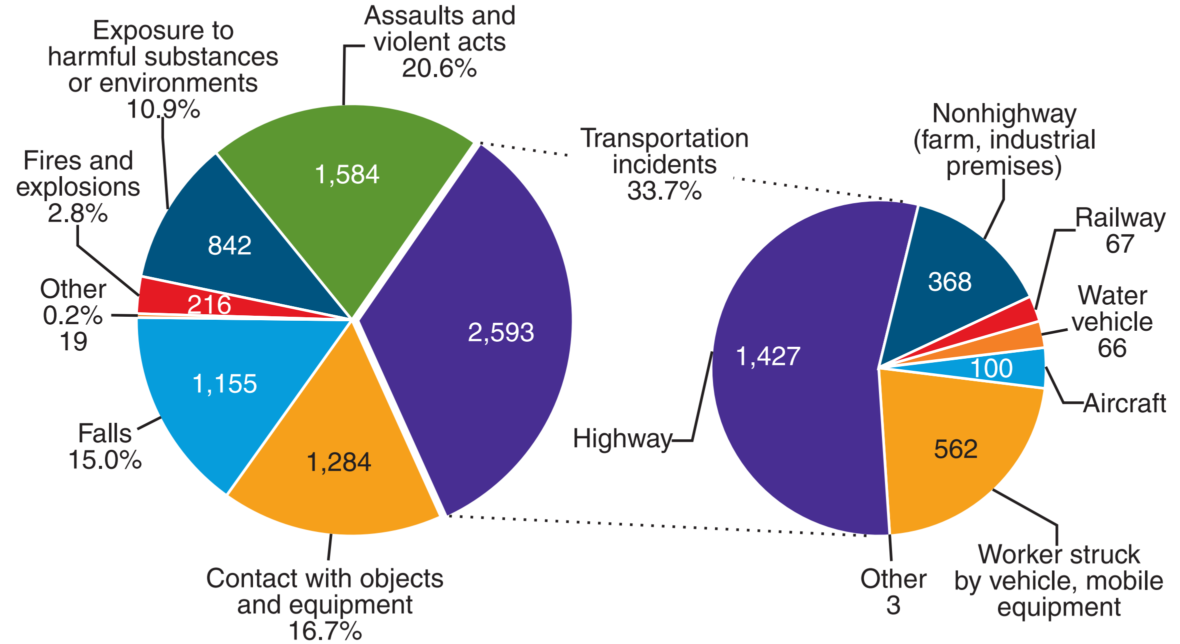


Figure 5–37. Distribution and number of fatal occupational injuries among Hispanic workers by industry, 1992–2002. During this period, the largest proportion of fatal occupational injuries among Hispanic workers was in construction, which accounted for 27.7% of the total, or 1,994 cases. ***(Source: BLS [2003d].)***

Event or Exposure

How did fatal occupational injuries differ by event or exposure among Hispanic workers during 1992–2002?

Figure 5–38. Distribution and number of fatal occupational injuries among Hispanic workers by event or exposure, 1992–2002. Transportation incidents accounted for 33.7% of fatal occupational injuries among Hispanic workers during 1992–2002. Other events or exposures that accounted for substantial proportions of fatal injuries included assaults and violent acts (20.6%), contact with objects and equipment (16.7%), and falls (15.0%). The 2,593 transportation fatalities were primarily associated with incidents on highways (1,427 cases) or on farm or industrial premises (368 cases), or with incidents in which workers were struck by a vehicle or mobile equipment (562 cases). ***(Source: BLS [2003d].)***

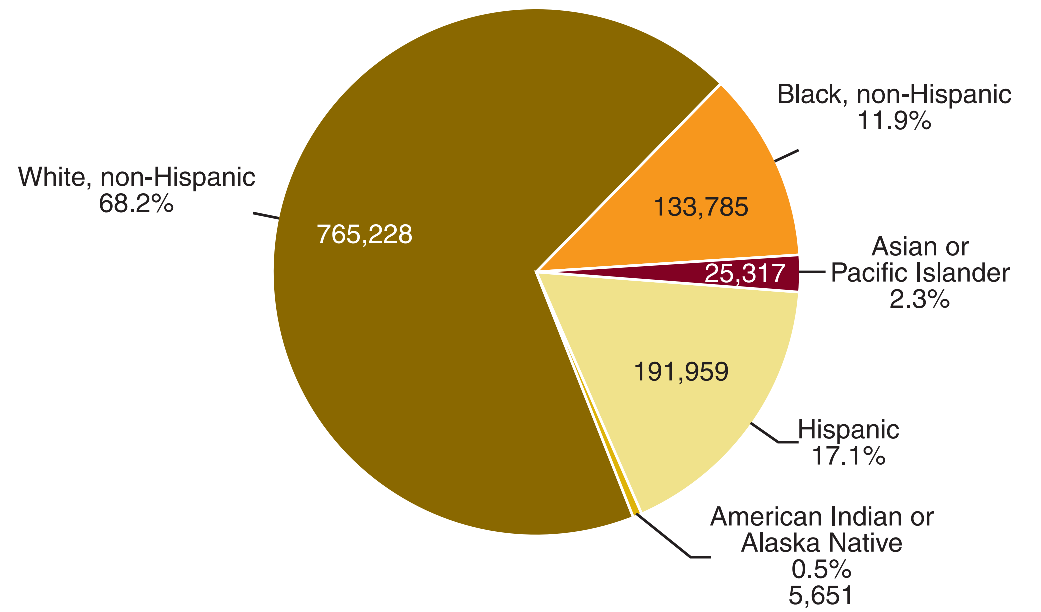


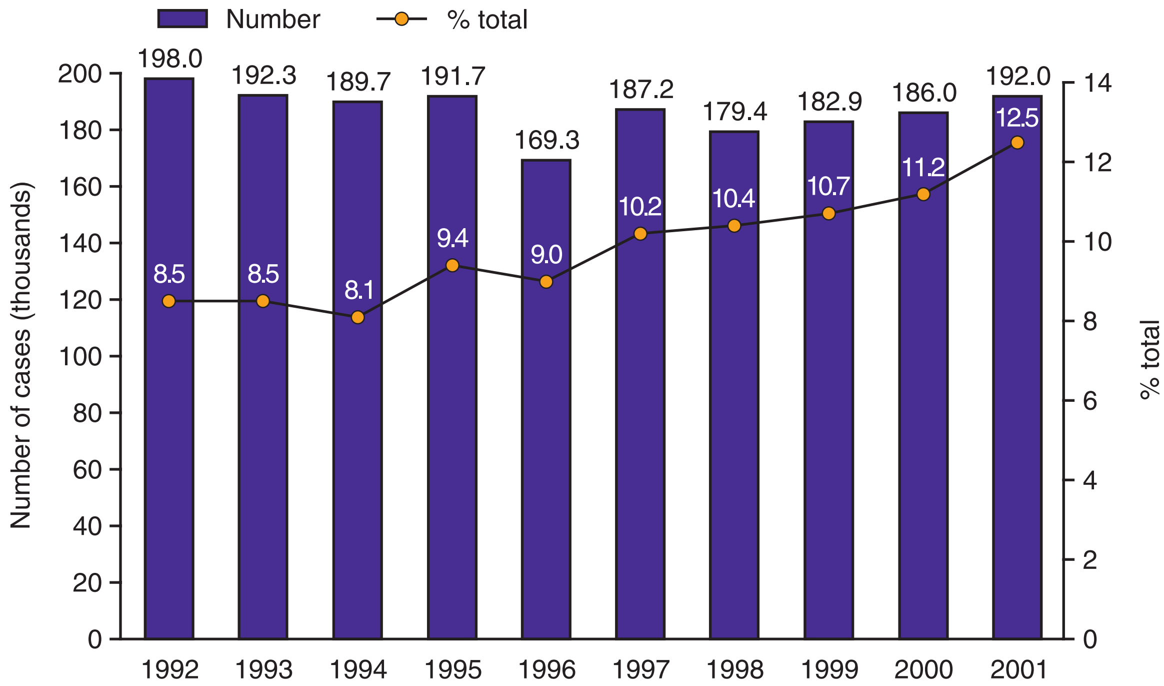
Nonfatal Injuries and Illnesses

Magnitude and Trend

How did nonfatal occupational injuries and illnesses involving days away from work differ by race/ethnicity among Hispanic and non-Hispanic workers in 2001?

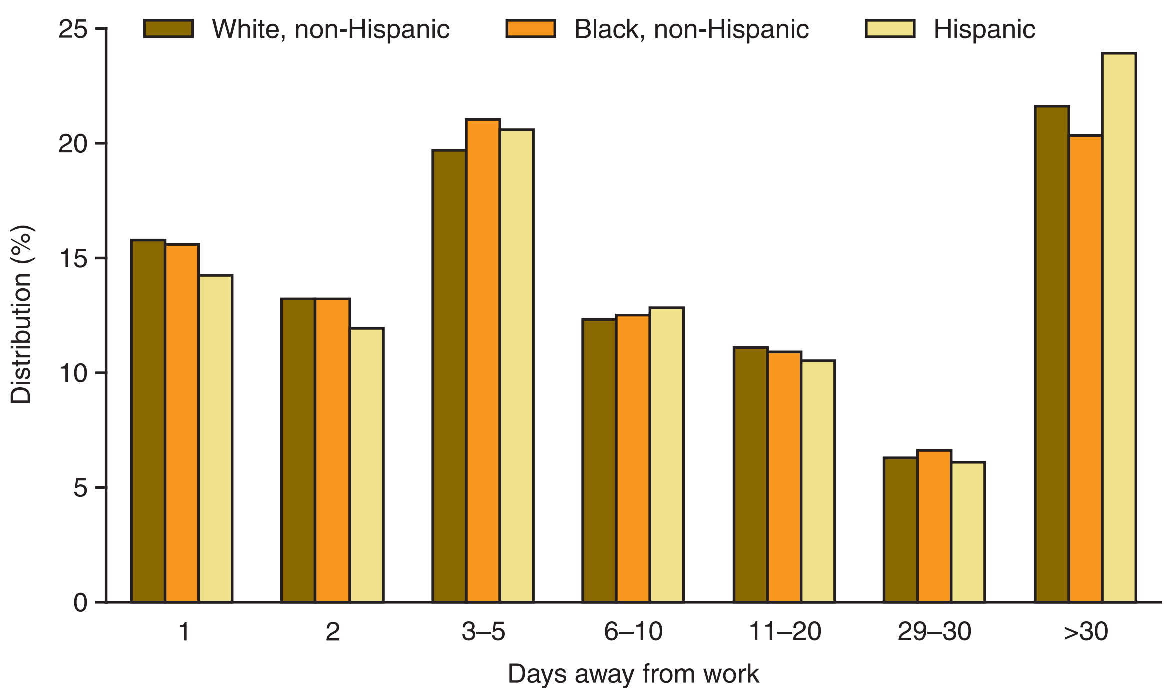
Figure 5–39. Distribution and number of nonfatal occupational injuries and illnesses involving days away from work in private industry by race/ethnicity among Hispanic and non-Hispanic workers, 2001. Among cases reporting race/ethnicity in 2001, white, non-Hispanic workers accounted for 68.2% of the cases involving days away from work. Hispanic workers represented 17.1% of the cases involving days away from work, and black, non-Hispanic workers accounted for 11.9%. (*Note:* Race/ethnicity was not reported for 415,616 of the 1.5 million cases involving days away from work in 2001). ***(Source: BLS [2003b].)***





How did nonfatal occupational injuries and illnesses involving days away from work change among Hispanic workers during 1992–2001?

Figure 5–40. Annual number and percentage of nonfatal occupational injuries and illnesses involving days away from work among Hispanic workers in private industry, 1992–2001. Cases of nonfatal occupational injury and illness with days away from work among Hispanic workers ranged from 198,022 in 1992 to 169,300 in 1996. The decrease for 1992–1996 contrasts with the increase for 1996–2001, when reported cases increased from 169,300 cases to 191,959. When presented as a percentage of all nonfatal occupational injuries and illnesses with days away from work, the cases among Hispanic workers show a fairly consistent upward trend, from 8.5% in 1992 to 12.5% in 2001. ***(Sources: BLS 2003b,c].)***



Severity

How did nonfatal occupational injuries and illnesses involving days away from work vary by severity among non-Hispanic and Hispanic workers in 2001?

Figure 5–41. Distribution of nonfatal occupational injuries and illnesses involving days away from work in private industry among non-Hispanic and Hispanic workers by number of days away from work, 2001. Compared with white, non-Hispanic or black workers, Hispanic workers had the lowest percentages of short-term work loss (1 or 2 days) and the highest percentage of long-term work loss (31 days or more). ***(Sources: BLS [2003b,c].)***

Occupation

How did nonfatal occupational injuries and illnesses among Hispanic workers differ by major occupational group in 2001?

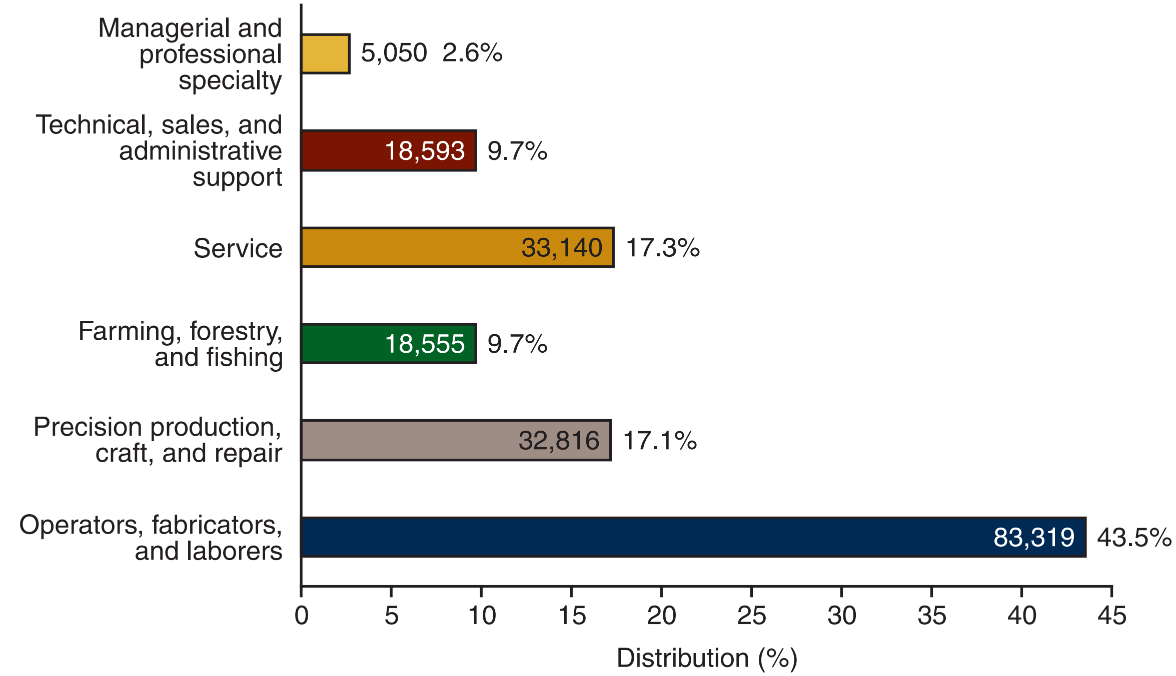


Figure 5–42. Distribution and number of nonfatal occupational injuries and illnesses involving days away from work among Hispanic workers in private industry by occupation, 2001. Among Hispanic workers, the distribution of nonfatal occupational injury and illness cases involving days away from work by occupation shows the highest proportion of cases (43.5% or 83,319 cases) among operators, fabricators, and laborers. Service and precision production, craft, and repair accounted for 17.3% (33,140 cases) and 17.1% (32,816 cases), respectively. ***(Sources:** BLS [2003b,c].)*

Industry

How did nonfatal occupational injuries and illnesses involving days away from work differ by major private industry sector among Hispanic workers in 2001?

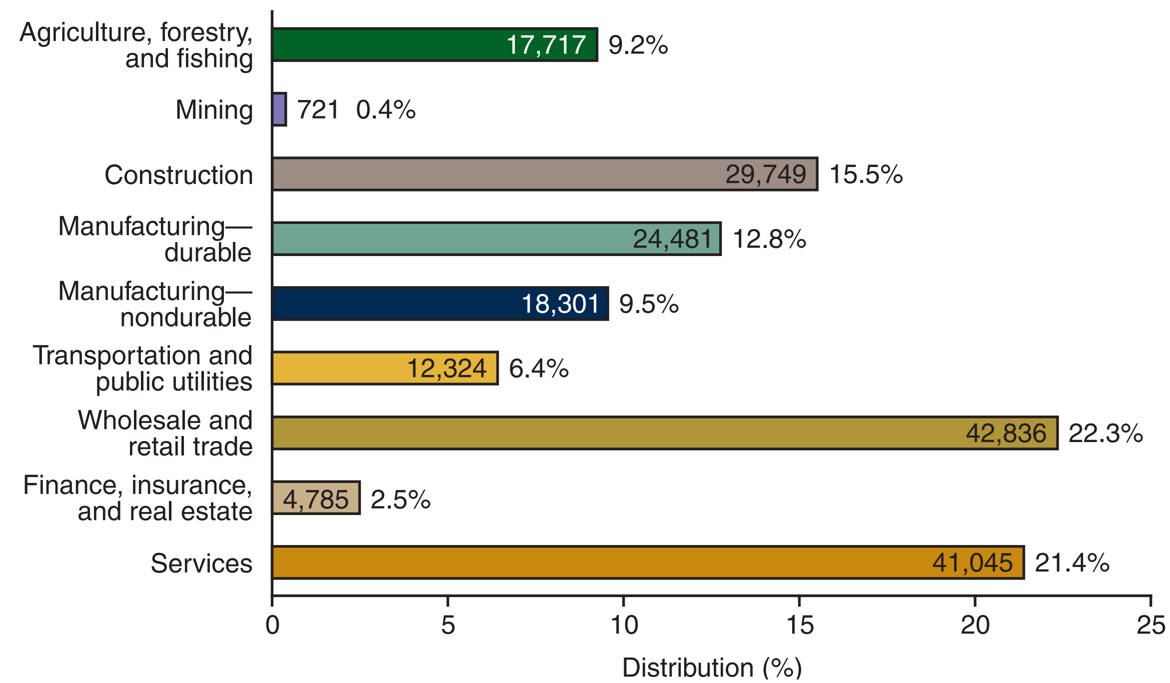


Figure 5–43. Distribution and number of nonfatal occupational injuries and illnesses involving days away from work among Hispanic workers by industry, 2001. Among the total 191,959 cases of nonfatal occupational injury and illness, wholesale and retail trade and services accounted for the largest percentages of Hispanic cases (22.3% and 21.4%, respectively). ***(Sources:** BLS [2003b,c].)*

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BLS [2003b]. Survey of occupational injuries and illnesses. Nonfatal (OSHA recordable) injuries and illnesses. Case and demographic characteristics. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics, Safety and Health Statistics Program.

BLS [2003c]. Occupational injuries and illnesses in the United States: profiles data 1992–2001, version 9.0, CD–ROM. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics, Safety and Health Statistics Program. [www.bls.gov/iif/]

BLS [2003d]. Census of fatal occupational injuries. Special tabulation—number and rate of fatal occupational injuries by selected worker characteristics, 1992–2002. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics, Safety and Health Statistics Program.

DOL [2000]. Report on the youth labor force. Chapter 6. Occupational injuries, illnesses, and fatalities. Washington, DC: U.S. Department of Labor. [www.bls.gov/opub/rylf/rylfhome.htm]

Davis L [2002]. Unpublished SENSOR work-related injuries to adolescents data. Massachusetts Department of Public Health, Bureau of Health Statistics, Research and Evaluation, Occupational Health Surveillance Program. [www.state.ma.us/dph/bhsre/ohsp/ohsp.htm]

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Appendix A • Survey and Surveillance Program Descriptions

Adult Blood Lead Epidemiology and Surveillance (ABLES) Program

Since 1987, the National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention (CDC) has sponsored the ABLES program to track laboratory-reported blood lead levels (BLLs) in adults. The public health goal of the ABLES program, as stated in *Healthy People 2010*, is to reduce the number of adults with work-related BLLs equal to or greater than 25 micrograms per deciliter (µg/dL) [DHHS 2000]. For the States that report data to ABLES, the primary sources of BLL reports are public and private laboratories; physician reporting may supplement laboratory reporting. ABLES requires the laboratory reporting of BLL results, both occupational and nonoccupational. These laboratory reports include basic demographic information, including personal identifiers, to differentiate between incidence and prevalence cases and to account for multiple reports for the same person. In coordination with the ABLES program, the Council of State and Territorial Epidemiologists (CSTE) has adopted a surveillance case definition for adult BLLs to be reported. The definition provides that "(an) adult blood lead level that should be maintained under surveillance is defined as an adult (16 or older) with a venous (or comparable) blood lead level equal to or greater than 25 micrograms per deciliter (µg/dL) of whole blood" [Stanbury and Roscoe 1999].

The ABLES program aims to accomplish the *Healthy People 2010* objective by building capacity at the State level to initiate or improve surveillance programs that can accurately measure trends in adult BLLs and intervene to prevent further exposures to lead. Nationwide data and findings from the ABLES program are periodically published in the CDC's *Morbidity and Mortality Weekly Report* (MMWR) [CDC 1999]. The NIOSH ABLES program has published 24 reports in the MMWR, which may be retrieved at www.cdc.gov/mmwr/mmwrsrch.htm by searching for "ables AND blood lead" for the years 1989 to the present year.

For further information, contact

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Division of Surveillance, Hazard Evaluations, and Field Studies
National Institute for Occupational Safety and Health
4676 Columbia Parkway, MS–R21
Cincinnati, OH 45226

Telephone: 513–841–4424
www.cdc.gov/niosh/ables.html

Census of Fatal Occupational Injuries (CFOI)

CFOI, administered by the Bureau of Labor Statistics (BLS) in conjunction with participating State agencies, compiles comprehensive and timely information about fatal work injuries occurring in the 50 States and the District of Columbia [BLS 2003a]. To compile counts that are as complete as possible, CFOI uses multiple data sources to identify, verify, and profile fatal work injuries. BLS compiles the census of fatalities from various Federal, State, and local administrative sources, including death certificates, workers' compensation reports and claims, reports to various regulatory agencies, medical examiner reports, police reports, and news reports. These diverse sources are used because studies have shown that no single source captures all job-related fatalities. Source documents are matched so that each fatality is counted only once. To ensure that a fatality occurred while the decedent was at work, information is verified from two or more source documents or from a source document and a follow-up questionnaire.

Key information about each workplace fatality (occupation and worker characteristics, equipment or machinery involved, and the circumstances of the event) is obtained by cross-referencing the source records. A work relationship is verified for each work injury fatality by using at least two independent source documents. For a fatality to be included, the decedent must have been employed (that is, working for pay, compensation, or profit) at the time of the event, engaged in 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 or from work are excluded from the census counts.

States may identify additional fatal work injuries after data collection closeout for a reference year. In addition, other fatalities excluded from the published count because of insufficient information to determine work relationships may subsequently be verified as work-related. States have up to 1 year to update their initial published State counts. BLS revises fatality counts but not rates. Occupational fatalities and rates shown in this report may reflect such changes, except for the most recent year, and may differ from original data published by BLS. Since 1992, the updates have averaged less than 1.0 % of each year's total that was initially published.

For further information, contact

U.S. Bureau of Labor Statistics
OCWC/OSH – Suite 3180
2 Massachusetts Avenue, NE
Washington, DC 20212–0001

Fatality information: 202–691–6175
Fax: 202–691–6196
Fatalities questions: cfoistaff@bls.gov
www.bls.gov/iif/oshcfoi1.htm

The Center to Protect Workers' Rights (CPWR)

CPWR is a research, development, and training arm of the Building and Construction Trades Department—the 15 construction unions in the AFL-CIO. Since 1990, CPWR has conducted much of its safety and health research under a cooperative agreement with NIOSH. The overriding goal for CPWR has been to build a safety culture in the construction industry—improving work conditions while lowering long-term costs and improving productivity. To help address the issues and find solutions, CPWR has led a consortium of experts at leading universities, government agencies, unions, and corporations (project owners, contractors, and insurers). The consortium has used a variety of approaches to improve safety and health, including on-site interventions, national meetings, and publications for a broad audience. Research publications include technical reports and the groundbreaking *Construction Chartbook: the U.S. Construction Industry and its Workers,* first published in 1997. The third edition, completed in 2002, is available at www.cpwr.com or www.elcosh.org.

For further information, contact

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1998 Childhood Agricultural Injury Survey (CAIS)

CAIS was conducted using a computer-assisted telephone interview (CATI) survey instrument. Randomly selected farming operations across the United States were contacted by eight U.S. Department of Agriculture's National Agricultural Statistical Service (USDA/NASS) calling centers during February and March of 1999. The CAIS was conducted in these winter months to increase the response rate of the survey. The sample selection and sampling frame information for the survey was provided by USDA/NASS through an interagency agreement. All agricultural production operations in the NASS area sampling frame, excluding large swine confinement operations, were in the population of study. NASS drew all samples, conducted all telephone contacts to the farm operations, entered all data, and provided all sampling frame information required for the NIOSH sampling design.

For the survey, a farm was defined as any operation of $1,000 or more of gross agricultural production within a calendar year; it included both crop and livestock operations. An injury was defined as any condition that resulted in 4 hours or more of restricted activity (e.g., a person could not perform work or other normal duties, missed work, or missed school), or a condition that required professional medical treatment. In this survey, a youth was defined as any person under age 20. Household youths were defined as all youths who resided on the farm. Hired farm workers were defined as youths who were hired directly by the farm operator (excluding contract laborers) to work on the farm but were not household members. Visitors were defined as all other youths who were on the farm but were not household members or hired workers.

An agricultural work-related injury was defined as any injury meeting the above definition that occurred while performing work on the farm associated with the farm business, including chores. Nonwork injuries were defined as injuries occurring on the farm that were not due to farm work. The survey excluded injuries to contractors working for the farm operation or injuries that occurred to youths off the farm property. The categorical injury variables of source of injury and event or exposure were coded from narrative injury descriptions using the American National Standards Institute Z16.2–1995 classification system [Toscano et al. 1996].

All information provided in the survey was self-reported by the farm operator, spouse, or the injured youths if they were aged 16 or older. As such, responses to items such as age and the cause of the injury event were subject to the interpretation of the respondent. Although the total number of childhood agricultural lost-time injuries was requested for the calendar year 1998, descriptive information was only requested for the four most recent injury events.

A stratified random sample of 50,000 farm operations was drawn to provide estimates for the study population. The strata for the sampling design were the four Census Bureau geographic regions. An equal sample allocation of 12,500 farms was selected in each region. A farm was considered to be a valid member of the sample regardless of whether youths were on the farm in 1998. This was necessary to allow for meaningful estimates of both injuries and the number of youths on farms for the various youth populations covered in the survey (i.e., household youths, youths directly hired to work on the farm, and youths visiting the farm).

For further information, contact

Surveillance and Field Investigations Branch
Division of Safety Research
National Institute for Occupational Safety and Health
1095 Willowdale Rd, MS H–1808
Morgantown, WV 26505

Telephone: 304–285–5916

Coal Workers' X-Ray Surveillance Program (CWXSP)

CWXSP is a NIOSH-administered occupational health program mandated by the U.S. Federal Coal Mine Health and Safety Act of 1969. The primary objective of the CWXSP is to screen miners for coal workers' pneumoconiosis (CWP). Since 1970, all active underground coal miners have been required to have a chest radiograph at the time of hire and again 3 years later. Subsequently, miners can volunteer for radiographs at approximately 5-year intervals. The chest X-rays are taken at no cost to the miner. In addition, other information is collected, including the miner's identification, age, tenure, and specific job in the mine.

The chest films are read by physicians certified by NIOSH as proficient in the use of the International Labour Office (ILO) classification system for radiographs of pneumoconiosis [ILO 1980]. Each film is read by at least two Readers (one of whom must be a B Reader*), and a consensus rule is used to reach a final determination for each film. The CWXSP defines CWP as a small opacity profusion category of at least 1/0 or large opacities (i.e., larger than 1 cm in diameter) consistent with pneumoconiosis. Miners with radiographic evidence of CWP on their chest radiographs are offered the option to work in an area of the mine with a respirable coal dust concentration of 1 mg/m^3 or less and have personal dust exposures monitored at frequent intervals.

The large number of chest X-rays collected since 1970 provide a means of monitoring the prevalence of CWP among active underground coal miners. However, coal miner participation rates have generally decreased since 1970 to less than 30% of working underground coal miners. Thus, tenure-specific prevalence estimates may be biased because of selective participation. Also, overall crude prevalence estimates may reflect over-representation of newly employed miners. Inferences regarding the entire coal mine work force that are based on CWXSP data should be used with caution. Tabulations of CWXSP data presented in this report may vary from those presented in related NIOSH surveillance reports because of criteria for categorizing tenure and rounding.

For further information, contact

Coal Workers' X-Ray Surveillance Program Activity
Division of Respiratory Disease Studies
National Institute for Occupational Safety and Health
1095 Willowdale Road, MS–HG900
Morgantown, WV 26505–2888

Telephone: 304–285–5724
www.cdc.gov/niosh/docs/2002-122/

*See *Reader* in Glossary.

Current Population Survey (CPS)

CPS is a household sample survey of the civilian noninstitutionalized population conducted by the BLS [BLS 2003b]. Respondents are interviewed to obtain information about the employment status of each member of the household aged 15 and older, although data are routinely published on those aged 16 and older. The survey inquires about work activity or status during the calendar week (Sunday through Saturday) that includes the 12th day of the month. This is known as the reference week. Field interviewing is conducted in the following week, referred to as the survey week.

The CPS sample is drawn from 754 sample areas, with coverage in every State and the District of Columbia. The sample provides estimates for the Nation as a whole and provides data for model-based estimates for individual States and other geographic areas. Since 2001, estimates have been based on interviews of an expanded sample of 60,000 households per month. Before 2001, estimates were based on 50,000 households per month. In an average month, the nonresponse rate is about 6%–7%.

The CPS provides estimates of employment, unemployment, and other characteristics of the general labor force, the population as a whole, and various other population subgroups. These statistics are available for various demographic characteristics including age, sex, race, marital status, and education. They are also available by occupation, industry, and class of worker. Supplemental questions are also often added to the regular CPS questionnaire to produce estimates on other topics, including school enrollment, income, previous work experience, health, employee benefits, and work schedules.

For further information, contact

U.S. Bureau of Labor Statistics
Division of Labor Force Statistics
Suite 4675
2 Massachusetts Avenue, NE
Washington, DC 20212–0001

Telephone: 202–691–6378
CPS data questions: cpsinfo@bls.gov
www.bls.gov/cps/ and www.bls.census.gov/cps/

Mine Safety and Health Research at NIOSH

NIOSH conducts mining surveillance through laboratories in Pittsburgh, Pennsylvania, and Spokane, Washington. These surveillance activities make extensive use of data obtained from the Mine Safety and Health Administration (MSHA). MSHA maintains databases of reported employment and reported cases of accident/injury/illness for mine operators as well as for independent contractors working on mine property, as required under 30 CFR Part 50 [MSHA 2003a]. Data sources for mining are described as follows:

Accident/injury/illness database. Mine operators and independent contractors whose employees perform certain types of work on mine property (e.g., construction or demolition of mine facilities, shaft and slope sinking, drilling, and blasting) are required to file a *Mine Accident, Injury, and Illness Report* (Form 7000–1) [30 CFR 50.20; MSHA 2003b] for reportable incidents within 10 working days after the accident or injury, or within 10 working days following the illness diagnosis. MSHA defines reportable injury as all incidents that require medical treatment or result in death, loss of consciousness, inability to perform all job duties, or temporary assignment or transfer to another job. Injuries involving first-aid only are not reportable: these include one-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, etc. that do not ordinarily require medical care, even if it was provided by a physician or a registered health care professional. Information reported on MSHA Form 7000–1 includes demographics of the injured or ill worker such as age, sex, years of total mining experience, years of experience at current mine, where the incident occurred (i.e., underground, surface, plant/mill), days away from work, days of restricted work activity, source of the injury, body part(s) injured, and a narrative description of the incident.

Employment database. Mine operators and independent contractors whose employees perform certain types of work on mine property are required to file a *Quarterly Mine Employment and Coal Production Report* (MSHA Form 7000–2) [30 CFR 50.30; MSHA 2003c] within 15 days after the end of each calendar quarter. This information is contained in MSHA's address and employment files and includes the address and other contact information, production of clean coal tonnage, average number of persons employed during the reporting period, and the corresponding number of hours worked for each type of mining operational subunit (MSHA identifies 10 different operational subunits within mining, including underground operations, surface areas at underground mines, strip/open pit operations, culm banks, auger mining, dredging operations, other surface mines, independent shops, coal preparation plants or mills, and offices).

MSHA data compared with other surveillance systems. The mining data presented in this report may differ from mining industry data for the same period using the National Traumatic Occupational Fatalities (NTOF) Surveillance System (see NTOF description below) and CFOI (described previously). Both NTOF and CFOI use the 1987 Standard Industrial Classification (SIC) Manual [OMB 1987] to categorize fatal injuries by industry. The SIC classification scheme includes oil and gas extraction in the mining industry. MSHA excludes oil and gas extraction, as regulatory authority is delegated to OSHA. In addition, MSHA data include only incidents that occur on mine property. Therefore, an injury occurring during the course of work, but off mine property, is excluded from the MSHA file. NTOF and CFOI systems capture this type of injury. On the other hand, fatal incidents that occur on mine property under MSHA jurisdiction but are not work-related may be included in the MSHA file but may not be captured by NTOF or CFOI (e.g., visitors or customers at the mine). In addition, workers in other industries who are injured on mine property may be reported in the MSHA data under mining. In the CFOI or NTOF data, these workers are reported in the industry of the worker's employer.

Hearing loss data. Data on hearing loss include unpublished audiometric data collected by NIOSH at 33 volunteer sand and gravel operations in 1999–2000.

For further information, contact

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Pittsburgh Research Laboratory
National Institute for Occupational Safety and Health
P.O. Box 18070
Pittsburgh, PA 15236

Telephone: 412–386–6613

or

Surveillance, Statistics, and Research Support Activity
Spokane Research Laboratory
National Institute for Occupational Safety and Health
315 E. Montgomery Avenue, MS–P11
Spokane, WA 99207

Telephone: 509–354–8065

For more detailed information about mining employment and fatal and nonfatal injuries, please visit our Web site at www.cdc.gov/niosh/mining/topics/data/default.htm.

2000 Minority Farm Operator Childhood Agricultural Injury Survey (M–CAIS)

M–CAIS was conducted for NIOSH by the USDA, National Agricultural Statistical Service (NASS) through an Interagency Agreement. The survey was defined as a census of the 49,270 minority farm operations identified in the NASS 1997 Census of Agriculture list. A farm was considered to be eligible for M–CAIS regardless of whether youths were on the farm in 2000. This was necessary to allow for meaningful estimates of both injuries and the number of youths on farms for the various youth populations covered in the survey. Because of confidentiality concerns, racial minority farm operators and Hispanic operators were handled independently. This resulted in farms being used to calculate both the racial minority estimate and the Hispanic estimate. In other words, individual operators who reported being a racial minority and of Hispanic ethnicity are represented in both estimates. Because of this overlap, it is not possible to add racial and Hispanic estimates together.

The survey used a CATI survey instrument. The interviews were conducted by 10 NASS calling centers between February and March of 2001. The M–CAIS survey was conducted in these winter months to increase the response rate of the survey. Participation in the survey was strictly voluntary. In addition to the main CATI data collection effort, five NASS State offices conducted personal interviews with a sample of 2,088 minority operators that were not contacted during the CATI survey period. The two main reasons for not contacting these farm operators during this period were their lack of availability (even after repeated contact attempts) and their lack of a working telephone number on file with the NASS. The five States that conducted the personal interviews were Alabama, Arizona, California, New Mexico, and Texas. These States were selected because they had the largest number of minority farm operations. The personal interviews were conducted during April and May of 2001 with the same survey instrument used in the CATI process.

The data collected for M–CAIS were self-reported by either the female or male head of household. If an injury occurred to a household youth aged 16 or older, and the youth was available to talk to the NASS enumerator, he or she was asked to answer the injury section of the survey. Information such as youth demographics, the occurrence of an injury, and the characteristics of an injury event were subject to the interpretation of the respondent.

For the survey, a farm was defined as any operation with $1,000 or more of gross agricultural production within a calendar year and included both crop and livestock operations. A youth was defined as any person under age 20. Household youths were defined as all youths who resided on the farm. Hired youths were defined as youths who were hired directly by the farm operator (excluding contract laborers) to work on the farm but were not household members. Visitors were defined as all other youths who were on the farm but were not household members or hired workers. An injury was defined as any condition that resulted in 4 hours or more of restricted activity (e.g., the person could not perform work or other normal duties, missed work, or missed school) or a condition that required professional medical treatment. Although the total number of childhood agricultural injuries was requested for the calendar year 2000, descriptive information was collected only for the four most recent injury events. An agricultural work-related injury was defined as any injury meeting the above definition that occurred while performing work on the farm associated with the farm business, including chores. Non-work injuries were defined as injuries occurring on the farm that were not due to farm work. The survey excluded injuries to contractors working for the farm operation or injuries that occurred to youths off the farm property.

The racial and Hispanic origin classification for the farm operator and all household youths were set to the racial classification provided on the 1997 Census of Agriculture sampling frame. In addition, Asians and Native Hawaiian or Other Pacific Islanders were combined into a single Asian category for all analyses.

The estimation procedure for the M–CAIS was developed as a two-step process. The first step involved post-stratifying the CATI and personal interview results to account for farm operators who refused to participate in the survey or were inaccessible. For the racial minority data, the results were post-stratified by the four farm operator racial categories (Black, Native American, Asian, and Other) within the nine U.S. geographic regions defined by the U.S. Census Bureau. For the Hispanic data, post-stratification was for the nine geographic regions only.

The second step in the estimation process was benchmarking the post-stratified survey results to the published counts for minority-operated farms released in the 1997 Census of Agriculture. These published counts from the 1997 Census of Agriculture include imputed values for minority farm operations (i.e., some farm operations without racial data for the operator were classified as racial minority operations based on characteristics of the farm operation or other factors). Since these imputed values caused the published minority farm counts to be higher than the sampling frame minority farm counts, the benchmarking process was necessary. Benchmarking was applied by race within the nine geographic regions.

For further information, contact

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Multiple-Cause-of-Death Data

The National Center for Health Statistics (NCHS) compiles and publishes annual national statistics on causes of death. NCHS is one of the 12 centers, institutes, and offices of CDC. As the Nation's principal health statistics agency, NCHS provides statistical information to guide actions and policies to improve the health of people in the United States. NCHS surveys and data systems provide fundamental public health and health policy statistics that are used to track changes in health and health care delivery. Statistics are obtained through a broad-based program of ongoing and special studies in partnership with State government, including household interview surveys, examination surveys, surveys of health care providers, and collection of statistics on birth and death. NCHS participates with other agencies, such as NIOSH, and promotes the use and dissemination of vital and health statistics.

The Division of Vital Statistics obtains information about deaths from the registration offices of all States, New York City, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam. Geographic coverage has been complete since 1933. The mortality data file comprises demographic and medical information. Demographic data are provided by the funeral director and are based on information supplied by an informant. Medical certification of cause of death is provided by a physician, medical examiner, or coroner. Mortality data are used to profile deaths by underlying demographic and geographic characteristics to compare mortality trends with other countries and determine life expectancy.

Traditionally, national mortality statistics have been based on a count of deaths with one underlying cause assigned for each death. National single-cause mortality statistics are available from the early 1900s. Beginning in 1968, electronic files with multiple-cause-of-death information were compiled and made available by NCHS. Causes of death are coded according to the International Classification of Diseases as adapted for use in the United States. Public-use files contain records of all U.S. deaths that are reported to State vital statistics offices (approximately 2 million annually). Each death record includes codes for up to 20 conditions listed on the death certificate, including both underlying and contributing causes of death. Other data include age, race, sex, and State and county of residence at the time of death. In addition, usual occupation and industry codes have been available for decedents from some States since 1985 [NIOSH 1997], and NCHS annually determines that certain quality criteria have been met by usual industry and occupation data from selected States.

Potential limitations posed by multiple-cause-of-death data include the following: under-reporting or over-reporting of conditions on the death certificate by certifying physicians, incomplete or unclassified reporting of usual occupation and industry, and nonspecificity of codes.

For further information, contact

Mortality Statistics Branch
Division of Vital Statistics
National Center for Health Statistics
Centers for Disease Control and Prevention
3311 Toledo Road, Floor 7
Hyattsville, MD 20782

Telephone: 301–458–4666
www.cdc.gov/nchs/about.htm and
www.cdc.gov/nchs/products/elec_prods/subject/mortmcd.htm

National Agricultural Workers Survey (NAWS)

The Office of the Assistant Secretary for Policy (OASP), U.S. Department of Labor, advises the Secretary of Labor and coordinates and provides leadership to the Department's activities in economic policy issues. Activities are both short-term and long-term and include economic research and regulatory policies and procedures bearing on the welfare of all U.S. workers. The U.S. Department of Labor is the only national information source on the demographics and working and living conditions of U.S. farm workers.

The U.S. Department of Labor began surveying farm workers in 1988 and has collected information from more than 25,000 workers. Each year, NAWS interviews approximately 2,500 randomly selected farm workers across the United States. The sampling procedure accounts for seasonal and regional fluctuations in the level of agricultural work activity. Each survey year includes a fall cycle, a winter cycle, and a spring/summer cycle of interviews. The number of interviews conducted during a cycle is proportionate to the amount of agricultural activity at that time of year.

NAWS uses area sampling of sites to obtain a nationally representative group of farm workers while containing travel costs of survey staff. A sample of 288 counties in 25 States is selected to represent 12 distinct agricultural regions. No fewer than four counties were chosen from each region. Multistage sampling is used to choose respondents in each cycle. The likelihood of a given site being selected varies with the size of its agricultural payroll. Agricultural employers within each of the selected counties are chosen randomly from public agency records, including unemployment insurance files and Agricultural Commissioners' pesticide registrations. These sources of employer names are supplemented from lists maintained by such agencies as the Bureau of Labor Statistics, the Agricultural Soil and Conservation Service, and State Departments of Industrial Relations.

NAWS locates and samples workers at their work sites, avoiding the well-publicized undercount of this difficult-to-find population. During the initial contact, arrangements are made to interview the respondent at home or at another convenient location. The interviewed farm workers reveal detailed information about their basic demographics, legal status, education, family size and household composition, wages and working conditions in agricultural jobs, and participation in the nonagricultural U.S. labor force. This information permits in-depth research on current farm workers and for the tracing of changes occurring since 1988.

For further information, contact

Office of the Assistant Secretary for Policy
U.S. Department of Labor
200 Constitution Ave., NW
Suite S–2312
Washington, DC 20210

Telephone: 202–693–5959
www.dol.gov/asp/programs/agworker/naws.htm

National Electronic Injury Surveillance System (NEISS)

NIOSH collects information about nonfatal work-related injuries and illnesses treated in U.S. hospital emergency departments through the NEISS in collaboration with the U.S. Consumer Product Safety Commission (data are collected without regard to consumer product involvement). Data are abstracted from emergency department records in a national probability-based sample of 67 hospitals with 24-hr emergency departments. Case information is collected for noninstitutionalized civilian workers who were working for pay or other compensation, doing production-related activities on a farm or ranch, or working as a volunteer for an organized group at the time that they were injured or became ill. Cases are included without regard to age or other demographic characteristics, industry or size of employer, self or household employment, or indication of workers' compensation as medical care payer. However, for the purposes of this *Chartbook*, only emergency department-treated injuries and illnesses to workers aged 15 and older were included. Each included case is assigned a statistical weight on the basis of the size (annual number of emergency department visits) for the hospital where treatment was received. By using the statistical weights, nationally representative estimates of emergency department-treated injuries and illnesses are made and can be characterized by demographics, nature of injury/illness, and injury event characteristics.

NEISS estimates are for nonfatal injuries and illnesses treated in an emergency department and as such exclude those workplace injuries or illnesses treated in other medical venues. Additionally, occupational fatalities, military injuries/illnesses, revisits to the emergency department, common illnesses (e.g., cold or flu), and routine drug and alcohol screenings are excluded. Indications of lost-work time or medical claim payer are not included in NEISS. As a result of the types of injuries and illnesses treated in an emergency department, the broad, unrestricted population base, and the limitations of information available in emergency department records, NEISS estimates of work-related injuries and illnesses are complementary to BLS estimates through the Survey of Occupational Injuries and Illnesses and are not directly comparable.

NEISS work-related injury and illness data are publicly available through an online query system: Work-Related Injury Statistics Query System (Work-RISQS) [www2a.cdc.gov/risqs]. Technical details of the NEISS work-related injury and illness data collection, query help, and additional work-related statistics resources are available in addition to user-directed queries for national injury/illness estimates and rates per 100 full-time workers.

For further information, contact

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www2a.cdc.gov/risqs

National Notifiable Diseases Surveillance System (NNDSS)

In partnership with the Council of State and Territorial Epidemiologists (CSTE), the Epidemiology Program Office of CDC operates NNDSS. The primary purpose of the system is to provide weekly provisional information about the occurrence of diseases defined as notifiable by CSTE. The system also provides summary data on an annual basis. State epidemiologists report cases of notifiable diseases to the Epidemiology Program Office, which tabulates and publishes these data in the *Morbidity and Mortality Weekly Report* (MMWR) and the *Summary of Notifiable Diseases, United States* (entitled *Annual Summary* before 1985). Notifiable disease surveillance is conducted by public health practitioners at local, State, and national levels to support disease prevention and control activities.

Notifiable disease reports are received from health departments in the 50 States, 5 territories, New York City, and the District of Columbia. Policies for reporting disease cases may vary by disease or reporting jurisdiction, depending on case status classification (i.e., confirmed, probable, suspect). CSTE and CDC annually re-review the status of national infectious disease surveillance and recommend additions or deletions to the list of nationally notifiable diseases on the basis of the need to respond to emerging priorities. Reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local or State level. Thus the list of diseases that are considered notifiable varies slightly among the States. The degree of completeness of reporting is influenced by the diagnostic facilities available; the control measures in effect; public awareness of a disease; and the interests, resources, and priorities of State and local officials responsible for disease control and public health surveillance. Factors such as changes in case definition for public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease.

For further information, contact

Chief, Surveillance System Branch
Division of Public Health Surveillance and Informatics
Epidemiology Program Office
Centers for Disease Control and Prevention
4770 Buford Highway, MS–K74
Atlanta, GA 30341–3717

www.cdc.gov/epo/dphsi/phs.htm
www.cdc.gov/epo/dphsi/nndsshis.htm

National Occupational Respiratory Mortality System (NORMS)

NORMS is a data storage and retrieval system developed and maintained by NIOSH. The National Surveillance System for Pneumoconiosis Mortality (NSSPM), which is the precursor to NORMS, is now a component of it. These data are a compilation of NCHS multiple-cause-of-death records for the following respiratory conditions:

- asthma
- chronic obstructive pulmonary disease (COPD)
- conditions due to chemical fumes and vapors
- hypersensitivity pneumonitis
- interstitial pulmonary diseases
- lung cancer
- malignant mesothelioma
  - all sites (aggregated)
  - mesothelioma of pleura
  - mesothelioma of peritoneum
  - mesothelioma of other sites
  - mesothelioma, unspecified
- malignant neoplasms of the peritoneum
- malignant neoplasms of the pleura
- mycobacterial infections
  - all sites (aggregated)
  - pulmonary and unspecified sites
- pleural plaque
- pneumoconioses
  - all (aggregated)
  - asbestosis
  - byssinosis
  - coal workers' pneumoconiosis
  - silicosis
  - unspecified/other pneumoconioses
- tuberculosis
  - all sites (aggregated)
  - respiratory
  - pulmonary

Deaths for these conditions are defined on the basis of World Health Organization (WHO) International Classification of Diseases coding categories: ICD–8 (WHO 1967) from 1968–1979 and

ICD–9 (WHO 1977) from 1979–1998. Since 1999, ICD–10 (WHO 1992) codes specific to each condition have been used.

NORMS provides statistics for the surveillance of occupational respiratory diseases in an easily accessible, user-friendly format and is the source for much of the mortality data presented in the 1999 and 2002 Work Related Lung Disease Surveillance (WoRLD) reports. The data are a subset of national mortality data obtained annually from NCHS since 1968. NORMS contains death certificate information for all U.S. residents aged 15 and older identified with any of the previously mentioned respiratory conditions as the underlying cause or a contributing cause of death. Additional information includes age, race, sex, and State and county of residence at the time of death.

The All 50 States query is designed to generate a variety of summary statistics in the form of tables, charts, and maps. Examples of the types of statistics that this application generates are counts of deaths, crude and age-adjusted mortality rates, and years of potential life lost by year, age group, race, sex, underlying cause, contributing cause, or any mention of death at the national, State, and county levels since 1968. Data from additional sources, such as population statistics, comparative standard population, and life-table values are incorporated into the system.

The Industry/Occupation query generates only tabular counts of deaths and years of potential life lost by usual industry/occupation, year, age group, race, sex, underlying cause, contributing cause, or any mention of death for a selected list of States (and years), but only for 1985–1999. Proportionate mortality ratios (PMRs) by usual industry/occupation are likewise available by age group, race, sex, underlying cause, contributing cause, or any mention of death but only at the national level and only for specific time intervals.

For further information, contact

Public Health Surveillance Team
Surveillance Branch
Division of Respiratory Disease Studies
National Institute for Occupational Safety and Health
1095 Willowdale Road, MS–HG900
Morgantown, WV 26505–2888

Telephone: 304–285–6115

National Surveillance System for Health Care Workers (NaSH)

NaSH is a CDC surveillance system that focuses on exposures and infections among hospital-based health care workers. NaSH was developed by the Division of Health Care Quality Promotion, National Center for Infectious Diseases (NCID); the Division of Viral Hepatitis, NCID; the Division of Tuberculosis Elimination, National Center for HIV, STD, and TB Prevention; the National Immunization Program; and NIOSH. The objectives of NaSH are to monitor national trends and incidence rates of occupational infections among health care workers; identify newly emerging hazards for health care workers; assess the risk of occupational exposures and infections; and evaluate preventive measures including engineering controls, work practices, protective equipment, and post-exposure prophylaxis to prevent occupational infections.

NaSH enrollment is voluntary. To ensure that a representative sample of U.S. hospitals from every demographic category (including urban and rural, large and small, teaching and nonteaching, and serving minority and nonminority populations), the system has been advertised in several ways, including at scientific meetings of professional organizations and in their national newsletters. Hospitals participating in the CDC National Nosocomial Infection Surveillance System (NNIS) have also been invited to participate. Initial entry of a health care worker into NaSH usually occurs during the provision of health care at the hospital's employee health service for a relevant event (e.g., routine tuberculin skin test, initial assessment or follow-up after an exposure to blood, or initial assessment or follow-up after an exposure to a vaccine-preventable disease).

Data are collected in NaSH to assist hospitals, health care workers, health care organizations, and public health agencies. Hospitals participating in this system benefit by receiving technical support and standardized methodologies (including software) for conducting occupational health surveillance activities. NaSH software permits hospitals to analyze their own data in an integrated system and compare their data with aggregate data from all NaSH hospitals.

The system collects the following data on health care workers: demographic information (identifying data is not sent to CDC), occupation, vaccination history, serologic results/immune status for vaccine-preventable diseases (including hepatitis B virus), tuberculin skin test results, evaluation for positive tuberculin skin tests and therapy status as appropriate, detailed information about the nature of the exposure to blood, body fluids and bloodborne pathogens, postexposure prophylaxis treatment, information about exposures and infections from vaccine-preventable diseases such as measles, and information about exposures to infectious TB. Hospitals provide CDC with denominator data (such as number of staff) once a year. Every 2 to 5 years, participating hospitals distribute a survey to employees (to be filled out anonymously) that asks about history of needlestick or sharps injuries; the purpose of this survey is to assess underreporting of incidents in the NaSH system.

For further information, contact

Health Care Outcomes Branch
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National Center for Infectious Diseases
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1600 Clifton Road, NE, MS–E55
Atlanta, GA 30333

Telephone: 800–893–0485
Nash@cdc.gov
www.cdc.gov/ncidod/hip/SURVEILL/nash.htm

National Surveillance System for Pneumoconiosis Mortality (NSSPM)

NSSPM is a pneumoconiosis mortality surveillance system developed and maintained by the Division of Respiratory Disease Studies, NIOSH. Types of pneumoconioses included in the NSSPM are based on International Classification of Diseases coding categories (ICD–8 [WHO 1967] from 1968–1979, ICD–9 [WHO 1977] from 1979–1998, and ICD–10 [WHO 1992] since 1999): asbestosis, coal workers' pneumoconiosis (CWP), silicosis, byssinosis, other/unspecified pneumoconioses, and all pneumoconioses aggregated.

The system provides statistics for the surveillance of occupational respiratory diseases in an easily accessible, user-friendly format. The data are a subset of national mortality data obtained annually from NCHS since 1968 (see multiple-cause-of-death data described above). Currently, NSSPM contains death certificate information for 1968–1996 for all U.S. decedents aged 15 and older with any type of pneumoconiosis listed on the death certificate as an underlying or contributing cause of death. Additional information includes age, race, sex, and State and county of residence at the time of death. Usual occupation and industry of each decedent have been available for several States since 1985.

NSSPM is designed to generate a variety of summary statistics, tables, charts, and maps. Examples of the types of statistics this system generates are counts of deaths, crude and age-adjusted rates, and years of potential life lost by year, age group, race, sex, and usual occupation or industry at the national, State, and county levels. Data from additional sources, such as population statistics, comparative standard population, and life table values are incorporated into the system.

For further information, contact

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National Traumatic Occupational Fatality (NTOF) Surveillance System

The NTOF Surveillance System was developed in the 1980s by NIOSH to fill gaps in the knowledge of work-related injury deaths in the United States. Data was first being collected for calendar year 1980. NTOF supports descriptive and analytical epidemiologic uses of the data, such as describing the nature and magnitude of occupational injuries and fatal injury trends, identifying risk factors, testing hypothesis, and setting safety research priorities.

For a case to be included in NTOF, the death certificate must meet three criteria: (1) the decedent must be aged 16 or older; (2) the external cause of death is classified as E800–E999 (ICD–9 [WHO 1977]); and (3) the Injury at Work item on the death certificate is marked positive by the certifier. The NTOF data system contains 30 variables useful for describing characteristics of victims, as well as injury circumstances. Data elements include coded characteristics such as age, gender, race, occupation, and cause of death. In addition, narrative text for industry, occupation, causes of death, and injury characteristics are entered and maintained for focused research studies.

For this *Chartbook*, fatality rates are computed using NTOF data as numerators and BLS CPS data to estimate employed groups. As noted above, the BLS CPS is a sample survey of the civilian noninstitutional population. The employment data used for rate calculations are based on the number of workers rather than hours of work (or full-time equivalents). Fatality rates were calculated as average annual deaths per 100,000 workers. Rates were not calculated for cells with fewer than three cases because of the instability of rates based on small numbers. Frequencies and rates are presented only for the civilian workforce because denominator data are not easily obtainable for military personnel.

For further information, contact

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www.cdc.gov/niosh/injury/traumadata.html

Sentinel Event Notification System for Occupational Risk (SENSOR)

NIOSH has a longstanding commitment to State-based surveillance efforts dating from the early 1980s. This commitment is reflected in (1) NIOSH funding of State-initiated occupational safety and health activities; (2) increased occupational disease, injury, and fatality surveillance; and (3) increased occupational and environmental capacity building activities; i.e., assisting State health departments to increase the capacity for investigating problems related to occupational and environmental health issues.

In 1987, NIOSH began the SENSOR program. The goal was to develop models for State-based disease or injury condition-specific surveillance and enhance the capability of the participating States to direct appropriate and effective intervention and prevention efforts. In addition to ongoing disease and injury surveillance, NIOSH/State collaborative efforts have supported the standardization of variables collected by the State programs, the creation of software to facilitate capacity building of surveillance systems by additional States, the evaluation and comparison of SENSOR surveillance data with other surveillance data sources, and publication and dissemination of SENSOR reports.

Contact the office listed below each topic for further information.

State-based asthma and silicosis surveillance

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State-based surveillance of carpal tunnel syndrome, noise-induced hearing loss, and pesticide poisoning

Surveillance Branch
Division of Surveillance, Hazard Evaluations, and Field Studies
National Institute for Occupational Safety and Health
4676 Columbia Parkway, MS–R17
Cincinnati, OH 45226

Telephone: 513–841–4589

State-based surveillance of injuries to working teens

Surveillance and Field Investigations Branch
Division of Safety Research
National Institute for Occupational Safety and Health
1095 Willowdale Road, MS–1808
Morgantown, WV 26505

Telephone: 304–285–6009

California SENSOR program surveillance of work-related asthma and carpal tunnel syndrome

Occupational Health Branch
Division of Environmental and Occupational Disease Control
California Department of Health Services
1515 Clay Street, Suite 1901
Oakland, CA 94612

Telephone: 510–622–4300
www.dhs.ca.gov/ohb/

Massachusetts SENSOR program surveillance of work-related asthma and injuries to working teens

Occupational Health Surveillance Program
Bureau of Health Statistics, Research and Evaluation

Massachusetts Department of Public Health
250 Washington Street, 6th Floor
Boston, MA 02108–4619

Telephone: 617–624–5621
www.state.ma.us/dph/bhsre/ohsp/ohsp.htm

Michigan SENSOR program surveillance of work-related asthma, noise-induced hearing loss, and silicosis

Occupational and Environmental Medicine
Michigan State University
117 West Fee Hall
East Lansing, MI 48824–1315

Telephone: 517–353–1846
www.chm.msu.edu/oem/

New Jersey SENSOR program surveillance of work-related asthma and silicosis

Occupational Health Surveillance Program
Division of Epidemiology, Environmental and Occupational Health
New Jersey Department of Health and Senior Services
P.O. Box 360
Trenton, NJ 08625–0360

Telephone: 609–984–1863
www.state.nj.us/health/eoh/survweb/

Ohio SENSOR program surveillance of silicosis

Silicosis Surveillance
Ohio Department of Health
246 North High Street
P.O. Box 118
Columbus, OH 43216–0118

Telephone: 614–466–4183
www.odh.state.oh.us/ODHPrograms/SILSUR/silsur1.htm

Surveillance of Health Care Workers with AIDS

Acquired immunodeficiency syndrome (AIDS) surveillance is conducted by CDC and collaborating health departments in each State, territory, and the District of Columbia. Although surveillance activities range from passive to active, most areas employ multifaceted active surveillance programs, including four major sources of AIDS information: hospitals and hospital-based physicians, physicians in nonhospital practice, public and private clinics, and medical record systems (death certificates, tumor registries, hospital discharge abstracts, and communicable disease reports). AIDS surveillance data are used to detect epidemiologic trends to identify unusual cases requiring follow-up and publish these trends in the semiannual publication in the HIV/AIDS Surveillance Report [CDC 2001].

Of the adults reported with AIDS in the United States through December 31, 2002, 24,844 had been employed in health care. These cases represented 5.1% of the 486,826 AIDS cases reported to CDC for whom occupational information was known (information about employment in the health care setting was missing for 337,225 reported AIDS cases). The type of job is known for 23,212 (93%) of the 24,844 reported health care workers with AIDS. CDC is aware of 57 health care workers in the United States who have been documented as having seroconverted to HIV following occupational exposures [CDC 2003]. Twenty-six have developed AIDS. CDC is also aware of 139 other cases of HIV infection or AIDS among health care workers who have not reported other risk factors for HIV infection. They reported occupational exposure to blood, body fluids, or HIV-infected laboratory material, but seroconversion after exposure was not documented. The number of these workers who acquired their infection through occupational exposures is unknown.

For more information contact

Chief, Surveillance Branch
Division of HIV/AIDS Prevention—Surveillance and Epidemiology
National Center for HIV, STD, and TB Prevention
Centers for Disease Control and Prevention
1600 Clifton Road, NE, MS–E47
Atlanta, Georgia 30333

www.cdc.gov/nchstp/od/nchstp.html
www.cdc.gov/hiv/surveillance.htm

Surveillance for Tuberculosis (TB) Infection in Health Care Workers

CDC recommends periodic tuberculin skin testing of health care workers with a potential for exposure to *Mycobacterium tuberculosis.* However, many health care facilities (e.g., hospitals, correctional facilities, long-term care facilities, and health departments) do not have a system for identifying and tracking workers due for tuberculin skin testing or a means of analyzing aggregate data. To facilitate surveillance for TB infection in health care workers in health departments, CDC undertook several studies designed to examine rates of skin test conversions in health care workers. The most comprehensive of these was a study initiated in 1995 called StaffTRAK–TB. The study included more than 13,000 health care workers. Data from this study are used to track, analyze, and report information pertaining to tuberculin skin testing surveillance in health care workers.

For further information, contact

Surveillance and Epidemiology Branch
Division of Tuberculosis Elimination
National Center for HIV, STD, and TB Prevention
1600 Clifton Road, NE, MS–E10
Atlanta, GA 30333

Telephone: 404–639–8117
www.cdc.gov/nchstp/tb/

Survey of Occupational Injuries and Illnesses (SOII)

Since 1971, the BLS has conducted an annual survey of establishments in the private sector to collect statistics on occupational injuries and illnesses. The SOII is a Federal and State program through which employer reports are collected from about 183,000 private industry establishments and processed by State agencies cooperating with BLS [BLS 2003c,d]. Data for the mining industry and railroad activities are provided by the Department of Labor's Mine Safety and Health Administration and Department of Transportation's Federal Railroad Administration. Excluded from the survey are the self-employed, farmers with fewer than 11 employees, private households, Federal government agencies, and employees in State and local government agencies. Establishments are classified in industry categories based on the 1987 *Standard Industrial Classification Manual* [OMB 1987].

Survey estimates of occupational injuries and illnesses are based on a statistically designed probability sample rather than a census of the entire working population. An independent sample is selected for each State and the District of Columbia that represents industries in that jurisdiction. BLS includes all State samples in the national sample. State agencies mail report forms to selected employers in February to cover the previous calendar year's experience. For those States not participating in the program, reporting forms are mailed by BLS. Each employer completes a single report form, which is used for both national and State estimates of occupational injuries and illnesses. This procedure eliminates duplicate reporting by respondents and, together with the use of identical survey techniques at the national and State levels, insures maximum comparability of estimates. Since 2002, employers have collected, maintained, and disseminated information about work-related injuries and illnesses using the Log of Work-Related Injuries and Illnesses (OSHA Form 300) [OSHA 2003a], the Summary of Work-Related Injuries and Illnesses (OSHA Form 300A) [OSHA 2003b], and the Injury and Illness Incident Report (or an equivalent form containing the information sought) (OSHA Form 301) [OSHA 2003c].

An occupational injury is any injury that results from a work-related event or from a single instantaneous exposure in the work environment. An occupational illness is any abnormal condition or disorder (other than one resulting from an occupational injury) caused by exposure to factors associated with employment. It includes acute and chronic illnesses or diseases that may be caused by inhalation, absorption, ingestion, or direct contact. Lost workday cases involve days away from work, days of restricted activity, or both. The response rate is about 92%.

In addition to publishing injury and illness counts, rates, and characteristics, the Bureau estimates injury and illness severity using information provided by employers about the number of days away from work needed to recuperate from each disabling condition. If, as a result of injury or illness, the employee did not return to work by the end of the survey year, then the employer reports an approximate return date, which, in conjunction with the date of injury or illness, yields an estimate of days away from work for that case. Two basic measures of severity are used with the characteristics of days away from work cases:

- Median days away from work is the measure used to summarize the varying lengths of absences from work among the cases involving days away from work. Half the cases involved more days and half involved fewer days than a specified median.

- Distribution of cases involving various lengths of absences from work, ranging from 1 or 2 days to 31 days or longer.

Summary data on nonfatal counts and rates for all recordable injuries and illnesses are issued by BLS in December of each year. Data are separated into cases with and without lost workdays. The following April, summary data are issued by BLS on the characteristics of workers sustaining days-away-from-work injuries and illnesses and how those incidents occurred.

For further information, contact

U.S. Bureau of Labor Statistics
OCWC/OSH, Suite 3180
2 Massachusetts Avenue, NE
Washington, DC 20212–0001

Nonfatal summary information: 202–691–6179
Nonfatal case and demographic information: 202–691–6170
Fax: 202–691–6196
Nonfatal injuries and illnesses questions: oshstaff@bls.gov
www.bls.gov/iif/

Traumatic Injury Surveillance of Farmers (TISF) Survey

The TISF Survey was a mail survey of farms and ranches conducted by the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS), in cooperation with NIOSH. The NASS provided the sampling frame and sample selection. All agricultural production operations were in the population for study. The NASS drew all samples, conducted the mailings, contacted farm operations that did not respond, and processed the data for NIOSH use.

In cooperation with the National Safety Council and NASS, NIOSH developed the TISF to determine the frequency, incidence rate, and characteristics of agricultural work-related injuries occurring in the United States. The TISF database permits NIOSH to produce injury estimates at the State, regional, and national levels. Injuries were defined as any condition that resulted in one-half day or more of restricted activity or required professional medical treatment. An agricultural work-related injury was defined as an injury meeting this definition that occurred while performing work (either on the farm or off the farm) associated with the farm business. Respondents provided detailed information about the demographic characteristics of the victim (age, gender, race), characteristics of the injury (body part, nature, and type of injury), work, and causal factors.

For further information, contact

Surveillance and Field Investigations Branch
Division of Safety Research
National Institute for Occupational Safety and Health
1095 Willowdale Road, MS–1808
Morgantown, WV 26505

www.cdc.gov/niosh/injury/traumaagric.html

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Appendix B • Data and Analysis Methods

The *Worker Health Chartbook, 2004* is based on data collected from the surveys and surveillance programs described in Appendix A. The information used is largely in the public domain and is available from existing bulletins, reports, or government publications. The extensive use of electronic media and the World Wide Web have increased dissemination channels for government agencies, particularly where database management systems support customization of data queries from data users. At times, users overlook or are not sensitive to aspects of data collection, analysis methods, and dissemination practices that limit the uses and inferences of data. The following information is provided to assist the users of the *Chartbook* and reinforce the cautionary guides that accompany the dissemination of survey and surveillance data.

Census of Fatal Occupational Injuries (CFOI)

Census Measures

The Bureau of Labor Statistics (BLS) CFOI provides numeric and percentage distributions of its fatality totals for worker and case characteristics. Frequencies indicate the magnitude of a problem or the number of injuries that could be prevented. Worker and case characteristics used in the Chartbook include gender, age, race, and event or exposure.

Fatality Rates

Fatality counts from the BLS census are combined with annual average employment from the Current Population Survey [BLS 2003a] to produce a fatal work injury rate. Fatality rates depict the risk of incurring a deadly injury faced by all or a subgroup of workers, such as workers in a certain occupation or industry. The formula for calculating a fatality rate is

$$\text{Fatality rate} = (N/W) \times 100{,}000$$

where N = the number of fatally injured workers aged 16 and older, and W = the number of employed workers aged 16 and older. Because neither hours nor employment is collected in the BLS census, fatality rates are calculated using annual average employment estimates from the Current Population Survey (CPS). Employment-based fatality rates measure the incidence of a fatal injury for all workers in the group regardless of exposure time.

Uses and Limitations

The CFOI helps safety and health experts to monitor the number and types of fatal work injuries over time and focus on work settings with particularly high risks. The CFOI database can produce fatality profiles for specific worker groups (self-employed or female workers, for example), certain types of machinery (such as farm equipment), and specific fatal circumstances (for instance, 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 for which intervention strategies need to be developed.

Although States are using independent data sources to identify and substantiate work-related fatalities, some fatal injuries at work are missed by the BLS census. Some unidentified work-related fatalities undoubtedly occur on farms, at sea, and on highways. States continue to search for new ways of verifying work-related fatalities to make their census counts as complete as possible. In that regard, States have up to 1 year to update their initial published counts with fatalities that were verified as work-related after data collection had ended for a given census. Since 1992, the average change due to updates in each year's initially published total has been less than 1%.

Publication Guidelines

BLS considers data that could identify a person, company, or data source to be confidential and not for public release. Data that do not meet publication criteria are suppressed using dashes in tables and charts [BLS 2003b].

For further information, contact

U.S. Bureau of Labor Statistics
OCWC/OSH–Suite 3180
2 Massachusetts Avenue, NE
Washington, DC 20212–0001

Fatality information: 202–691–6175
Fax: 202–691–6196
Fatalities questions: cfoistaff@bls.gov
www.bls.gov/iif/oshcfoi1.htm

The Center to Protect Workers' Rights (CPWR)

The following methods were used in conjunction with producing the data in the Chapter 4 Figures of the NIOSH *Worker Health Chartbook, 2004*.

Fatal Injury Rates

Fatal injury rates were calculated using fatality counts from the BLS Census of Fatal Occupational Injuries (CFOI) as numerators, and a workforce estimate (denominator) based on hours worked data from the BLS Current Population Survey (CPS).

Construction trades were identified using CFOI three-digit occupation codes. A full-time equivalent (FTE) for each construction trade was obtained from the CPS, corresponding to the three-digit occupation codes. Each FTE was computed as an average value within each occupation group over the 12 months during each survey year using the formula FTE = $52HW/2000$, where H = hours worked per week, and W = the weighted value in CPS. This formula assumes a full-time employee works 40 hours per week and 50 weeks per year, or 2,000 hours per year. Respondents who did not report hours were excluded from the calculation.

A fatal rate was computed for each of the construction trades and the construction industry. Each annual rate was computed using the annual CFOI fatality count as the numerator, and the corresponding FTE estimate as the denominator, per 100,000 full-time equivalent workers.

Nonfatal Injury and Illness Rates

The calculation of nonfatal injury and illness rates was similar in methods to those employed for fatal injury rates. Numerators for the rate computations were taken from the BLS Annual Survey of Occupational Injuries and Illnesses using counts of cases involving days away from work for the same three-digit occupation codes noted above. FTEs for the self-employed were excluded from the computation. Rates were computed as above, but expressed per 10,000 full-time equivalent workers.

Hispanic Construction Workers

Hispanic origin or ethnicity, as defined in CFOI and the CPS, includes a diverse population of all races. Hispanics include U.S.- and foreign-born. In the CPS, individuals identify themselves or are identified as Hispanic by proxy respondents. In CFOI, multiple data sources, such as news accounts and death certificates, may be evaluated and serve to document Hispanic ethnicity or other racial characteristics.

Establishments

Information about establishments or employers was obtained from the most recent Economic Census. Large construction employers may include more than one establishment if they have more than one payroll office. The Economic Census produces information about the number of employees, location, industry code for principal activity, and other data for establishments with payrolls. The group of nonemployers, or establishments with zero employees reported, was excluded from these calculations. These nonemployers or establishments with zero employees for the month of March are not the same as self-employed workers. The workforce of self-employed is assessed based on the CPS household survey responses to class of worker questions. Some self-employed workers are in establishments with payroll, in which case they are the owner or partner.

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Mine Safety and Health Research Data Analysis Methods

Commodity Differences for Type of Employer (Mine Operators versus Independent Contractors)

The five commodity groups of coal (anthracite and bituminous), metal, nonmetallic minerals (nonmetal), stone, and sand and gravel are based on a slight modification of the Mine Safety and Health Administration's (MSHA) six canvass classes, which are general product classifications based on the Standard Industrial Classification (SIC) [OMB 1987]. The only modification combines anthracite and bituminous into one coal category. Because independent contractors may work at multiple mining operations associated with a diversity of commodities, a canvass class is not designated for independent contractors. Instead, independent contractors report employment under two categories: (1) all coal locations and (2) all metal, nonmetal, stone, and sand and gravel locations. As a result of these reporting differences, fatality and injury rates for independent contractors can only be computed for coal and metal/nonmetal locations.

Work Location

Employment and injuries reported within the underground operational subunit are designated as underground work locations. All other operational subunits (surface areas at underground mines, strip/open pit operations, culm banks, auger mining, dredging operations, other surface mines, independent shops, coal preparation plants or mills) are combined under surface work locations with the exception of the office subunit, which is excluded from all analyses.

Selection Criteria for Fatalities

The number of fatalities used for the analyses varies slightly from the number reported in the publicly released MSHA accident/injury/illness database because of the following: (1) injuries to nonemployees have been excluded from analysis; and (2) injuries identified by MSHA after the files were closed out are not included.

Employment Size of Mining Operations

The annual average number of employees (excluding office employees) reported by mining operations was used to categorize these operations by employment size. Employee hours used to compute fatality rates within categories of employment size also excluded employee hours reported for these office workers.

Selection Criteria for Lost-Workday Cases

Lost-workday cases include only those cases that resulted in total or partial permanent disabilities, actual days away from work, and days of restricted work activity (i.e., MSHA degree of injury codes 2 through 5). The number of lost workdays was computed by adding the days away from work and days of restricted work activity, with one exception. MSHA assigns scheduled lost-workday charges for permanent partial disabilities as a means to determine the relative severity of certain injuries regardless of the days lost [MSHA 2002]. For injuries resulting in total or partial permanent disabilities, lost workdays were the statutory days charged to the incident whenever the statutory days exceeded the lost workdays reported or when lost workdays were unreported.

Calculation of Rates

Injury rates were computed using employment estimates derived from total hours worked (excluding office employees). Full-time equivalent workers were calculated by dividing total hours by 2,000 hours per worker. Nonfatal injury rates were calculated per 100 full-time equivalent workers, and fatal injury rates were calculated per 100,000 full-time equivalent workers, excluding office workers.

Injury/Illness and Mining Experience Data Inclusion Criteria

Counts within categories of total years of mining experience included all reported injuries and illnesses (i.e., MSHA degree of injury codes 1 through 7) for the years 1991 through 2000 (Figures 4–16 and 4–17). Excluded were cases for which total mining experience was not reported.

Determining the Type of Incident Associated with the Injury

MSHA's accident/injury/illness classification scheme, which identifies the circumstances contributing most directly to the fatal or nonfatal injury, was used to establish the type of incident associated with a fatal or nonfatal injury [MSHA 2002]. The type of incident is identical to MSHA's accident/injury/illness classification with two exceptions:

> Both fatal and nonfatal cases classified as a fall of highwall or rib (accident/injury/illness code = 06) or as a fall of roof or back (accident/injury/illness code = 07) are reported as a fall of ground incident.
>
> Nonfatal injury cases occurring underground and classified under machinery (accident/injury/illness code = 17) were reclassified as a fall of ground if the source of the injury was caving rock, ore, etc. (MSHA source of injury code = 90). This reclassification is consistent with the way in which MSHA classifies similar incidents that resulted in a fatal injury. Typically, the victim is operating a roof bolter or continuous miner and is struck by caving rock from the mine roof or rib.

For further information, contact

Surveillance and Research Support Branch
Pittsburgh Research Laboratory
National Institute for Occupational Safety and Health
P.O. Box 18070
Pittsburgh, PA 15236

Telephone: 412–386–6613

or

Surveillance, Statistics, and Research Support Activity
Spokane Research Laboratory
National Institute for Occupational Safety and Health
315 E. Montgomery Avenue, MS–P11
Spokane, WA 99207

Telephone: 509–354–8065

For more detailed information about mining employment and fatal and nonfatal injuries, please visit www.cdc.gov/niosh/mining/topics/data/default.htm.

National Electronic Injury Surveillance System (NEISS)

Case Definition

Cases are defined as follows:

- Medical: Nonfatal injuries and illnesses treated in an emergency department
- Population: Civilian, noninstitutionalized workers
- Work: Doing work for pay or other compensation (including arriving at or leaving work, but on the employer's premises); being transported between locations as a part of the job (excluding commuting to or from home); engaging in agricultural production activities; or working as a volunteer for an organized group (e.g., volunteer fire department)

- Demographics: All workers without restriction by age, type of employer or industry (e.g., self-employed, private industry, or government), or employer size

Case Exclusions

The following types of cases are excluded:

- Injuries or illnesses to active duty military, national guard, and State militia
- Injuries or illnesses to institutionalized persons including prisoners or mental health patients
- Common illnesses (e.g., colds and flu)
- Routine drug and alcohol screening
- Revisits to the same emergency department for a previously treated injury or illness

For the purposes of this *Chartbook*, injuries and illnesses to workers under age 15 were excluded in all graphs.

Case Identification

Work-related cases are identified from admissions information and emergency department chart review by hospital coders. A workers' compensation claim is not required for inclusion.

Injury and Illness Estimates

NEISS is designed to produce national estimates and is not suitable for regional, State, or local injury and illness estimates. A national estimate is obtained by extrapolating the number of cases seen in the approximately 67 hospitals by using the statistical weight of each case. The statistical weight varies depending on the size of the hospital and the number of patients typically treated in their emergency department. Each case captured in a sample hospital may represent 20 to more than 100 cases seen in other U.S. hospitals. By adding the weights for similar cases, a national estimate is obtained for a demographic group, type of injury, injury circumstances, or all injuries and illnesses. The public may access NEISS work-related injury and illness data through the NIOSH online Work-Related Injury Statistics Query System (Work-RISQS at www2a.cdc.gov/risqs). At Work-RISQS, national estimates are expressed in thousands of injuries and illnesses for a given year. For example in 1999, an estimated 3,930.9 thousand or 3,930,900 occupational injuries and illnesses were treated in U.S. hospital emergency departments for workers who were aged 15 and older. Other surveillance systems may produce different estimates.

Injury and Illness Estimate Confidence Bounds

Because the NEISS system is a sample of all U.S. hospitals and does not count every injury or illness treated in all hospitals, the national estimates may be in error. However, because the sample was statistically selected, we can calculate what the error due to sampling is likely to be. Each estimate produced for NEISS data through Work-RISQS has confidence bounds listed. The error estimates are based on the 95% confidence interval and are expressed as a value that should be subtracted from the estimate to get the lower confidence bound and added to it to get the upper bound. For example, in 1999, there were an estimated 3,930.9 thousand work-related injuries and illnesses with 95% confidence bounds of ±793.7 thousand cases for workers aged 15 and older. In other words, we expect the true value from this system is likely to be in the range of 3,137,200 to 4,724,600 injuries and illnesses. Simply put—about 3 to 5 million nonfatal occupational injuries and illnesses were treated in U.S. emergency departments in 1999.

The confidence bounds do not account for biases (nonsampling error) in the estimates that arise from the way in which data are collected or defined, ability to identify all work-related cases, or mistakes in data collection or coding.

The 95% confidence bounds are an approximation based on the classical formula for variance of a total from a stratified sample. These confidence bounds are an approximation of the general magnitude of error about an estimate and are not precise values.

Worker Population

The employment estimates used by NIOSH with NEISS data and Work-RISQS are derived from the U.S. Bureau of Labor Statistics Current Population Survey (CPS) of civilian noninstitutionalized workers. Employment estimates are calculated for Work-RISQS as full-time equivalent workers (FTE), where one FTE equals 2,000 hours worked per year. The FTE estimates account for hours worked in all jobs reported to CPS. At Work-RISQS, FTE estimates may be obtained by month, quarter, or year for workers aged 15 and older. FTE estimates may be obtained by age group or sex.

Volunteer workers are not included in CPS estimates, although they are included in the NEISS and Work-RISQS injury/illness counts. This creates a small but insignificant bias in rate estimates.

Approximate standard errors are calculated for CPS employment estimates by using parameters for selected demographic characteristics in a generalized variance function provided by the Bureau of Labor Statistics (see BLS [2001]). Parameters are independent of the time period selected within a given year, although they may change from year to year. In the calculation of error in the employment estimate, the selection of the variance parameters for the year are chosen based on the appropriate employment characteristics. When multiple characteristics apply for subsets of sex or age groups, the parameters are chosen to provide the most conservative error estimate (i.e., the largest error estimate). The errors generally decrease with longer time periods and when a selected sex or age group spans fewer than 20 years. However, the errors resulting from these calculations are only an approximation of the true sampling error and do not account for systematic biases in the data.

Injury and Illness Rate Estimates

In workplace safety, the injury/illness rate is commonly calculated as the frequency of injuries divided by the number of workers or the number of hours worked within a time period. Work-RISQS only provides rates as the number of injuries and illnesses per 200,000 hours worked (i.e., 100 FTEs) for time periods of a month, quarter, or year. A rate estimate query at Work-RISQS produces a table that includes the number of injuries and illnesses treated in an emergency department (the rate numerator), the FTE (the rate denominator), the rate per 100 FTEs, and the confidence bounds expressed as a value to be added and subtracted from the rate value.

Minimum Reporting Requirements

NEISS data reported through Work-RISQS have three criteria to determine whether a national estimate is reportable. First, estimates must be based on at least 40 cases among the small sample of U.S. hospitals within NEISS. This means that on average, a type of injury was treated at least once in about two-thirds of the 67 hospitals. Second, the national estimate must be greater than or equal to 2,500 injuries/illnesses. Third, the error associated with an estimate must be small enough to indicate that the estimate would be reasonably reproducible (i.e., the coefficient of variation is less than or equal to 33%).

Selected Data Elements

Sex

Definition: The distinction between male and female. A worker's sex is indicated as male, female, or not stated. In any given year's data, the number of cases with sex listed as not stated is very small (e.g., typically < 0.01% of all cases).

Age group

Definition: Inclusive range of ages of patients (in years). Injured or ill workers are grouped by age ranges (typically a 5-year range). One or more age groups may be selected. No age restrictions exist for cases captured in NEISS provided they meet the definition of a work-related case. However, injury rates are not available for youths under age 15 because data on hours worked are not available. Age is unknown for a small proportion of cases.

Race/Ethnicity

Definition: Construct for classifying people with similar biological, social, and cultural heritage into four race groups (White, Black, American Indian/Alaska Native, and Asian/Pacific Islander) and one ethnicity group (Hispanic or Latino) as recorded on the emergency department chart.

Within the original NEISS data, race and ethnicity of an injured worker are collected as a two-part question. In the first part, race is coded as white, black, other, or not stated. In the second part which is free text, other races may be described such as Asian or American Indian, or ethnicity may be entered such as Hispanic or Latino. Because NEISS hospitals do not collect race and ethnicity uniformly (if they collect or report it at all) and because of the two-part nature of the NEISS race/ethnicity question, consistent reporting of race and ethnicity is not always achieved. For example, a Hispanic patient might be indicated as (1) white or black with the free text blank (only race reported); (2) white or black with Hispanic entered into the free text (both race and ethnicity reported); and (3) other, with Hispanic in the free text field (only ethnicity reported).

Within Work-RISQS, race and ethnicity were recoded under a single combined data structure where Hispanic ethnicity was indicated preferentially as opposed to white or black race. Thus, for the purposes of estimating injuries and illnesses, workers who were identified as white or black and Hispanic or Latino were counted under their Hispanic ethnicity. If originally race was listed as other, and the free text contained a country of origin or ancestry, those cases were recoded to the race or ethnicity category predominant for the region (e.g., Chinese was recoded as Asian and Mexican was recoded as Hispanic). Race was recoded as not stated if the free text listed Indian without an indication that the patient was American Indian or Native American. However, Indian was recoded to American Indian if the NEISS hospital where the case was seen generally treated a large population of American Indians.

Note: Because of these and other problems in collecting race and ethnicity information and missing information for approximately 20% of cases, Work-RISQS estimates for specific race or Hispanic worker populations should be used with caution.

Data Objectives and Limitations

The primary objective of NEISS data collection and the online Work-RISQS is to provide public access to occupational injury and illness data for use in workplace safety and injury prevention activities for which understanding the general magnitude of injuries, worker characteristics, and injury events are important (e.g., estimating the number of falls from elevation). Use of these data for other purposes should be done with caution. NEISS is not suitable for examining rare events or events involving very detailed specification of the incident characteristics, workplace setting, personal protective equipment, or tools, machinery, or objects that were associated with the injury (e.g., estimating the number of falls from Type IA aluminum extension ladders made by XYZ Manufacturing or the number injured workers wearing fall protection).

Occupational Respiratory Disease

Number of Deaths

In this report, the number of deaths for each occupational respiratory condition is the number of decedents for which the condition was coded as either an underlying or contributing cause of death. For the years 1968–1998, these numbers were tabulated from the record axis of the National Center for Health Statistics (NCHS) multiple-cause-of-death data files. Beginning with the 1999 data, these numbers were tabulated from the entity axis and the underlying cause of death of the multiple-cause-of-death data files. A small number of deaths in 1999 with underlying cause code J65 (pneumoconiosis associated with tuberculosis) were included in tabulations of the underlying cause of death for each type of pneumoconiosis. Similarly, deaths in 1999 with underlying cause code J92.0 (pleural plaque with asbestos) were included in tabulations with asbestosis as the underlying cause of death. The number of deaths by condition is reported both annually and for selected time periods. Reported deaths are restricted to U.S. residents aged 15 or older based on State of residence at death. Race was classified as white, black, and all others.

Industry and Occupation Codes and Titles

Since 1993, the 1990 U.S. Census Bureau occupation and industry titles and three-digit codes [Census 1992] have been used for coding death certificate information in the NCHS multiple-cause-of-death data files (see Technical Appendix for 1995 at www.cdc.gov/nchs/about/major/dvs/mcd/1998mcd.htm). Occupation and industry mortality data for 1984–1992 were based on the 1980 Census Bureau occupation and industry classifications [Census 1982]. Most codes and titles in the 1990 system do not differ from the 1980 system. The primary industries associated with silicosis and work-related asthma cases in the SENSOR sections of this report are grouped by the 1987 SIC system. However, the primary occupations are grouped by the 1990 Census Bureau classification system.

Age-Adjusted Mortality Rates

Age-adjusted mortality rates presented in this report were based on deaths with the condition of interest mentioned as an underlying or contributing cause of death. Rates were calculated annually for each specified condition from 1968 through 1999, as well as for selected periods. For a given year, the age-adjusted rates represent the rates that would have been observed if the age-specific rates for specified age groups had occurred in a population with the same age distribution as the standard population. To conform with current NCHS guidelines, the year 2000 standard population [Anderson and Rosenberg 1998] was used as the standard. The age intervals used were 15–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84, and 85 years and older. Rates for the entire U.S. population and for each sex-race group were age-adjusted separately, using the same standard population.

Age-adjusted rates were computed by the direct method. First, the annual age-specific rates for the population were calculated. The product of the age-specific rates and the number in the comparable age-specific group in the standard population equals the expected number of deaths per million population for each age group. The total expected numbers of deaths were then obtained by adding all age groups. The total expected number of deaths was divided by the sum of the standard population and the resulting quotient was multiplied by 1,000,000 to produce the age-adjusted rate (per million).

Age-adjusted rates were computed at the national and State level for the period 1990–1999. Rates also were computed at the county level either for two 15-year periods and one 30-year period (1970–1984, 1985–1999, and 1970–1999) or for a single 20-year period (1980–1999), depending on whether the condition was discretely classified during those time periods. Rates for malignant mesothelioma were computed for 1999 only. For each time period (1970–1984, 1970–1999, 1980–1999, 1985–1999, and 1990–1999), age-specific rates were first computed by dividing the average annual number of deaths in each age group by the corresponding age-grouped, mid-year population (1977, 1985, 1990, 1992, and 1995, respectively) in the comparable geopolitical unit. Age-adjusted rates then were computed as described above.

Proportionate Mortality Ratio (PMR)

The data used for PMR analyses are a subset of the NCHS multiple-cause-of-death files for which usual industry and occupation codes are available and meet quality criteria set by NCHS. The PMR is defined as the observed number of deaths with the condition of interest (mentioned as either underlying or contributing) in an industry/occupation from selected States and years, divided by the expected number of deaths with that condition. The expected number of deaths is the total number of deaths in the industry or occupation classification of interest multiplied by a proportion. This proportion is defined as the number of cause-specific deaths for the condition of interest in all industries/occupations divided by the total number of deaths in all industries/occupations. The PMRs in this report have been internally adjusted by 5-year age groups (i.e., 15–19, 20–24, …, 110–114, and 115 years and over), sex, and race (i.e., white, black, and all other). Confidence intervals were calculated assuming Poisson distribution of the data.

A PMR greater than 1.0 indicates that more deaths were associated with the condition in an occupation or industry than expected. This report includes only those industries/occupations with 5 or more decedents with the condition and a lower 95% confidence limit exceeding 1.0.

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Survey of Occupational Injuries and Illnesses (SOII)

Survey Measures

The number of injuries and illnesses are reported nationwide and by industry for three basic types of cases:

Lost-workday cases

Cases involving days away from work

Nonfatal cases without lost workdays

Lost-workday cases may include (1) cases involving days away from work, or (2) cases involving restricted work activity only, or (3) both. For cases involving days away from work, the survey presents numeric and percent distributions by occupation and by the worker demographic traits and case characteristics, such as the part of body involved, the nature of the injury or illness, the source of the injury or illness, and the event or exposure in which the injury or illness was produced or inflicted. In addition, the survey includes two measures of severity for lost work-time cases: median number of workdays lost and a percent distribution of days-away-from-work cases by their duration. The latter measures are presented nationwide by industry and for the aforementioned worker and case characteristics.

In addition to injury and illness counts, the survey also reports on the frequency (incidence rate) of such cases. Incidence rates permit comparison among industries and establishments of varying sizes. They express various measures of injuries and illnesses in terms of a constant, i.e., exposure hours in the work environment (for example, 200,000 employee hours or the equivalent of 100 FTE employees working for 1 year), thus allowing for a common statistical base across industries regardless of employment size of establishments.

Incidence rates also are useful in evaluating the safety performance of an industry over time or in comparing State-to-State variations in an industry's safety record. Such comparisons are possible using the total case rate or the rate for lost-workday cases, days-away-from-work cases, or nonfatal cases that do not involve lost workdays. These measures are available for injuries only and for injuries and illnesses combined. For illnesses, rates are available for total cases and separately for the seven illness categories (see Chapters 1 and 3). Rates for days-away-from-work injuries and illnesses are also available for the various categories of the four case characteristics studied, for example, the incidence rates associated with carpal tunnel syndrome, back cases, injuries inflicted by health care patients, or disabling falls to a lower level.

Incidence Rate Calculation

Incidence rates are calculated using the total obtained through BLS weighting and benchmarking procedures [BLS 2003]. The adjusted estimates for a particular characteristic, for example injury and illness cases involving days away from work, are aggregated to the appropriate level of industry detail. The total is multiplied by 200,000 (the base number of hours worked by 100 full-time employees for one year). The product is then divided by the weighted and benchmarked estimate of hours worked as reported in the survey for the industry segment.

The formula for calculating the incidence rate at the lowest level of industry detail is

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

Incidence rates for higher levels of industry detail are produced using aggregated weighted and benchmarked totals. Rates may be computed by industry, employment size, geographic area, extent or outcome of case, and case characteristic category. Rates for illnesses and rates for case 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. 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.

State Participation

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

Publication Guidelines

The estimating procedure generates occupational injury and illness estimates for approximately 900 SIC codes. *Industry estimates are not published* if one of the following situations occurs:

- Estimates for the industry are based on reports from fewer than three companies; the industry had fewer than six employees; or, if three or more companies report data for the industry, one firm employs more than 60% of the workers.
- Average employment for the industry was fewer than 10,000 in the survey year. However, data for an industry with an annual average employment of less than 10,000 can be published if most of the employment was reported in the survey.
- The relative standard error on total lost-workday cases for the industry exceeds a specified limit.
- The benchmark factor for the industry is less than 0.90 or greater than 1.49.
- Publication might disclose confidential information.

Data for an unpublished industry are included in the total for the broader industry level. In addition, selected items of data are suppressed for publishable industries if the sampling error for the estimate exceeds a specified limit, typically 60% at the national level.

For the case characteristics and demographic data, items of data are suppressed at the national level if one of the following situations occurred:

- The number of cases is fewer than five.
- The number of cases is greater than 5 and fewer than or equal to 20 and the sampling error for the estimate is greater than 60%.
- The number of cases is greater than 20 and the sampling error is greater than 40%.

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Fax: 202–691–6196
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www.bls.gov/iif/

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