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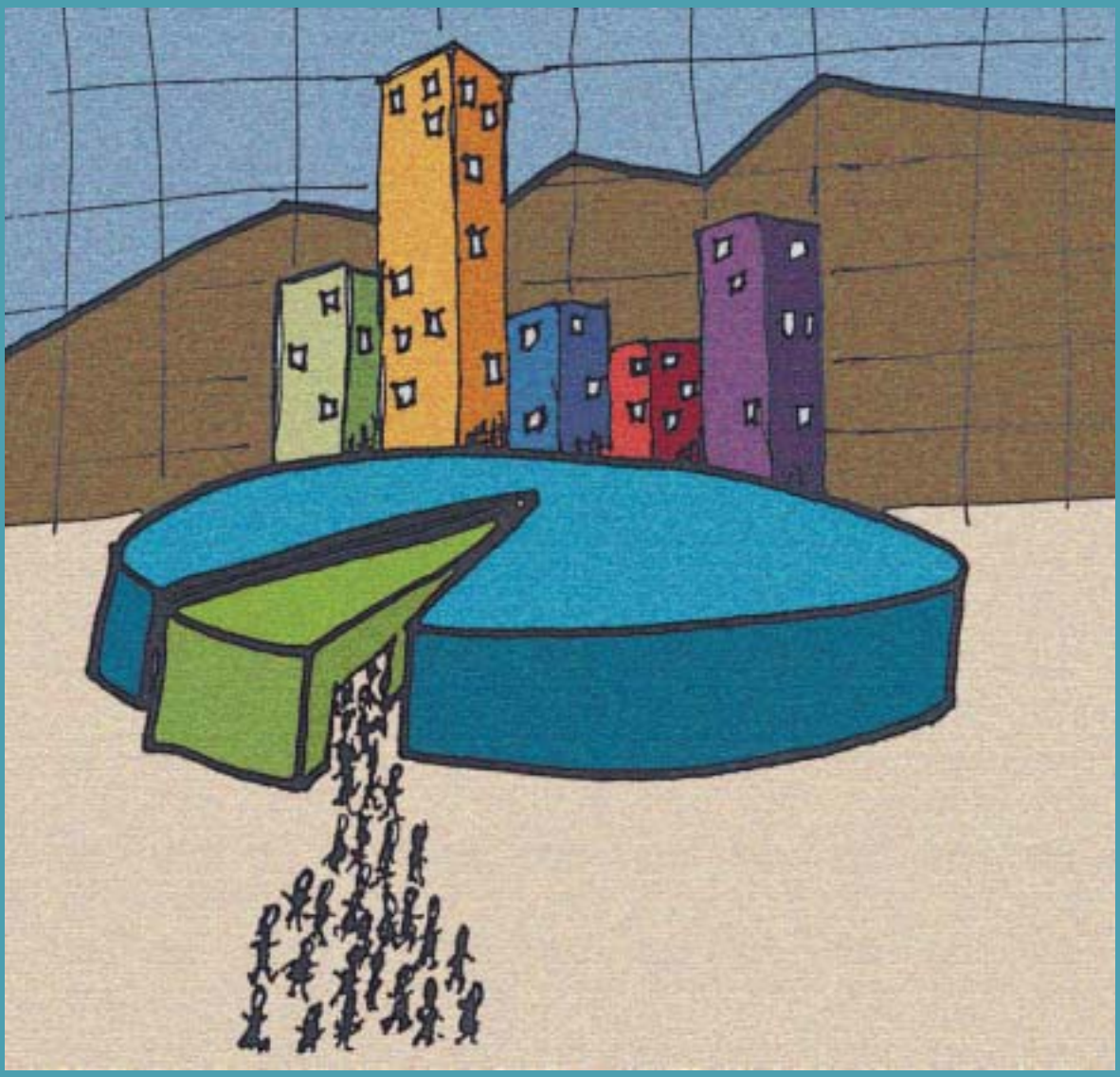
Workplace Safety and Health

Worker Health Chartbook, 2000

Nonfatal Illness



DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

NIOSH

Worker Health Chartbook, 2000
Nonfatal Illness

Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

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FOREWORD

The content of this booklet is taken from the *Worker Health Chartbook, 2000* (DHHS NIOSH Publication No. 2000-127), a comprehensive guide to surveillance data for work-related fatal and nonfatal injury and illness. The publication of the chartbook is an important step toward identifying and filling significant gaps in workplace injury and illness information. Several Federal agencies worked with NIOSH to compile data for the chartbook, using a variety of systems that track the nature, prevalence, and incidence of workplace injuries and diseases. These data help us identify new and emerging problems, analyze trends over time, target and evaluate the effectiveness of intervention efforts, and anticipate future needs and concerns. This booklet highlights nonfatal illness. It is intended for anyone interested in this topic, including occupational safety and health practitioners, policy makers, health care providers, educators, researchers, workers, and employers. The tracking of injury and illness is a cornerstone of prevention. We hope this booklet contributes to that effort.

Kathleen M. Rest, Ph.D., M.P.A.
Acting Director
National Institute for Occupational
Safety and Health

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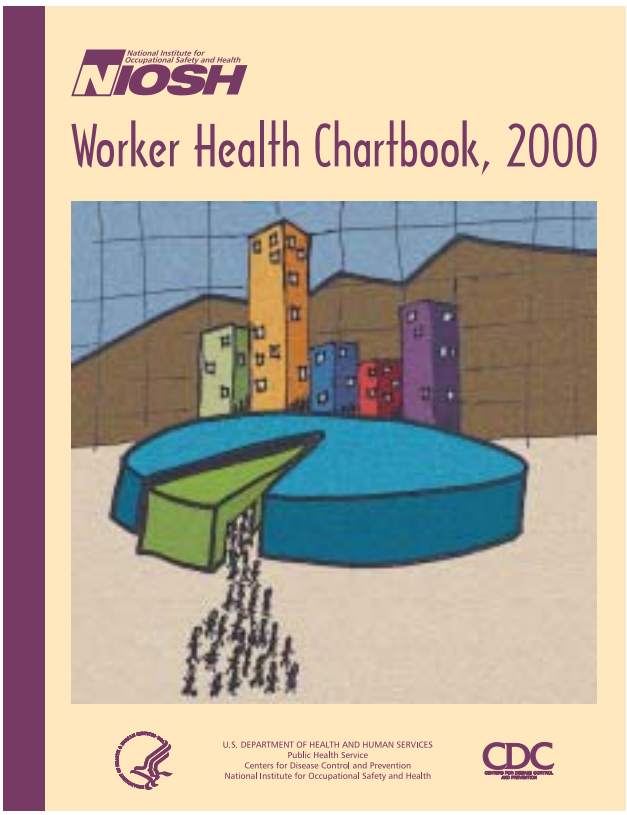

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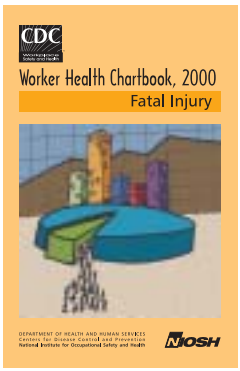

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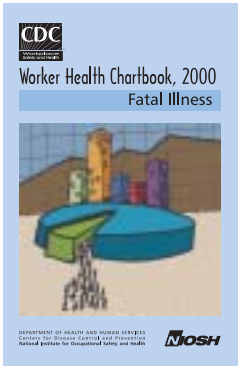

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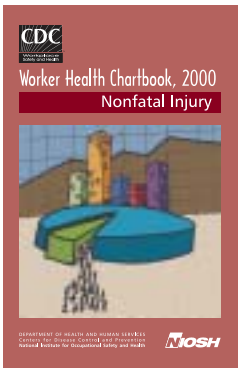
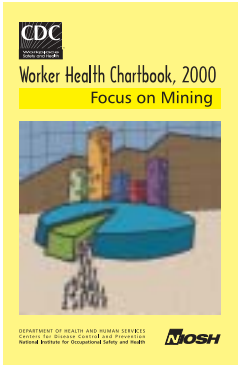


Nonfatal Injury (2002-119)



Focus on Mining (2002-121)

EXECUTIVE SUMMARY

The human and economic losses attributable to nonfatal occupational illness are difficult to fully assess. For many illnesses, there is a long latency between exposure and the development of disease, and the association of disease with occupation is not readily apparent. The failure of some health care professionals to routinely obtain patients' work histories and report work-related illnesses contributes to the lack of data. Even so, occupational health data systems have helped identify new and emerging problems and trends such as occupational musculoskeletal disorders and asthma.

The Bureau of Labor Statistics (BLS) records information about nonfatal occupational illness in the Survey of Occupational Injuries and Illnesses (SOII) using data from logs maintained by employers. Nearly 430,000 nonfatal occupational illnesses were recorded in SOII in 1997. About 60% of those illnesses occurred in the manufacturing sector. The illness incidence rate for 1997 was 49.8 cases per 10,000 full-time workers. Illness incidence rates varied by industry, with the highest rate occurring in manufacturing. The rates in private industry increased with establishment size, with the highest rate occurring in establishments employing 1,000 or more workers.

Disorders related to repeated trauma (including carpal tunnel syndrome [CTS], tendinitis, and noise-induced hearing loss) accounted for 64% of the occupational illnesses recorded in SOII in 1997. CTS accounted for more than 29,000 cases with days away from work in 1997. Half of the CTS cases required 25 or more days away from work. Most noise-induced hearing loss cases with days away from work occurred in manufacturing.

Skin diseases or disorders represented 13% (approximately 58,000 cases) of work-related illnesses recorded in SOII in 1997. Dermatitis, a subcategory of skin diseases or disorders, resulted in more than 6,500 cases with time away from work. Half of these cases required 3 or more days away from work.

Illnesses reported to SOII are those most easily and directly related to workplace activity (e.g., contact dermatitis). Diseases that develop over a long period (e.g., cancers) or that have workplace associations that are not immediately obvious are overwhelmingly underrecorded in SOII. Consequently, other approaches and data

sources have been developed to track occupational illnesses in a more active way. For example, the Sentinel Event Notification System for Occupational Risks (SENSOR) establishes a variety of simultaneous data sources to increase the chances of identifying a work-related illness in State surveillance systems. The California SENSOR program has specifically targeted surveillance of occupational CTS. Of the CTS cases identified in that program through physician first reports filed with the State compensation system in 1998, 30% occurred in the services industry and 17% occurred in manufacturing. Currently, the Michigan SENSOR program monitors noise-induced hearing loss. Manufacturing accounted for 51% of the noise-induced hearing loss cases reported by clinicians in 1998. Seven States have had active SENSOR programs for silicosis surveillance. From 1993 to 1995, 75% of silicosis cases occurred in manufacturing. In addition, four States have had active SENSOR programs for occupational asthma surveillance. The industry divisions accounting for the most cases from 1993 to 1995 were manufacturing (42%) and services (31%).

Other public and private programs describe toxic exposures, pesticide poisonings, X-rays of working underground coal miners, infections in health care workers, and self-reported respiratory diseases among nonsmokers by industry. For example, the Adult Blood Lead Epidemiology and Surveillance Program (ABLES) monitors elevated blood lead levels (BLLs) in persons aged 16 and older. In 1998, a total of 10,501 adults in 25 States had BLLs of 25 µg/dL or greater.

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ABBREVIATIONS

AAPCC ..... American Association of Poison Control Centers
ABLES ..... Adult Blood Lead Epidemiology and Surveillance Program
AIDS ..... acquired immune deficiency syndrome
BLL ..... blood lead level
BLS ..... Bureau of Labor Statistics
CDC ..... Centers for Disease Control and Prevention
CDPR ..... California Department of Pesticide Regulation
CI ..... confidence interval
COPD ..... chronic obstructive pulmonary disease
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
EPA ..... U.S. Environmental Protection Agency
HARS ..... HIV/AIDS Reporting System
HIV ..... human immunodeficiency virus
ILO ..... International Labour Organization or Office
NaSH ..... National Surveillance System for Hospital Health Care Workers
NCHS ..... National Center for Health Statistics
NCID ..... National Center for Infectious Diseases
n.e.c. ..... not elsewhere classified
NHANES III .... Third National Health and Nutrition Examination Survey
NIOSH ..... National Institute for Occupational Safety and Health
n.o.s. ..... not otherwise specified
PEST ..... Pesticide Exposure Surveillance in Texas Program
RADS ..... reactive airways dysfunction syndrome
SENSOR ..... Sentinel Event Notification System for Occupational Risk
SOII ..... Survey of Occupational Injuries and Illnesses

staffTRAK–TB ... Surveillance for Tuberculosis Infection in Health Care Workers
STD ..... sexually transmitted disease
TB ..... tuberculosis
TESS ..... Toxic Exposure Surveillance System
VHSP ..... Viral Hepatitis Surveillance Program
WoRLD ..... *Work-Related Lung Disease Surveillance Report 1999*
µg ..... microgram(s)

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NONFATAL ILLNESS

Illnesses are often more difficult to link with work than injuries. Illnesses related to occupational exposures (e.g., tuberculosis [TB], cancers, central nervous system disorders, and asthma) appear no different when encountered in the absence of occupational exposures. Work-related aspects of illness may go unrecognized for many reasons, including long latency periods between the exposure and development of some diseases and the failure of health care professionals to recognize or report work-related illnesses or obtain information about a patient's work history.

The Bureau of Labor Statistics (BLS) records information about nonfatal occupational illness in the Survey of Occupational Injuries and Illnesses (SOII) using data from logs maintained by employers. The illnesses reported in SOII are those most easily and directly related to workplace activity. Illnesses with workplace associations that are not immediately obvious are vastly undercounted in SOII. Other illness surveillance systems use different approaches to record and classify illnesses for targeting prevention efforts. Data are presented here from SOII and other systems, including the Sentinel Event Notification System for Occupational Risk (SENSOR), the Third National Health and Nutrition Examination Survey (NHANES III), the Coal Workers' X-Ray Surveillance Program (CWXSP), the Adult Blood Lead Epidemiology and Surveillance Program (ABLES), the National Surveillance System for Hospital Health Care Workers (NaSH), and various reporting systems for human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS), viral hepatitis, and TB. Details about each of the surveillance systems and information contacts are presented in Appendix A of the *Worker Health Chartbook, 2000* [NIOSH 2000].

Incidence of Occupational Illness in Private Industry

New nonfatal occupational illness cases recorded in SOII totaled 429,800 in 1997—the third year of decline in reported illnesses after a high of more than 500,000 cases in 1994 (Figure 1). Disorders associated with repeated trauma accounted for most of the decrease from 1994 to 1997. Sixty percent of nonfatal occupational illnesses reported in 1997 occurred in manufacturing (Figure 2). The overall incidence rate that year was 49.8 illnesses per 10,000 full-time workers, with the highest rates reported by establishments with 1,000 or more workers (Figure 3). The highest rate by industry division occurred in manufacturing (Figure 4).

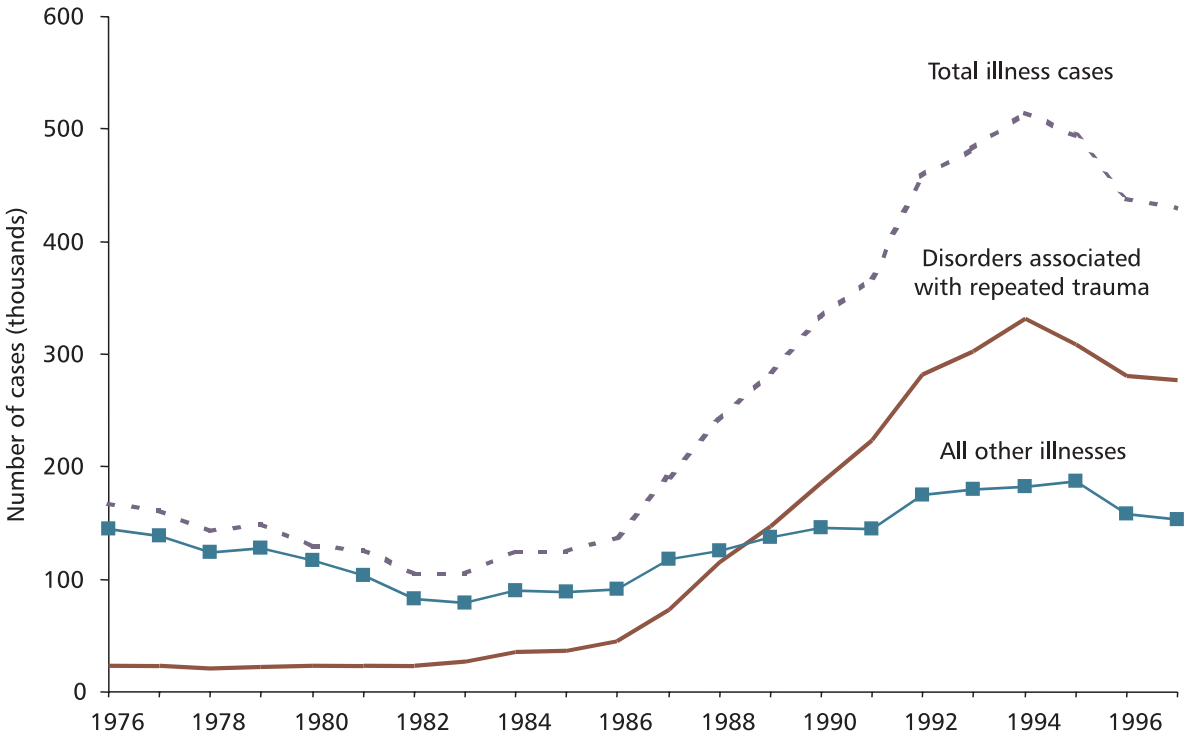

Figure 1. Incidence of nonfatal occupational illness cases in private industry, 1976–1997. (Source: SOII [1999].)

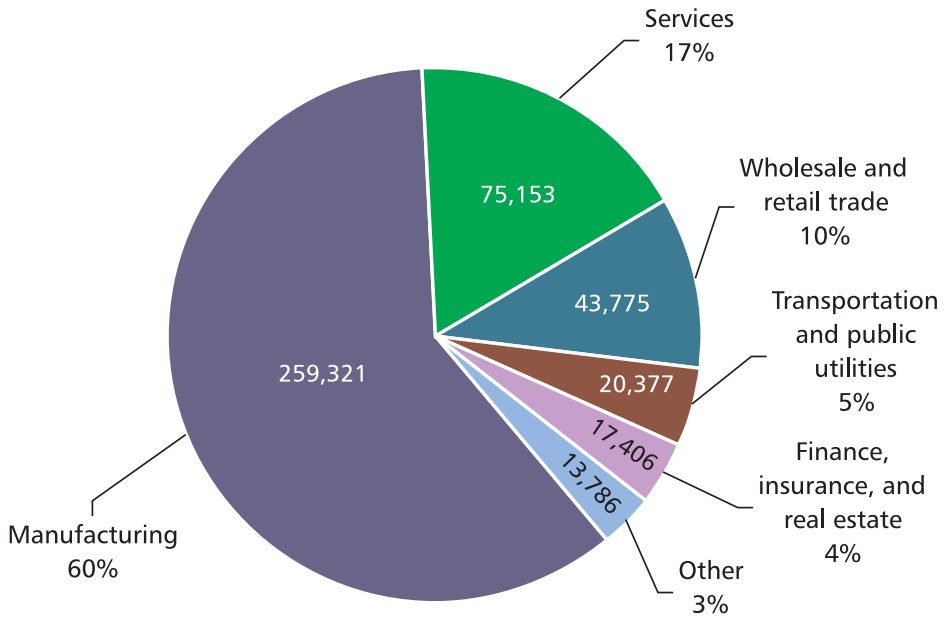

Figure 2. Number and distribution of nonfatal occupational illnesses in private industry by industry division, 1997. (Source: SOII [1999].)

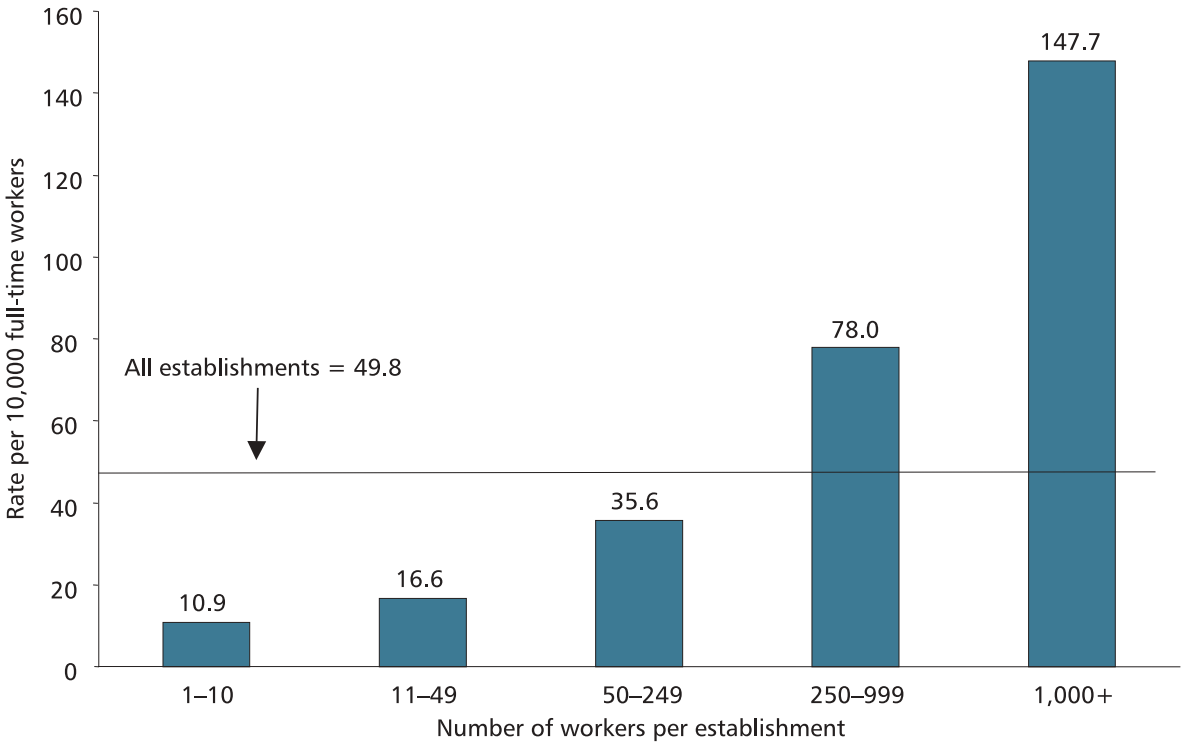

Figure 3. Incidence rates of nonfatal occupational illness in private industry by establishment employment size, 1997. (Source: SOII [1999].)

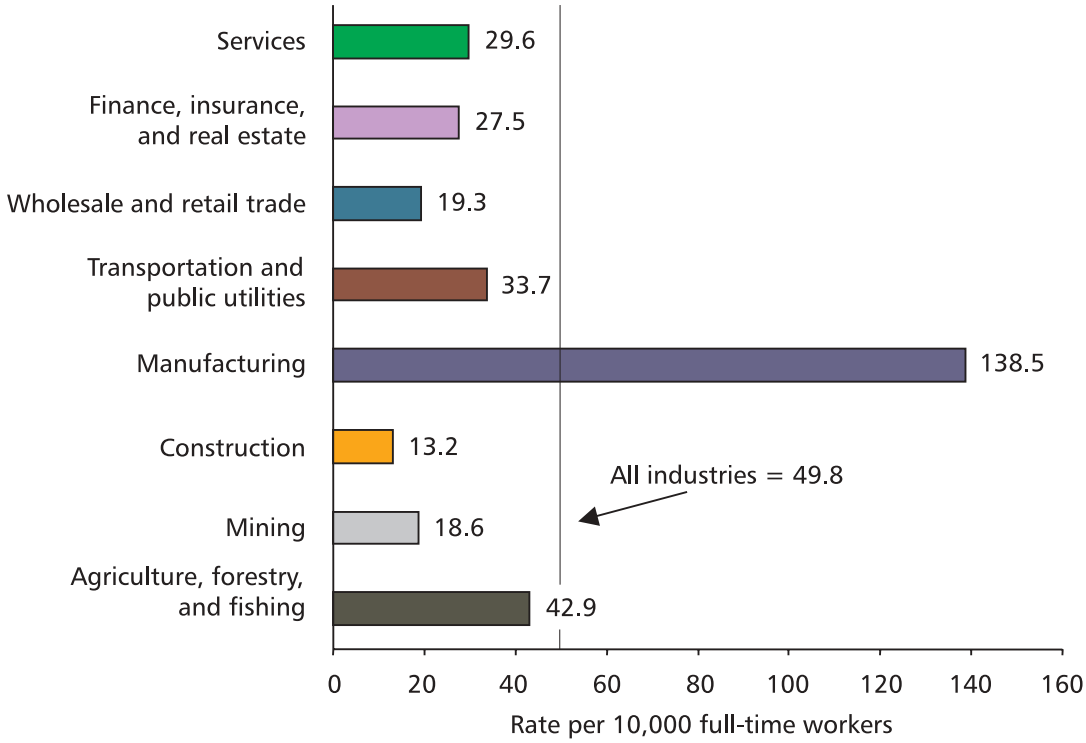

Figure 4. Incidence rates of nonfatal occupational illness in private industry by industry division, 1997. (Source: SOII [1999].)

Repeated Trauma Disorders

Repeated trauma disorders accounted for 64% (276,600 cases) of all nonfatal occupational illness cases recorded in SOII in 1997. Included in this category are carpal tunnel syndrome (CTS), tendinitis, and noise-induced hearing loss. Repeated trauma disorders accounted for most of the increases in nonfatal occupational illnesses recorded in SOII from 1976 through 1997 (Figure 1). Manufacturing accounted for 72% of the cases in private industry in 1997 (Figure 5). Industries associated with the highest rates of nonfatal occupational disorders involving repeated trauma were meat packing plants (1,192 cases per 10,000 workers), motor vehicles and car bodies (741 cases per 10,000 workers), and poultry slaughtering and processing (523 cases per 10,000 workers).

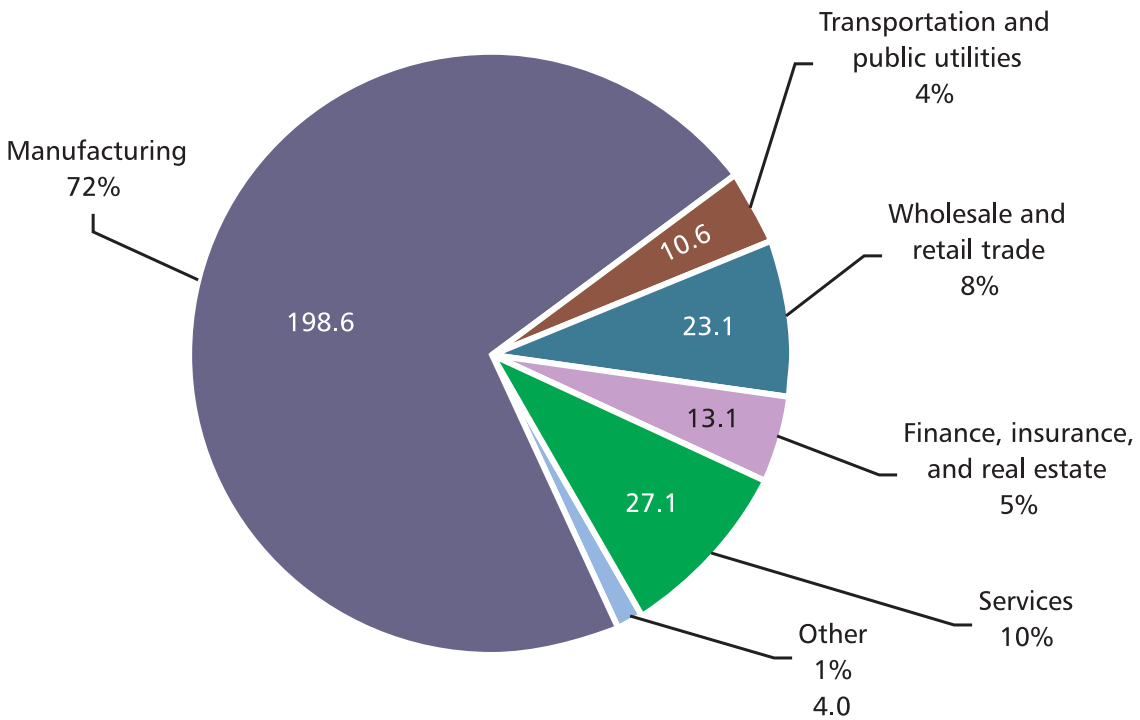

Figure 5. Number (thousands) and distribution of repeated trauma disorders in private industry by industry division, 1997. (Source: SOII [1999].)

Carpal Tunnel Syndrome

Cases Recorded by SOII

CTS accounted for more than 29,000 nonfatal occupational illness cases with days away from work recorded in SOII in 1997. Women accounted for 70% of these cases, and more than half of all CTS cases required 25 or more days away from work. Most CTS cases occurred in the manufacturing (42%) and service (21%) industries in 1997 (Figure 6) among operators, fabricators, and laborers (39%) and technical, sales, and administrative support personnel (30%) (Figure 7). The vast majority of SOII cases of CTS (98%) were attributed to job tasks requiring repetitive motion.

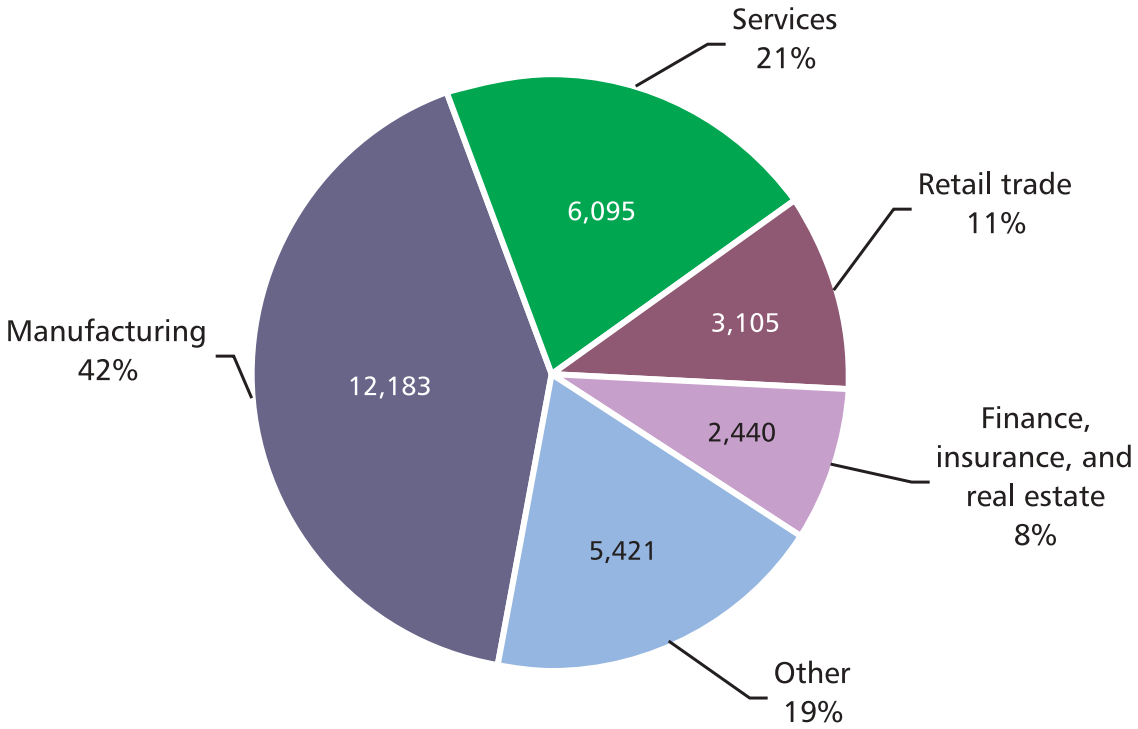

Figure 6. Number and distribution of CTS cases with days away from work in private industry by industry division, 1997. (Source: SOII [1999].)

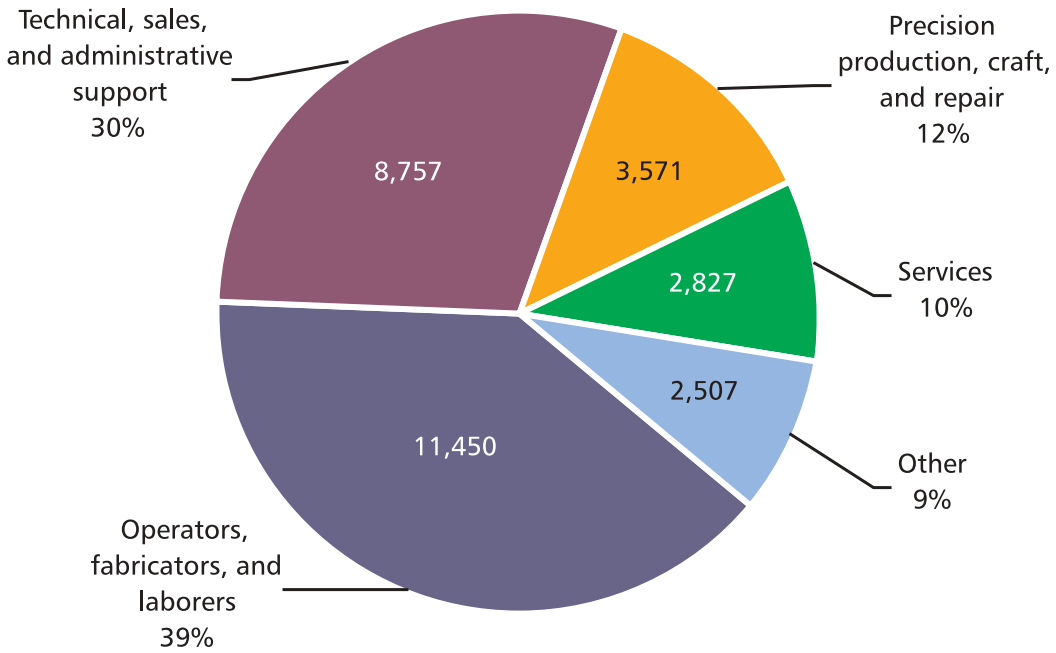

Figure 7. Number and distribution of CTS cases with days away from work in private industry by occupational group, 1997. (Source: SOII [1999].)

Cases Identified by SENSOR

In collaboration with the National Institute for Occupational Safety and Health (NIOSH), the California Department of Health Services conducts a SENSOR program for CTS using first reports filed by physicians seeking reimbursement through the State workers' compensation system. The CTS case definition for SENSOR includes (1) symptoms such as pain, burning, or numbness in the hands or wrists, (2) objective evidence from a physical examination or electrodiagnostic tests, and (3) a history of work involving one of the known risk factors. Of the approximately 1,300 CTS cases identified by the California SENSOR program in 1998, the industries with the most cases were services (30%), manufacturing (17%), and wholesale trade (15%) (Figure 8). Most cases occurred among technical, sales, and administrative support personnel (44%) and managerial and professional specialty personnel (14%) (Figure 9). Of the cases in which an activity or exposure was associated with the injury, 49% reported using a computer (Figure 10).

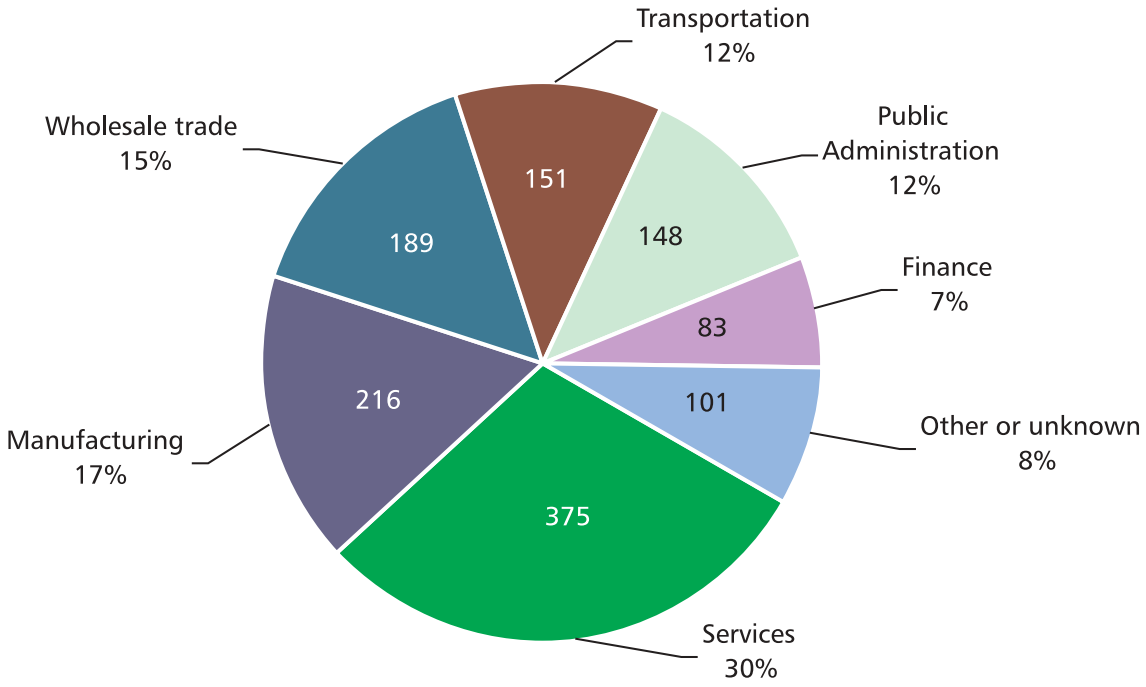

Figure 8. Number and distribution of CTS cases in California by industry group, 1998. (Source: SENSOR [California Department of Health Services 1999].)

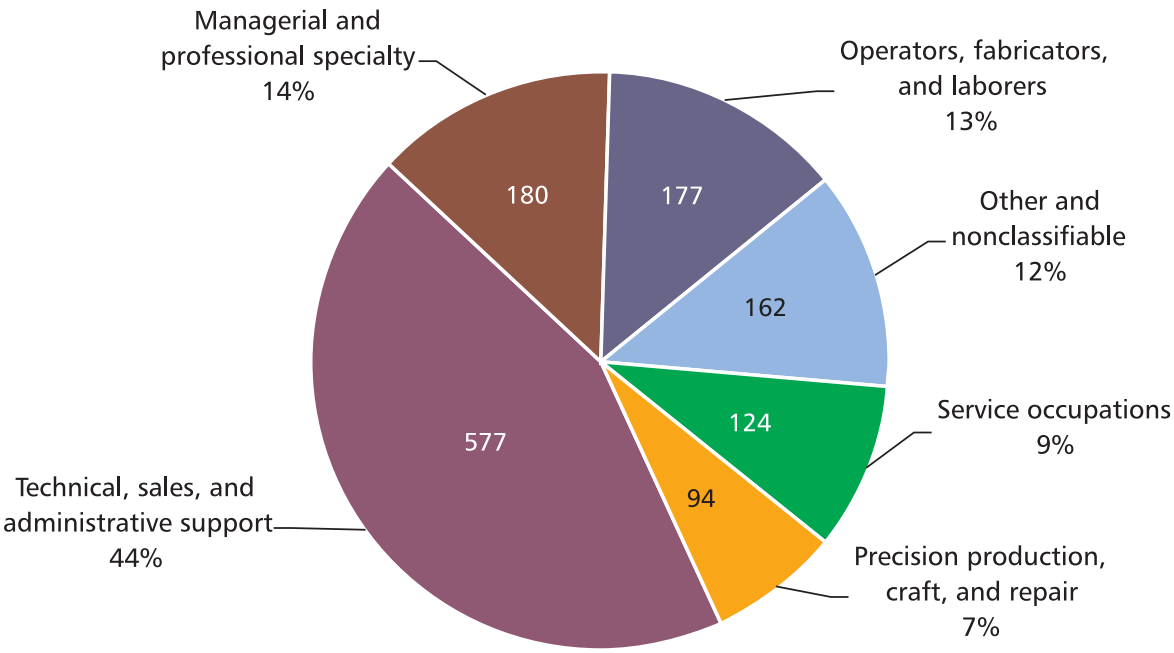

Figure 9. Number and distribution of CTS cases in California by occupational group, 1998. (Source: SENSOR. [California Department of Health Services 1999].)

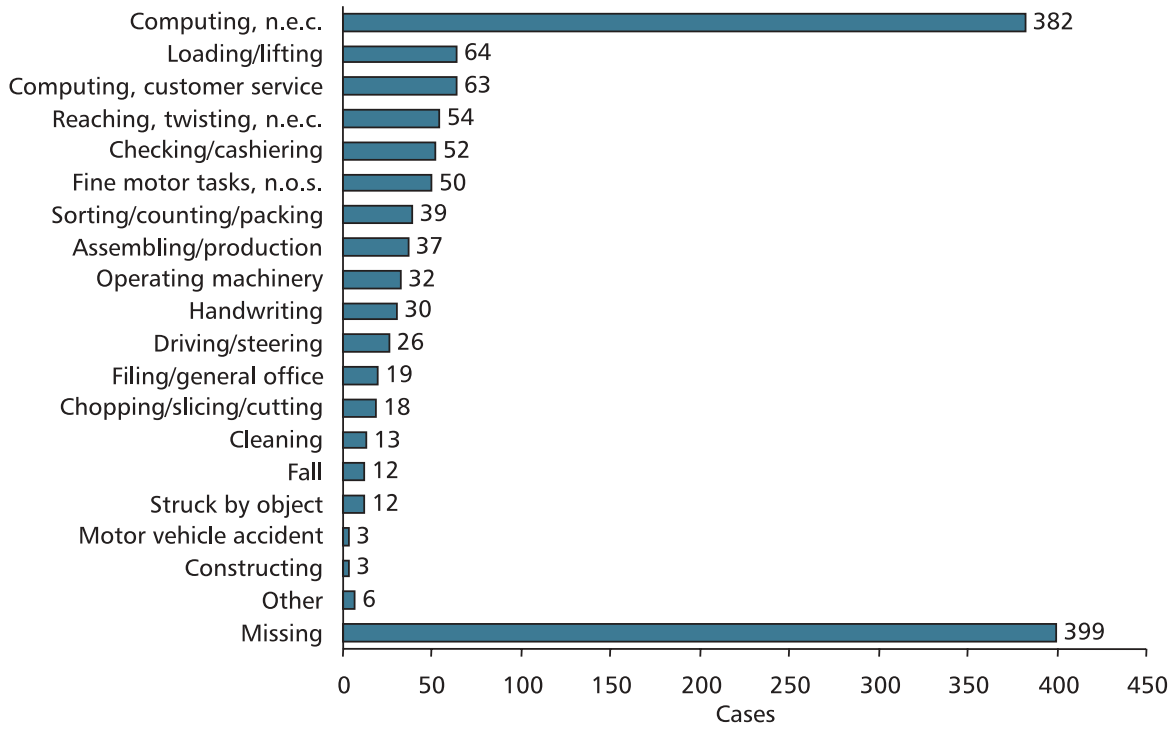

Figure 10. Number of CTS cases in California by type of activity or exposure, 1998. (Source: SENSOR [California Department of Health Services 1999].)

Tendinitis

Nearly 18,000 tendinitis cases recorded in SOII in 1997 required days away from work. Women accounted for more than 60% of those cases, and the upper extremities were affected in more than 70% of cases. Most cases occurred in the manufacturing (45%) and services (20%) industries (Figure 11) among operators, fabricators, and laborers (47%) and technical, sales, and administrative personnel (17%) (Figure 12). Worker motion or position was the event or exposure accounting for 73% of cases.

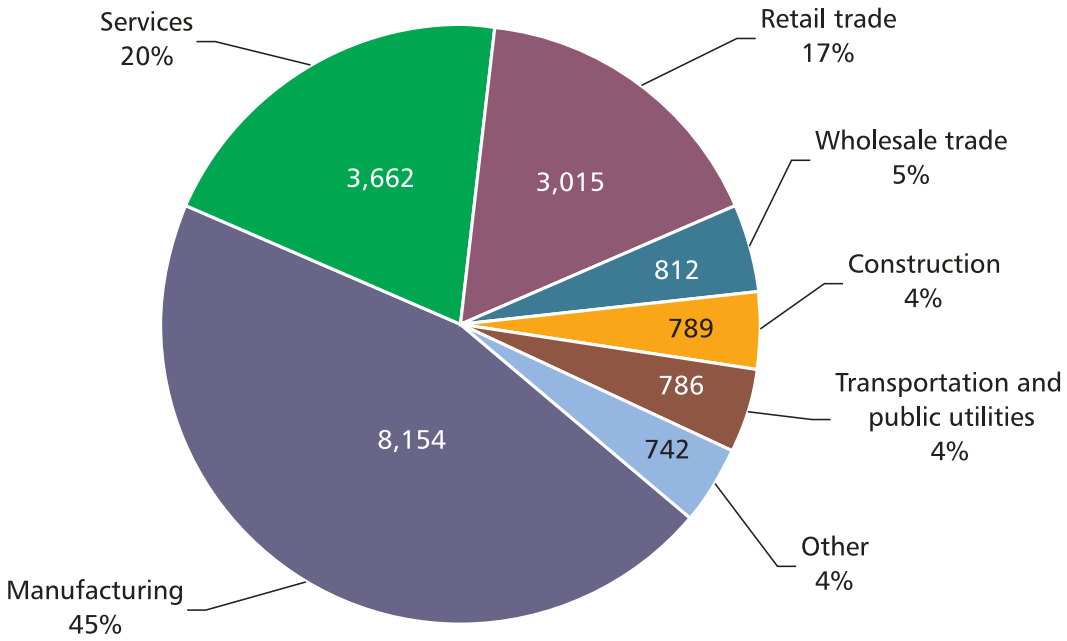

Figure 11. Number and distribution of tendinitis cases with days away from work in private industry by industry division, 1997. (Source: SOII [1999].)

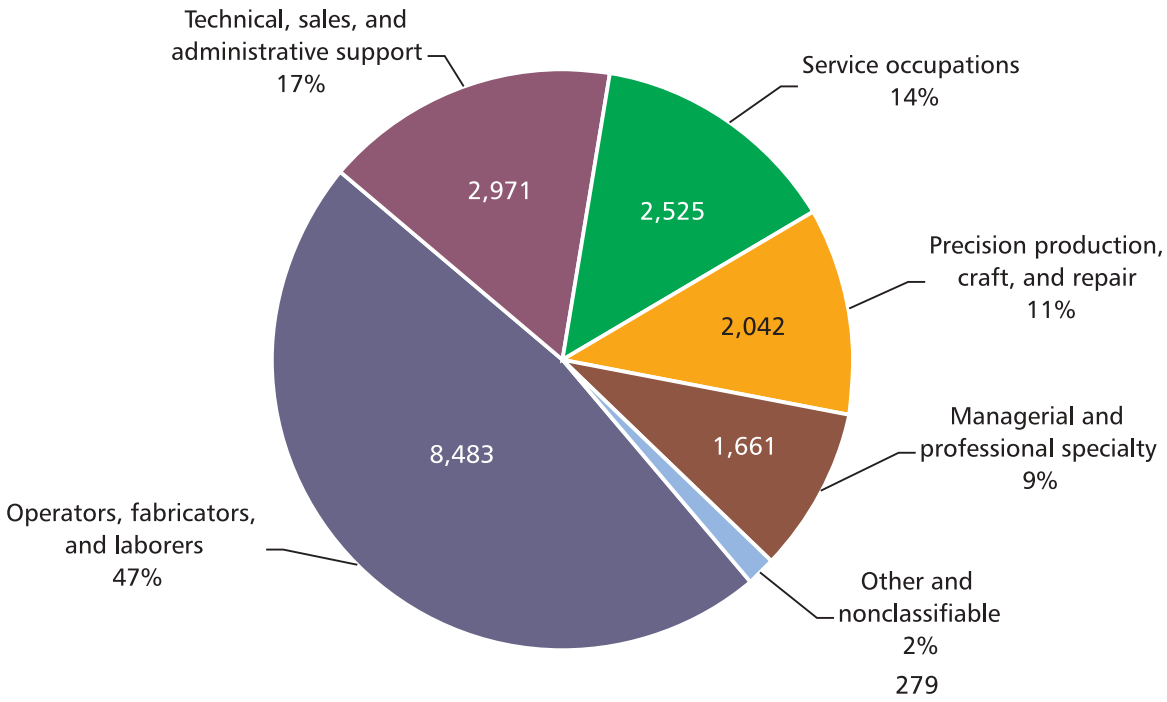

Figure 12. Number and distribution of tendinitis cases with days away from work in private industry by occupational group, 1997. (Source: SOII [1999].)

Noise-Induced Hearing Loss

A SENSOR program to protect workers from noise-induced hearing loss was initiated in Michigan in 1992. The case definition for occupational noise-induced hearing loss under the program requires audiometric findings consistent with noise-induced hearing loss and a history of noise exposure at work sufficient to cause hearing loss. This case definition includes (1) workers with standard threshold shifts reported by company hearing conservation programs and (2) workers with a permanent noise-induced hearing loss diagnosed by a clinician. From 1992 to 1998, there were 13,177 cases of noise-induced hearing loss reported by companies, audiologists, otolaryngologists, the Bureau of Workers' Compensation, and hospitals. Companies accounted for 85.2% of these cases (Figure 13). The SENSOR program interviews workers identified with permanent hearing loss by clinicians. In 1998, most of these cases were associated with manufacturing (Figure 14). Within the manufacturing sector, 60% of cases were associated with transportation manufacturing, which includes automobile manufacturing.

According to patient interviews, 25% to 76% of companies in major industry divisions did not test hearing at the time the worker was exposed to noise (Figure 15). Patients with hearing loss reported by companies (more than 85% of the reports) tended to be younger than patients whose hearing loss was reported by health professionals (Figure 16). Of the cases in which sex was listed, 89% were men.

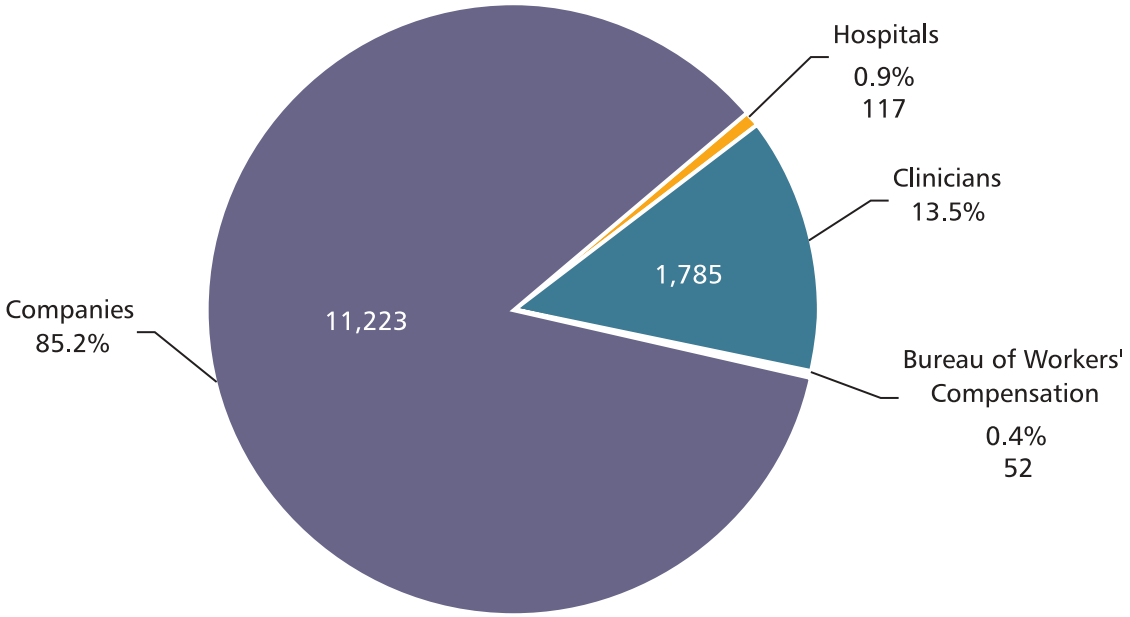

Figure 13. Number and distribution of noise-induced hearing loss cases in Michigan by source of reports, 1992–1998. Total number of cases was 13,177. (Source: SENSOR [Rosenman and Reilly 1999].)

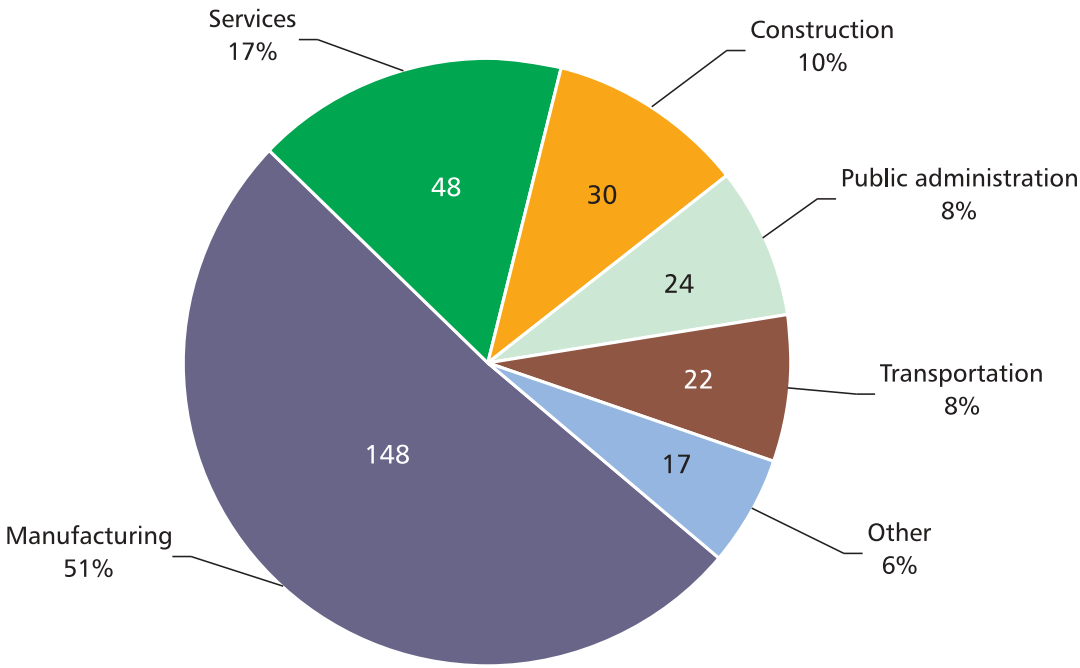

Figure 14. Number and distribution of permanent hearing loss cases reported by clinicians by industry division, 1998. (Source: SENSOR [Rosenman et al. 1999].)

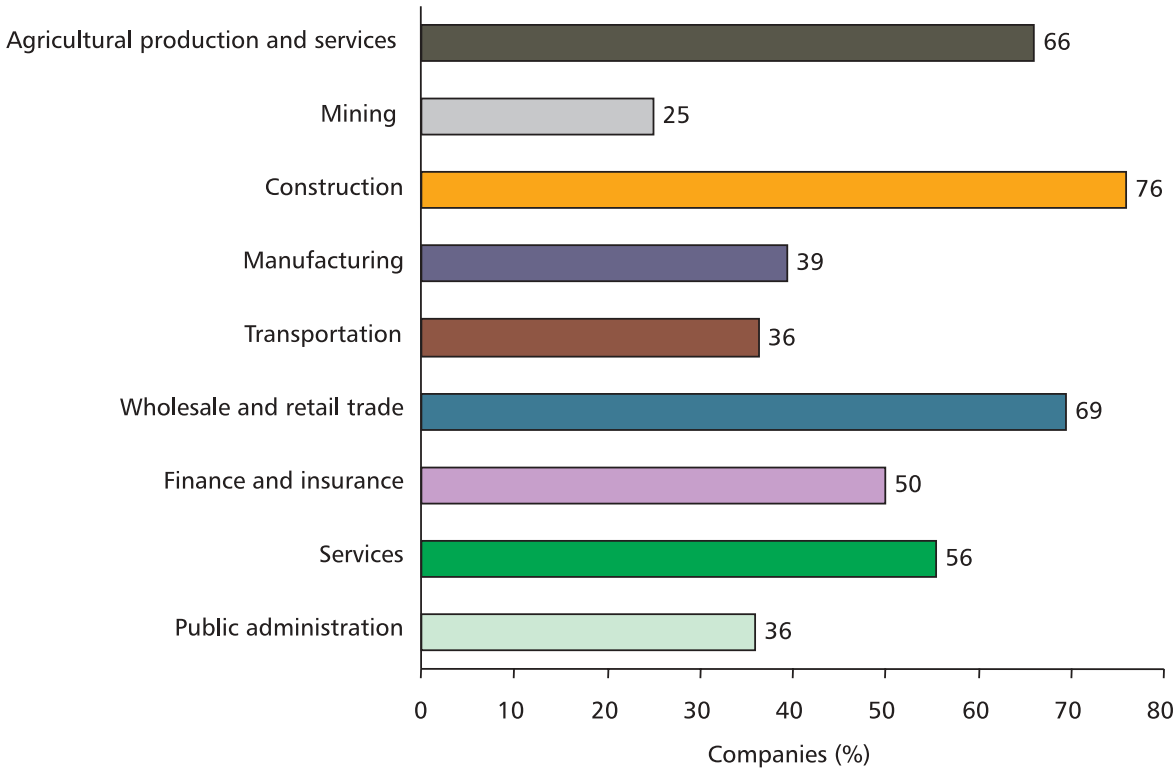

Figure 15. Percentage of companies within major industry divisions that did not test hearing at the time the worker was exposed to noise, as reported by patient interviews, 1992–1998. (Source: SENSOR [Rosenman et al. 1999].)

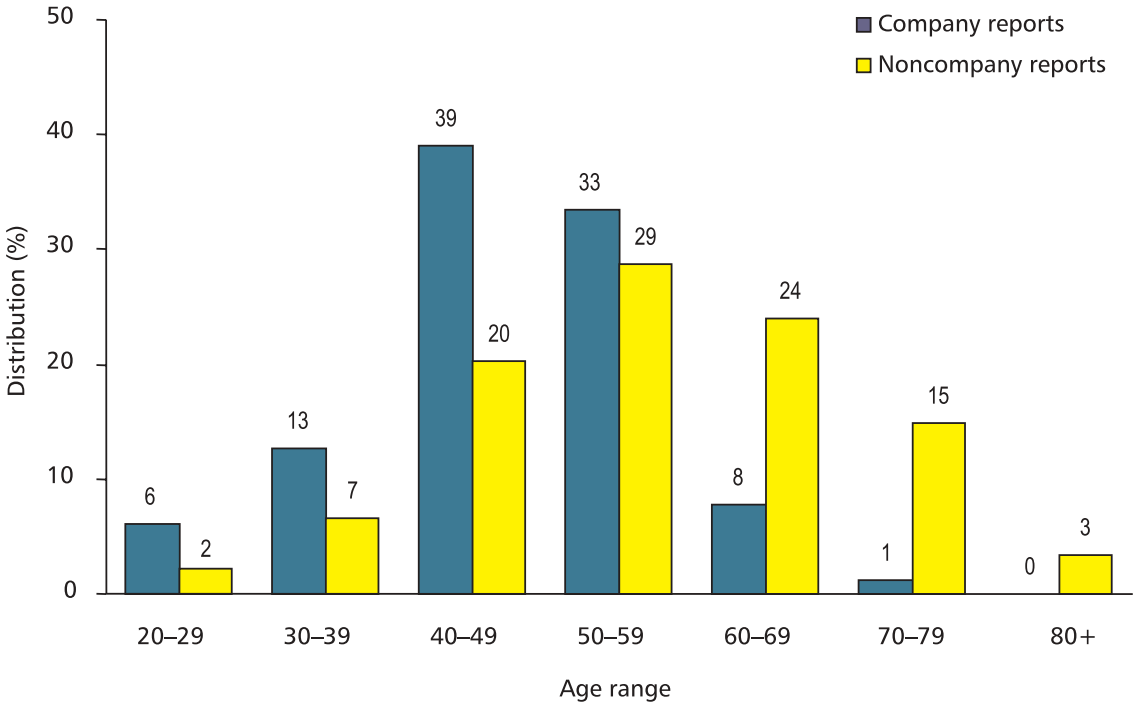

Figure 16. Distributions of noise-induced hearing loss cases by age range of patients and by company and noncompany reports, 1998. Age was unknown for 31 workers reported by company medical departments and 12 workers reported by noncompany hearing health professionals. (Source: SENSOR [Rosenman et al. 1999].)

Skin Diseases or Disorders

Skin diseases or disorders accounted for 13% (57,900) of all illness cases reported in SOII in 1997. These disorders include allergic and irritant dermatitis, skin cancer, and other conditions. Manufacturing accounted for 45% of the skin diseases or disorders in private industry in 1997 (Figure 17). The highest reported incidence rate was in the canned and cured fish and seafoods industry (181 cases per 10,000 workers). Other industries with the highest rates of occupational skin disease or disorder were meat packing plants (104 cases per 10,000 workers), ball and roller bearings (92 cases per 10,000 workers), and leather tanning and finishing (86 cases per 10,000 workers). Dermatitis, a subcategory of skin diseases and disorders, was associated with nearly 6,600 cases involving time away from work in 1997. A median number of 3 days away from work was associated with dermatitis. Exposures to chemicals and chemical products accounted for 53% of job-related dermatitis cases. The manufacturing and service industry divisions accounted for the most dermatitis cases with days away from work (29% each) (Figure 18). Occupational groups that experienced most dermatitis conditions were operators, fabricators, and laborers (36%) and precision production, craft, and repair personnel (18%) (Figure 19).

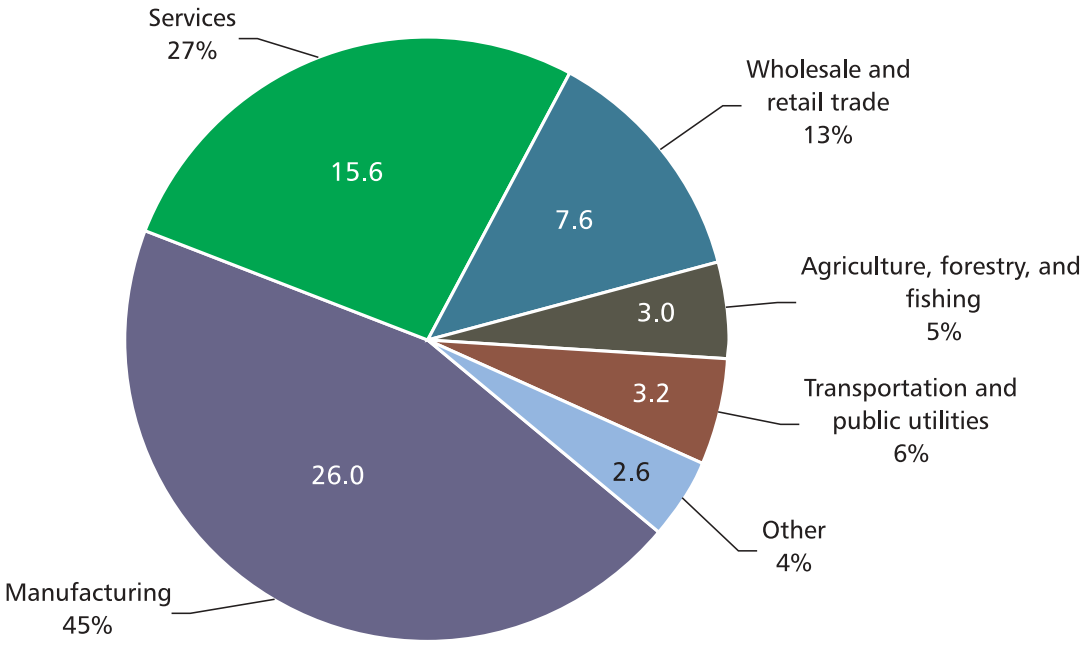

Figure 17. Number (thousands) and distribution of skin disease or disorder cases in private industry by industry division, 1997. (Source: SOII [1999].)

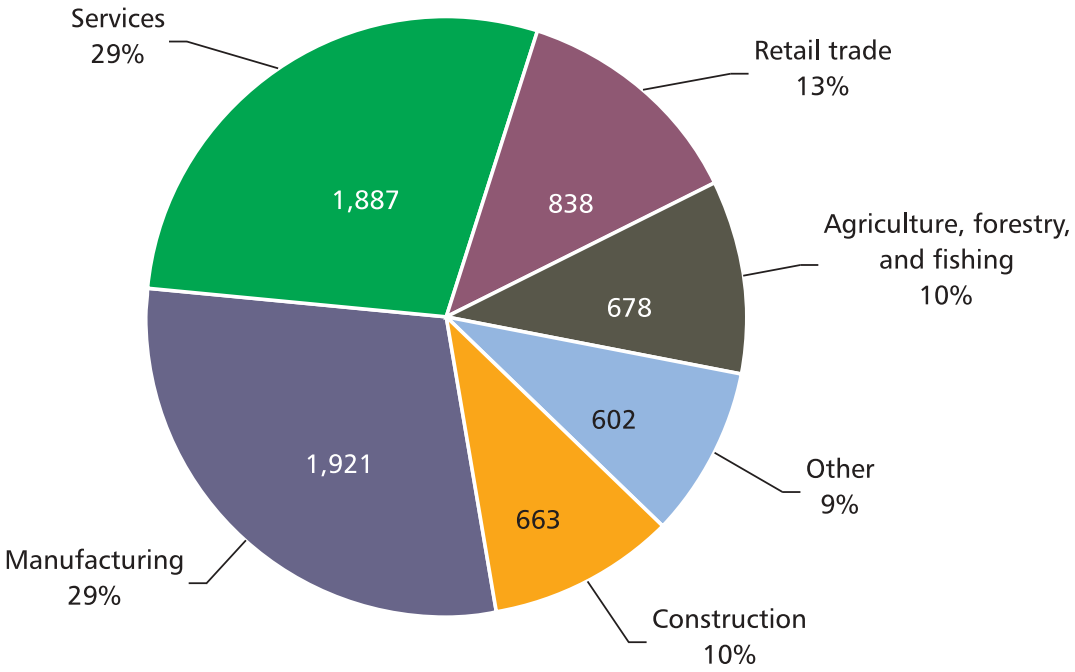

Figure 18. Number and distribution of dermatitis cases with days away from work in private industry by industry division, 1997. (Source: SOII [1999].)

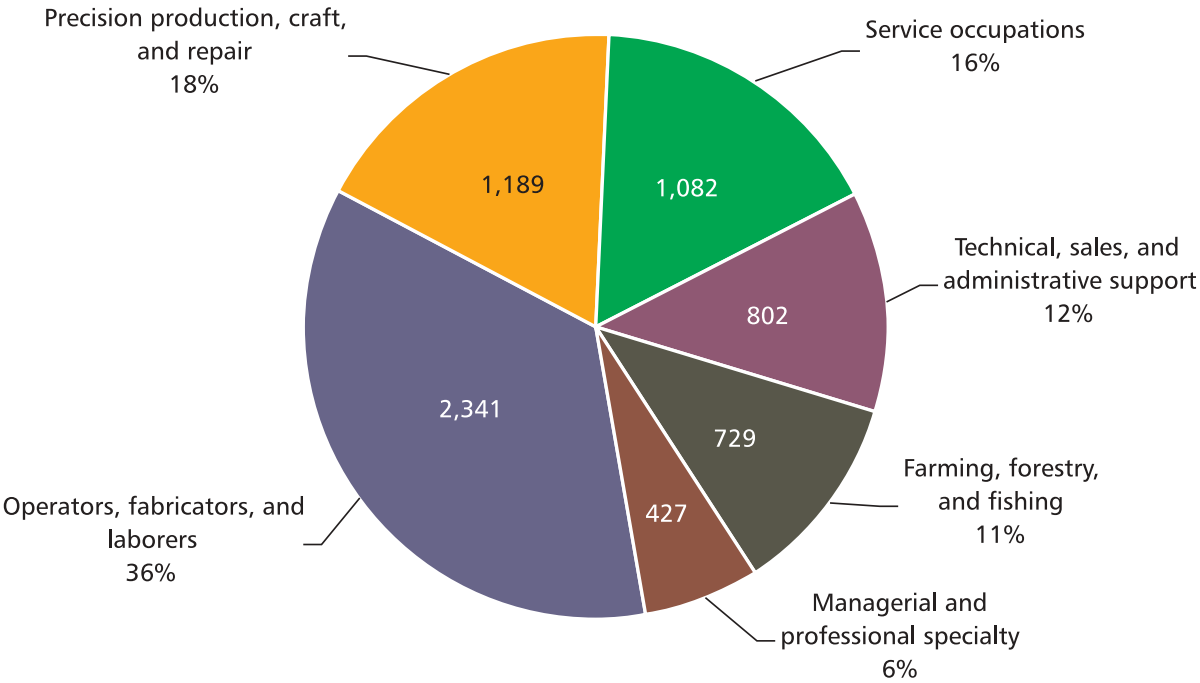

Figure 19. Number and distribution of dermatitis cases with days away from work in private industry by occupational group, 1997. (Source: SOII [1999].)

Respiratory Disorders

Dust Diseases of the Lungs

Dust diseases of the lungs accounted for less than 1% (2,900) of the nonfatal occupational illness cases recorded in SOII in 1997. These diseases include silicosis, asbestosis, and coal workers' pneumoconiosis (CWP). The most cases of occupational dust diseases of the lungs occurred in the manufacturing (33%) and service (27%) industries in 1997 (Figure 20). The highest dust disease incidence rates occurred in aluminum sheet, plate, and foil manufacturing (33 per 10,000 workers), anthracite mining (30 per 10,000 workers), and ship building and repairing (12 per 10,000 workers).

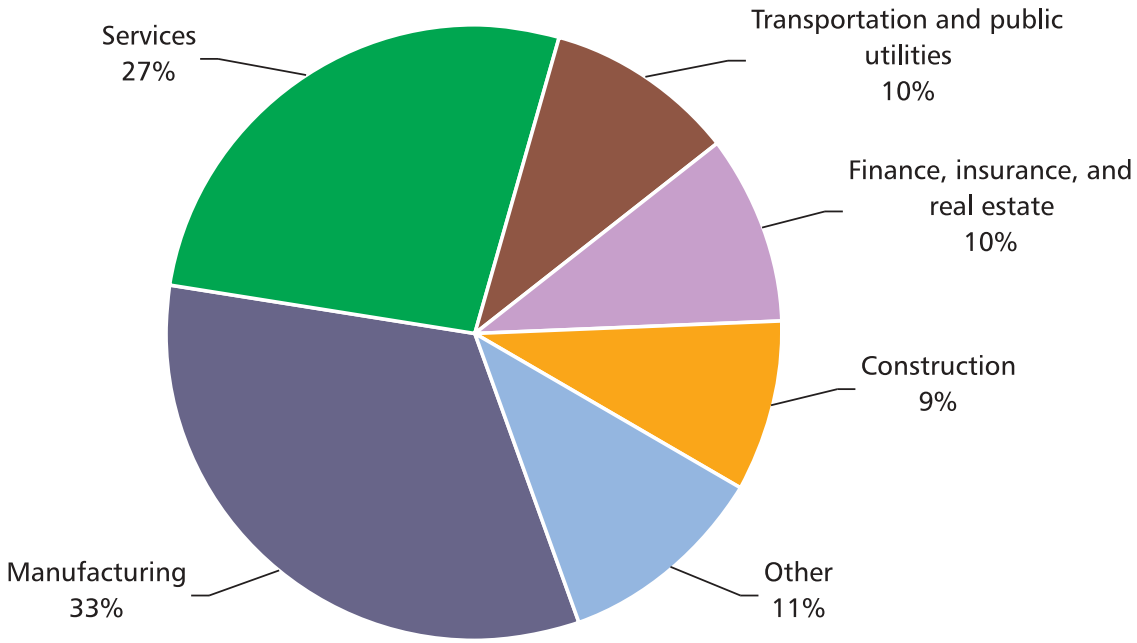

Figure 20. Distribution of occupational cases of dust diseases of the lungs in private industry, by industry division, 1997. Total number of cases was 2,900. (Source: SOII [1999].)

Coal Workers' Pneumoconiosis

The prevalence and severity of CWP are examined in Coal Workers' X-Ray Surveillance Program (CWXSP). CWP is defined as having X-ray evidence of lung abnormalities (grade 1/0 or higher) using the International Labour Organization (ILO) *Guidelines for the use of ILO International Classification of Radiographs of Pneumoconioses* [ILO 1980]. Among workers with 25 or more years of underground tenure, the prevalence of CWP category 1/0 or greater decreased from more than 28% during 1970–1973 to less than 10% during 1992–1995 (Figure 21). In the same tenure group, the prevalence of the more severe CWP category 2/1 or greater decreased from more than 10% during 1970–1973 to less than 2% during 1992–1995 (Figure 22). Decreases in prevalence are also apparent in groups with less tenure in underground mining (Figures 21 and 22).

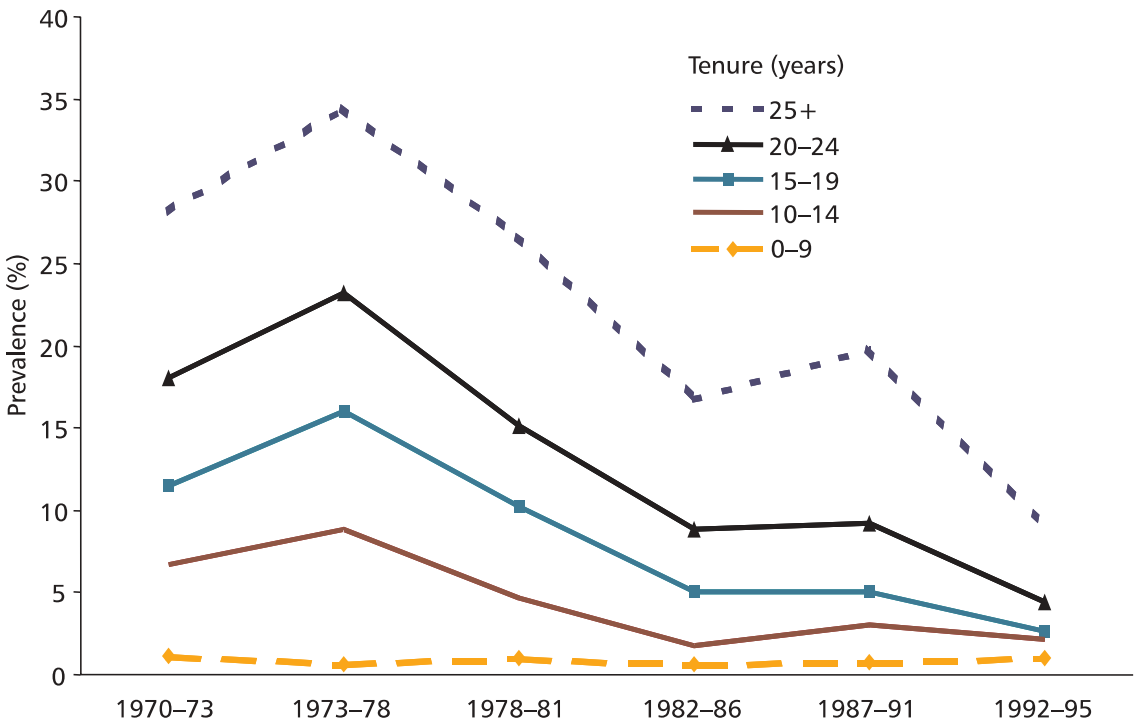

Figure 21. Prevalence of examined miners with CWP category 1/0 or greater by tenure in mining, 1970–1995. (Source: CWXSP [1999].)

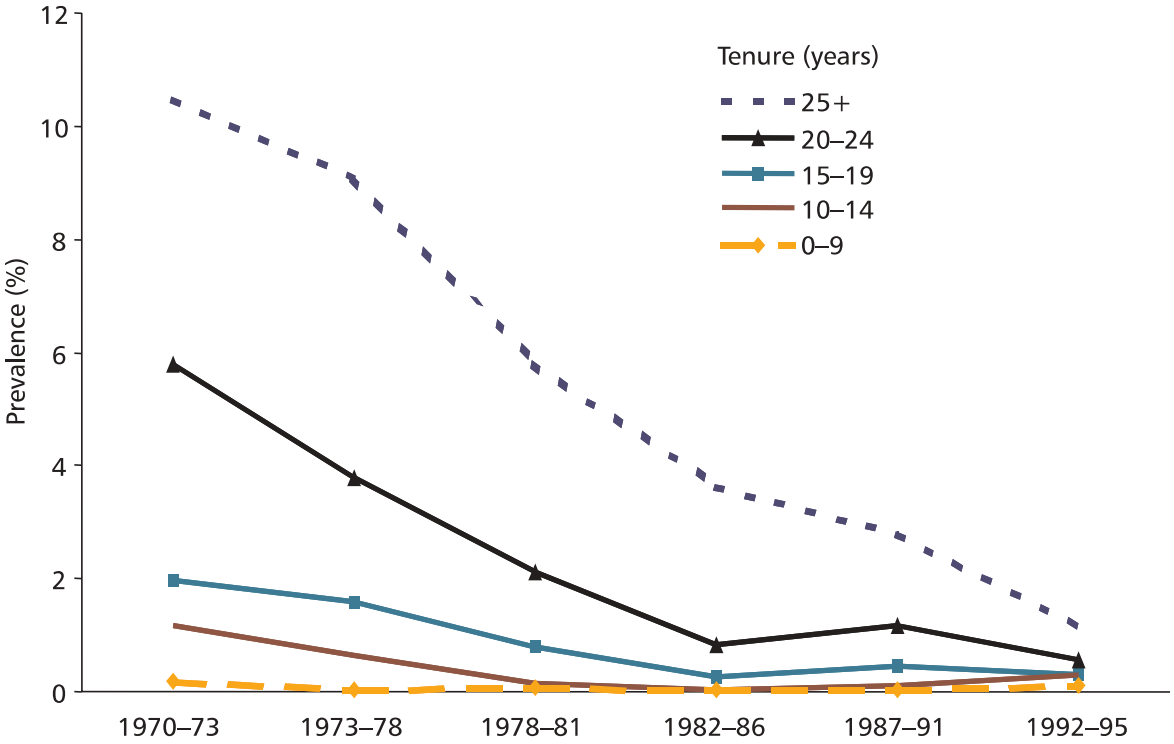

Figure 22. Prevalence of examined miners with CWP category 2/1 or greater by tenure in mining, 1970–1995. (Source: CWXSP [1999].)

Silicosis

Silicosis is a chronic inflammatory condition of the lung caused by the inhalation of silica particles; this condition is almost universally caused by occupational exposures. Prevalence of silicosis can be examined through the SENSOR program. For SENSOR purposes, silicosis cases require 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.

From 1993 to 1995, seven States participated in the SENSOR silicosis program. Together these States identified 604 cases of silicosis, mostly through hospital reports (64%), reports by health care professionals (11%), and death certificates (9%) (Figure 23). The cases originated mostly in manufacturing industries (75%), construction (9%), and mining (7%) (Figure 24). Operators, fabricators, and laborers represented the majority of cases (61%) (Figure 25).

Among silicosis patients who were interviewed, most had chronic disease with onset of symptoms 10 or more years after exposure. Exposure to high airborne concentrations of silica can cause disease within a few years, and acute silicosis (much less common) may result in death within months of intense occupational exposure. Although most of the interviewed workers had been occupationally exposed for more than 20 years, 8% had fewer than 10 years of exposure.

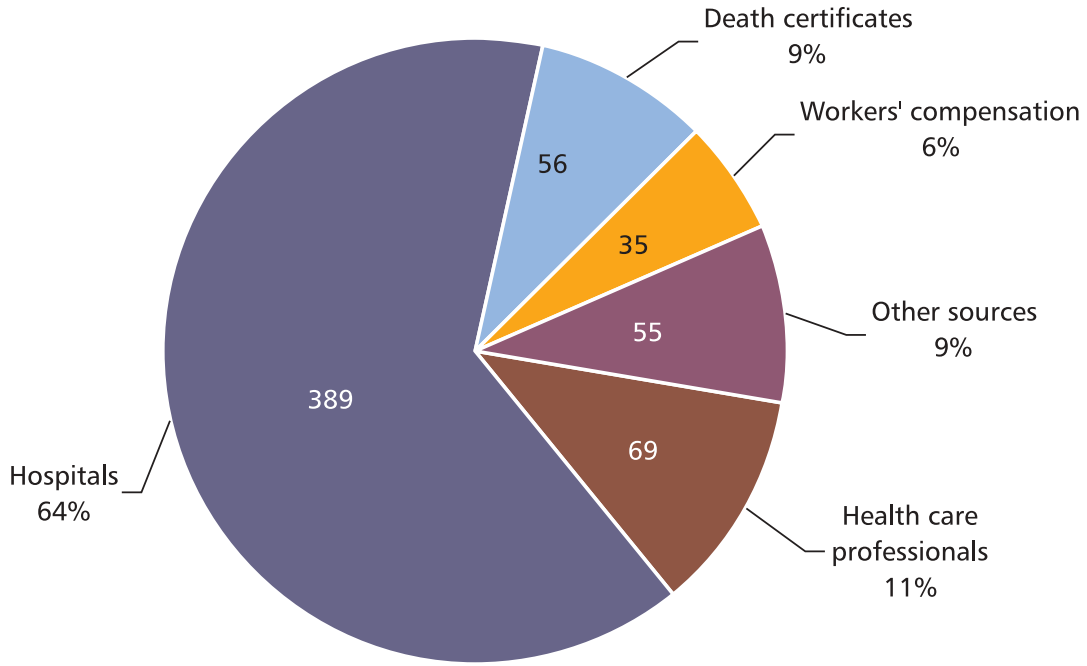

Figure 23. Number and distribution of silicosis cases in all seven reporting States by source of report, 1993–1995. (Source: SENSOR [NIOSH 1999].)

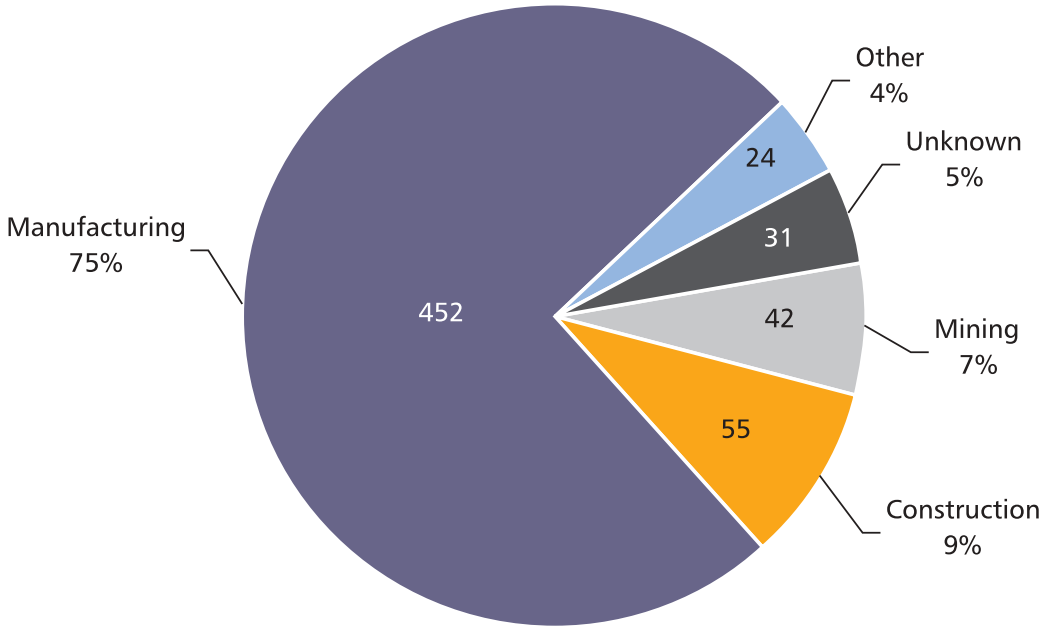

Figure 24. Number and distribution of silicosis cases in all seven reporting States by industry division, 1993–1995. (Source: SENSOR [NIOSH 1999].)

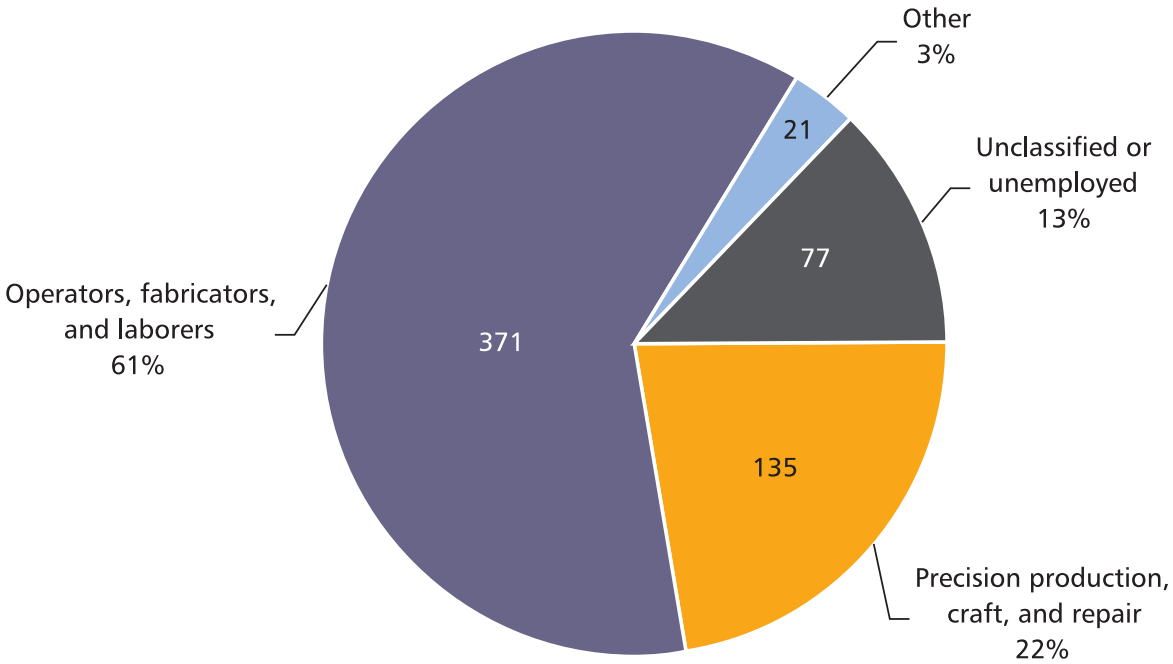

Figure 25. Number and distribution of silicosis cases in all seven reporting States by major occupational category, 1993–1995. (Source: SENSOR [NIOSH 1999].)

Respiratory Disorders Attributable to Toxic Agents

Respiratory disorders attributable to toxic agents in the work environment accounted for 5% (20,300) of the illness cases recorded in SOII in 1997. These disorders include allergic and irritant asthma, chronic bronchitis, and reactive airways dysfunction (an asthma-like syndrome). The industry divisions reporting the most cases in 1997 were manufacturing (37%) and services (34%) (Figure 26). SOII reported the highest industry incidence rates in leather tanning and finishing (77 per 10,000 workers), motorcycles, bicycles, and parts (50 per 10,000 workers), ammunition, except for small arms not elsewhere classified (n.e.c.) (36 per 10,000 workers), ship building and repairing (36 per 10,000 workers), and musical instruments (34 per 10,000 workers).

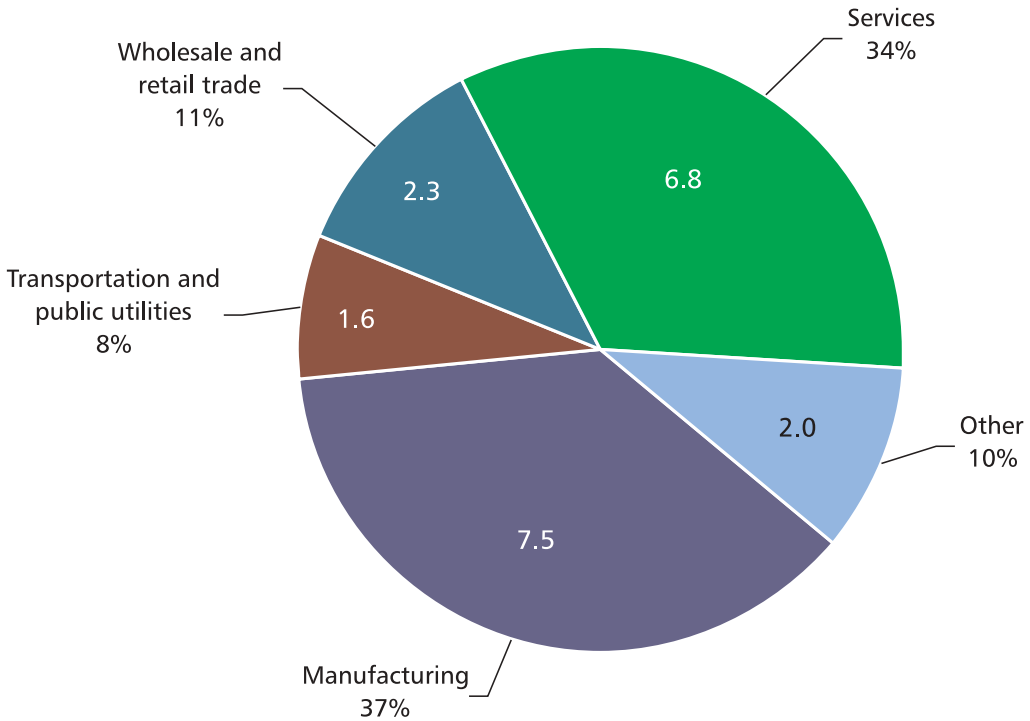

Figure 26. Number (thousands) and distribution of respiratory disorder cases attributed to toxic agents in private industry by industry division, 1997. (Source: SOII [1999].)

Asthma and Chronic Obstructive Pulmonary Disease

NHANES III

Workers' prevalence rates for asthma and chronic obstructive pulmonary disease (COPD) (such as chronic bronchitis and emphysema) are recorded in NHANES III (Figures 27 and 28). These conditions may be caused or exacerbated by workplace exposures, but no particular attribution to workplace factors is made in NHANES III. Variations in prevalence rates among workers in different industries (particularly among nonsmokers) may suggest an occupational association in some cases.

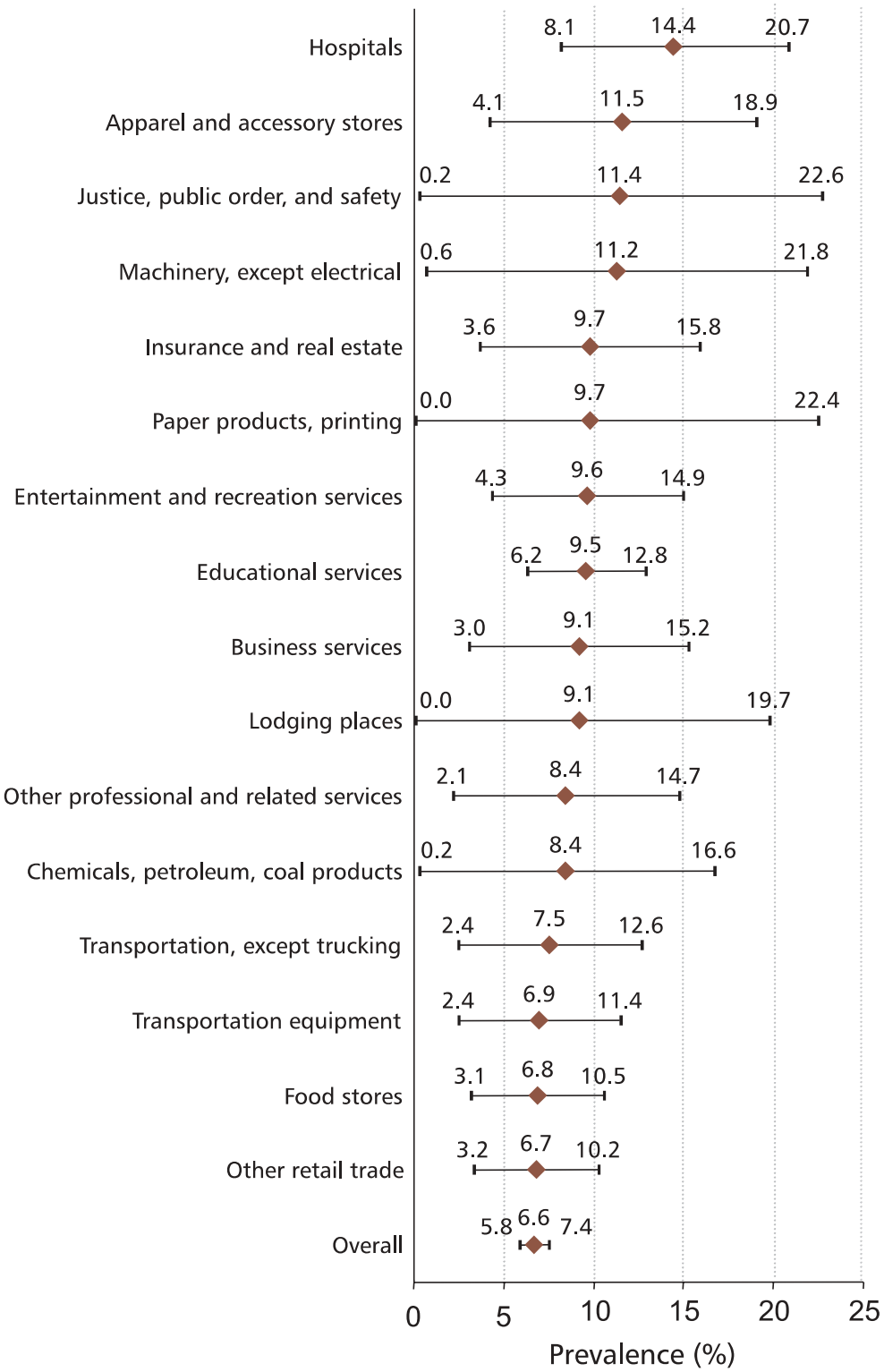

Figure 27. Estimated prevalence rates (and 95% confidence intervals [CIs]) for asthma among workers who are nonsmokers, by usual industry of workers' employment—U.S. residents aged 17 and older, 1988–1994. (Source: NHANES III [1999].)

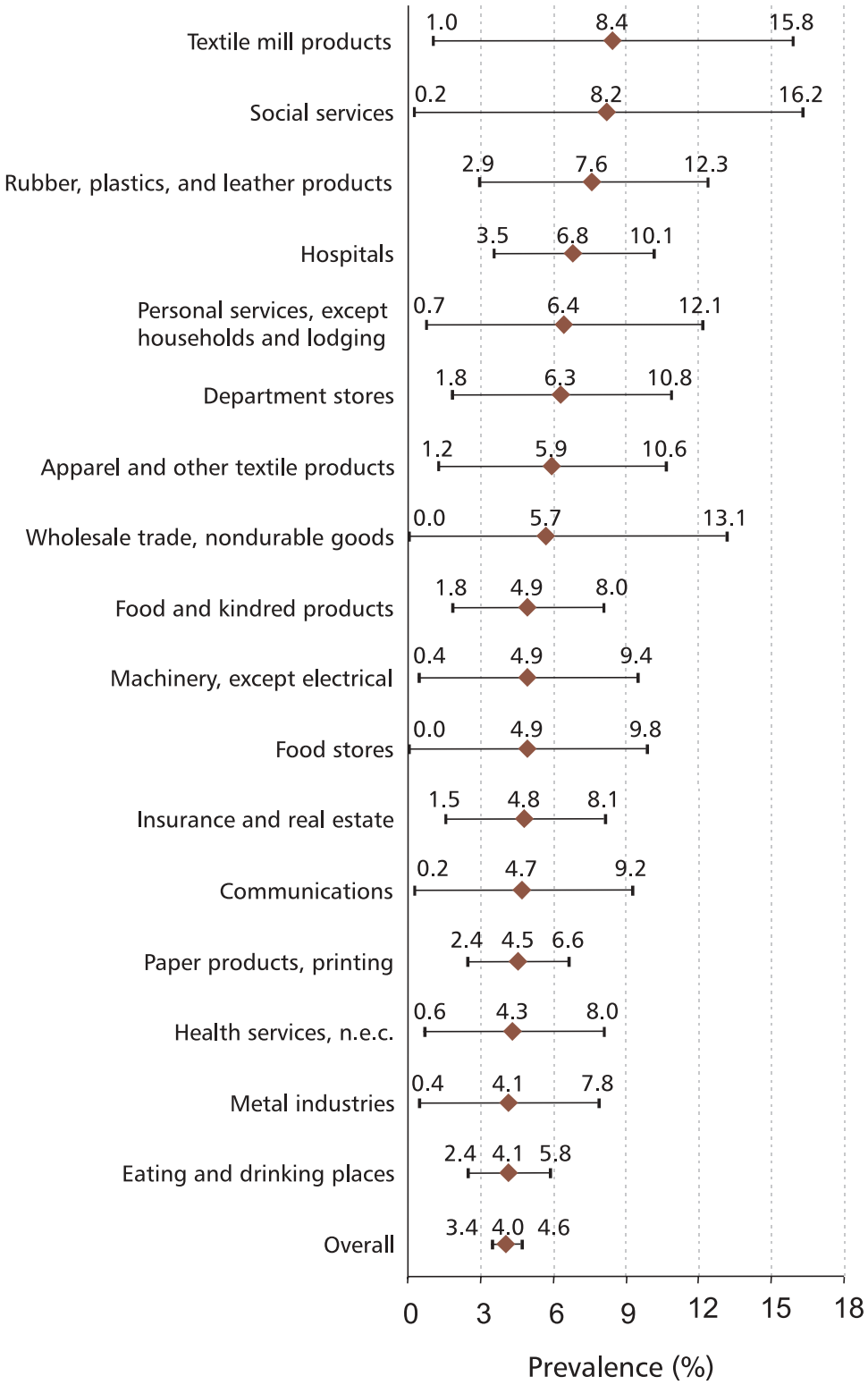

Figure 28. Estimated prevalence rates (and 95% CIs) for COPD among workers who are nonsmokers, by usual industry of workers' employment—U.S. residents aged 17 and older, 1988–1994. (Source: NHANES III [1999].)

SENSOR

Under the SENSOR program, several State health departments have developed surveillance systems for work-related asthma (including occupational asthma, occupationally induced reactive airways dysfunction syndrome [RADS], and work-aggravated asthma). Occupational asthma is now the most common disease reported in occupational respiratory disease surveillance systems in several developed countries. However, most cases either are not recognized as work-related or are not reported as such. Population-based estimates suggest that about 20% of new-onset asthma in adults is work-related.

Four States—New Jersey, Michigan, Massachusetts, and California—had active SENSOR programs during the years for which data are included in this report (1993–1995). California relies on the first reports filed by physicians seeking reimbursement through the State workers' compensation system. The three remaining States rely primarily on more active physician reporting. In all four States, 90% of the 1,101 occupational asthma cases were identified through physician reports (Figure 29). Most cases occurred in manufacturing (42%) and services (31%) (Figure 30) among operators, fabricators, and laborers (32%) and technical, sales, and administrative support personnel (21%) (Figure 31). The categories of agents most frequently associated with occupational asthma cases were all isocyanates (toluene diisocyanate, methylene diisocyanate, and other diisocyanates) (9%), indoor environments (8%), and mineral and inorganic dusts not otherwise specified (n.o.s.) (7%) (Figure 32).

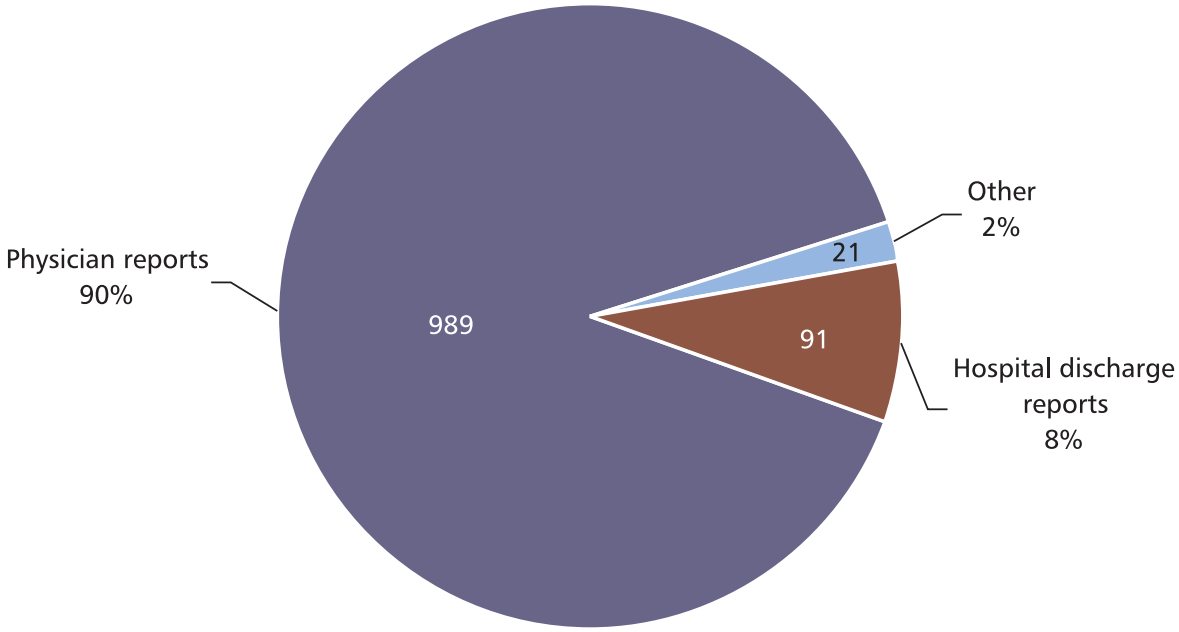

Figure 29. Number and distribution of occupational asthma cases for all four reporting States by source of report, 1993–1995. (Source: SENSOR [NIOSH 1999].)

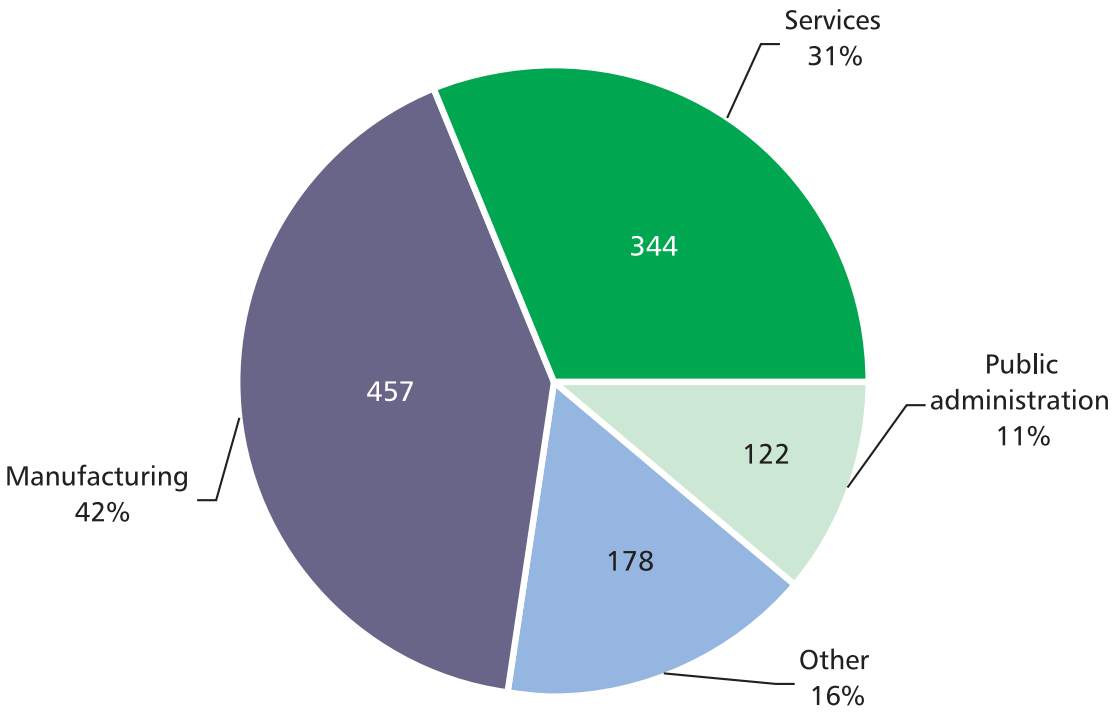

Figure 30. Number and distribution of occupational asthma cases for all four reporting States by industry division, 1993–1995. (Source: SENSOR [NIOSH 1999].)

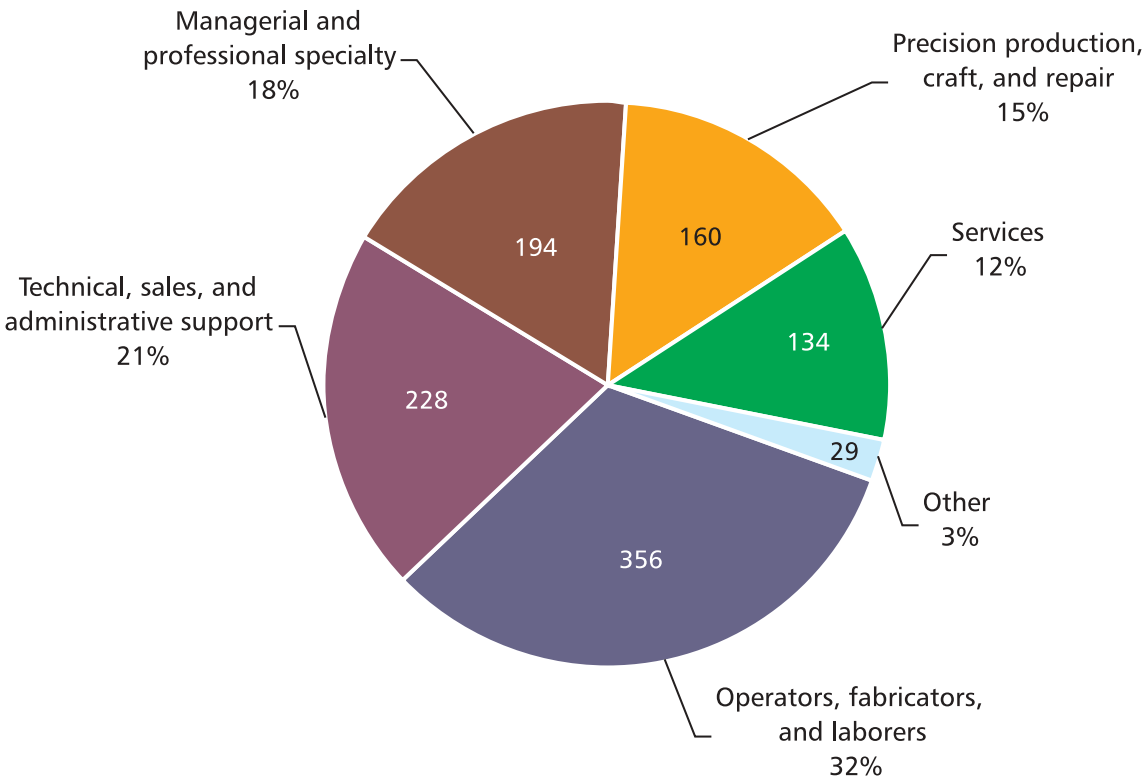

Figure 31. Number and distribution of occupational asthma cases for all four reporting States by occupation, 1993–1995. (Source: SENSOR [NIOSH 1999].)

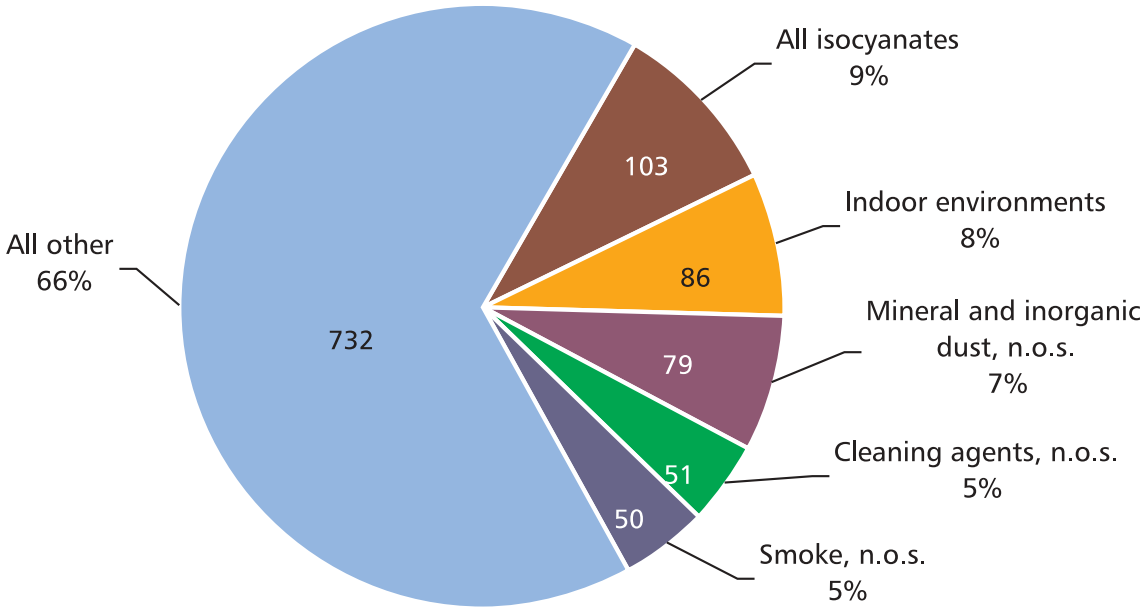

Figure 32. Number and distribution of occupational asthma cases for all four reporting States by most frequently associated agents, 1993–1995. (Source: SENSOR [NIOSH 1999].)

Poisoning and Toxicity

Poisoning

Poisoning represented 1% (5,100) of all nonfatal occupational illness cases recorded in SOII in 1997. Poisoning cases include exposures to heavy metals (including lead), toxic gases (such as carbon monoxide and hydrogen sulfide), organic solvents, pesticides, and other substances (such as formaldehyde). Manufacturing accounted for 55% of poisoning cases reported in private industry (Figure 33). The highest incidence rates occurred in the production of storage batteries (120 cases per 10,000 workers) and costume jewelry (78 cases per 10,000 workers), and in the secondary smelting and refining of nonferrous metals (62 cases per 10,000 workers).

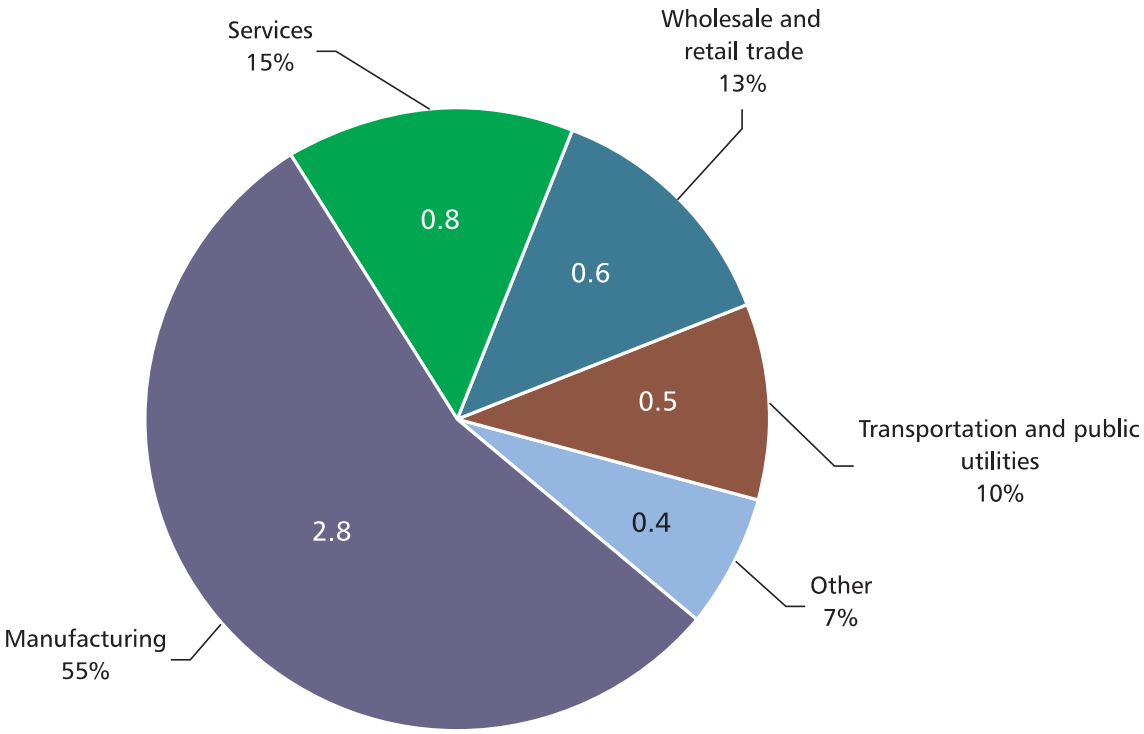

Figure 33. Number (thousands) and distribution of poisoning cases in private industry by major industry division, 1997. (Source: SOII [1999].)

Lead Toxicity

ABLES monitors elevated blood lead levels (BLLs) in adults (persons aged 16 and older). Twenty-seven States participated in this program in 1998 by collecting BLLs from local health departments, private health care professionals, and private and State reporting laboratories (Figure 34). During that year, a total of 10,501 adults in 25 of those States were reported to have BLLs of 25 µg/dL or greater. Prevalence rates for BLLs of 25 µg/dL or greater (based on all persons reported in a given year) do not reveal an obvious trend for the period 1993 through 1998, nor do the incidence rates (based on new cases reported in a given year) (Figure 35). However, prevalence and incidence rates for BLLs of 50 µg/dL or greater in 10 ABLES States decreased from 1993 to 1998 (Figure 36).

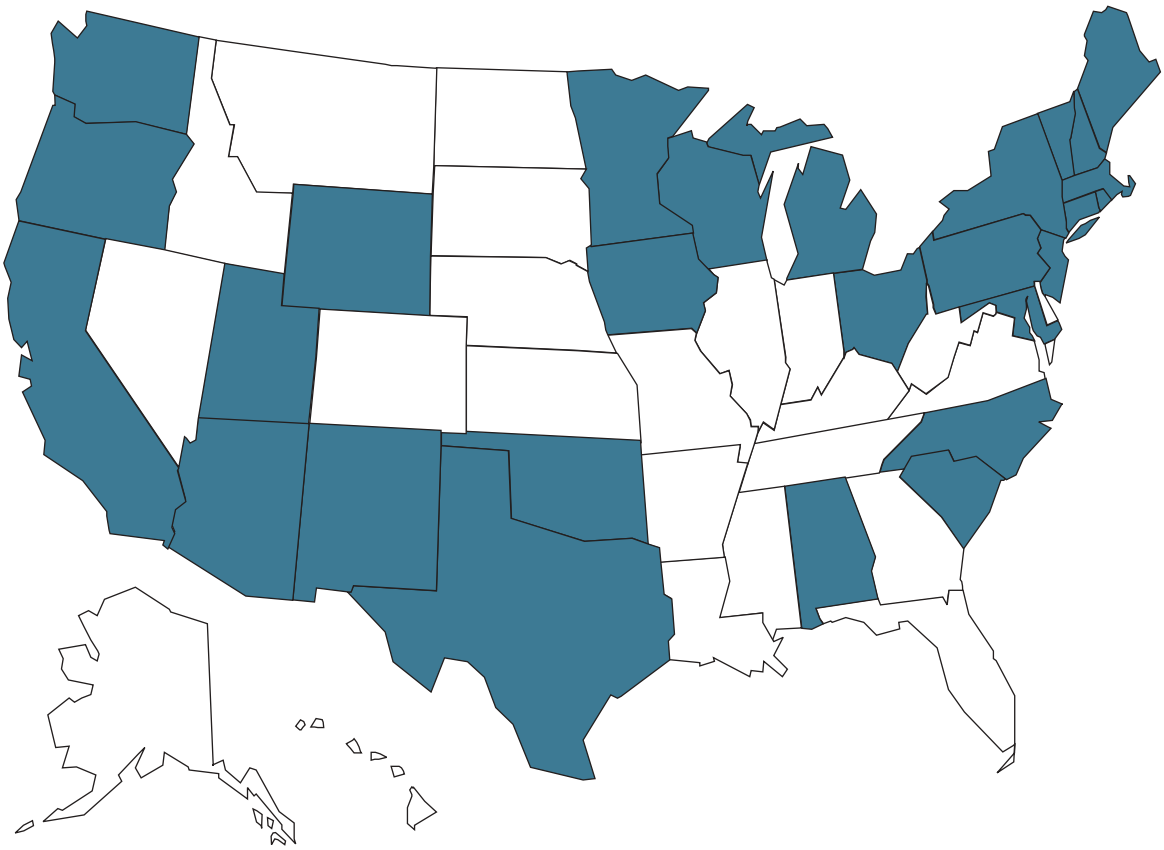

Figure 34. States (shaded) participating in the ABLES program in 1998. (Source: ABLES [1999].)

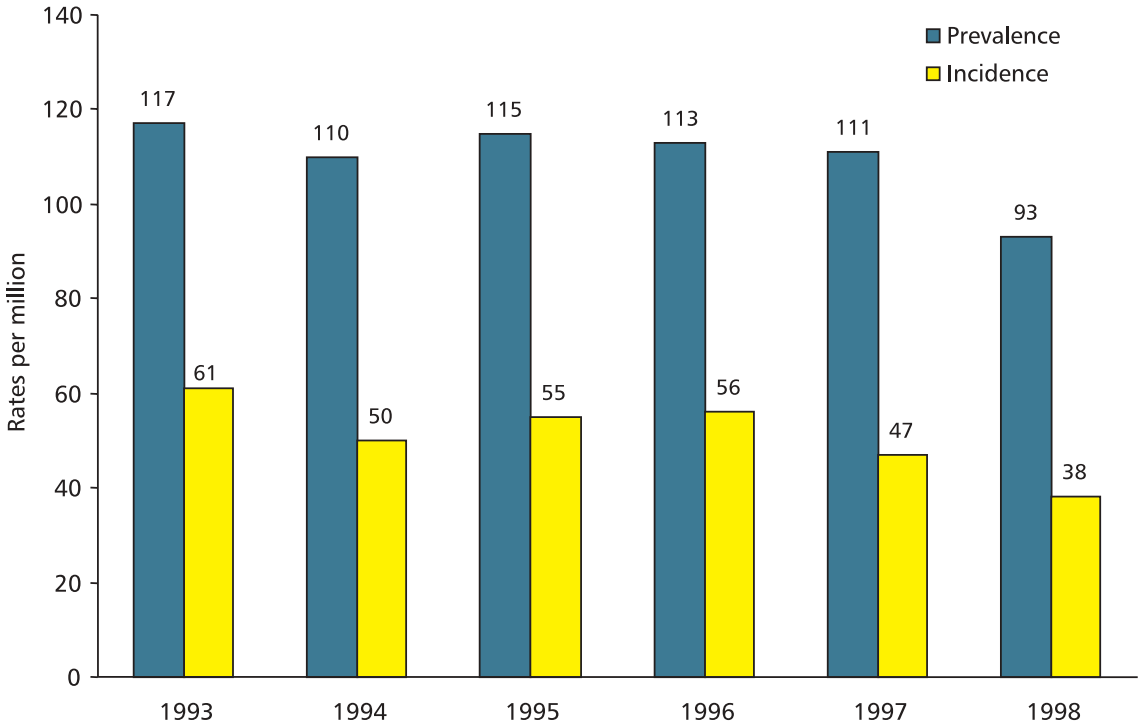

Figure 35. Prevalence and incidence rates of adults aged 16 to 64 with BLLs greater than 25 µg/dL, 1993–1998. (Source: ABLES [1999].)

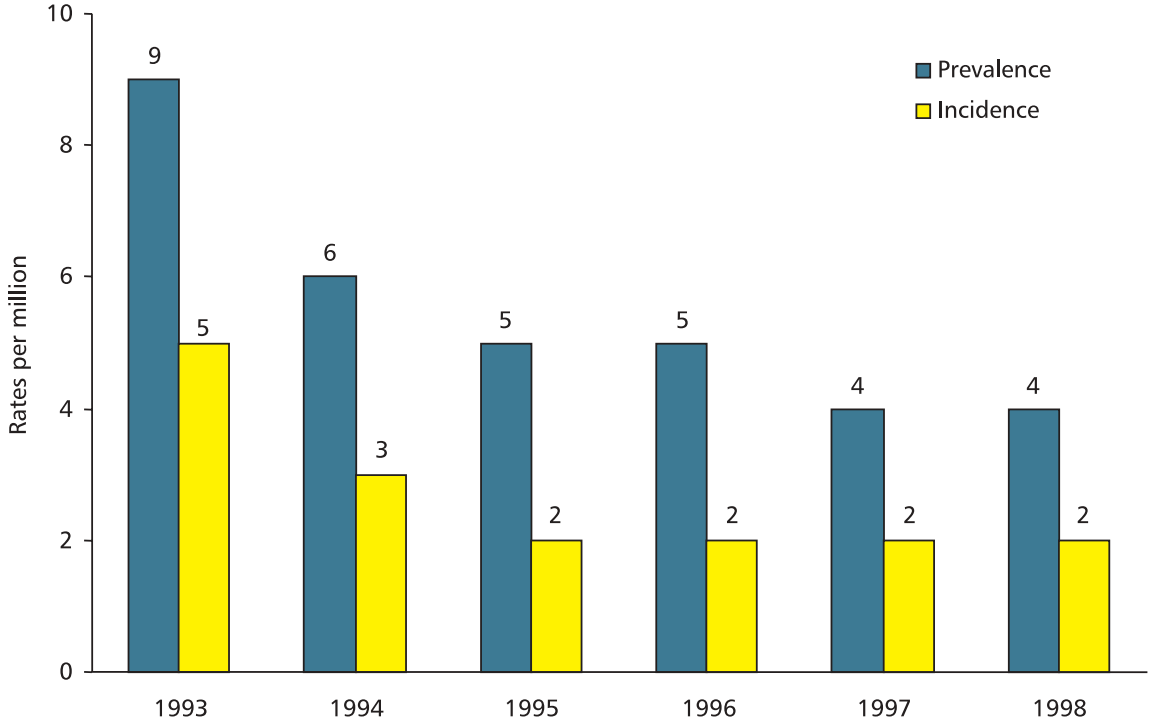

Figure 36. Prevalence and incidence rates for BLLs equal to or greater than 50 µg/dL in adults aged 16 to 64 from 10 States (California, Connecticut, Iowa, Maryland, Massachusetts, New Jersey, New York, Oregon, Texas, Utah), 1993–1998. (Source: ABLES [1999].)

Pesticide and Insecticide Toxicity

Several surveillance systems track acute occupational illness and injury related to pesticides. Two systems are national, and several additional systems cover individual States. The Toxic Exposure Surveillance System (TESS) is maintained by the American Association of Poison Control Centers. Between 1993 and 1996, about 81% of the U.S. population was covered by a participating poison control center. During those years, more than 6,300 pesticide poisonings that occurred in the workplace were documented in TESS. Most of the poisonings were associated with insecticides (Figure 37). Among those cases, 41% involved organophosphates, and 29% involved pyrethrins/pyrethroids.

SOII collects information about pesticide poisonings associated with lost workdays. Between 1992 and 1996, the annual number of nonfatal occupational illnesses and injuries related to pesticides ranged from 504 to 914 (Figure 38). Most of those illnesses were associated with exposure to insecticides. Because SOII records only cases that result in lost work time, illnesses may be more severe than those recorded by other surveillance systems.

Thirty-one States have reporting requirements for pesticide-related illness and injury, but only eight States conduct surveillance for this condition. In California, Florida, New York, Oregon, and Texas, surveillance activities for acute occupational illness and injury related to pesticides are conducted in a SENSOR program supported in part by the U.S. Environmental Protection Agency (EPA). Besides tabulating case reports, these systems perform in-depth investigations for case confirmation, conduct screening of other workers at a patient's worksite, and develop targeted interventions. Over a 5-year period (1992–1996), the annual number of cases in New York, Oregon, and Texas ranged from 72 to 170 (Figure 39). Most cases involved exposures to insecticides. In addition, 33% of the cases involved agricultural exposures, including pesticide mixing, loading, and application.

Pesticide-related illness has been a reportable condition in California since 1971. The California Department of Pesticide Regulation (CDPR) has responsibility for collecting and evaluating these reports. Between 60% and 75% of cases are identified from workers' compensation reports. Most of the remainder are reported by physicians. The annual number of acute occupational illnesses and injuries related to pesticides in California ranged from 656 to 979 (Figure 40). Insecticides were responsible for the largest proportion of cases. Among insecticides, insecticide combinations and organophosphates were most commonly responsible (Figure 41). More than half of the reported cases occurred in agriculture (56%); services and public administration together contributed 28% (Figure 42).

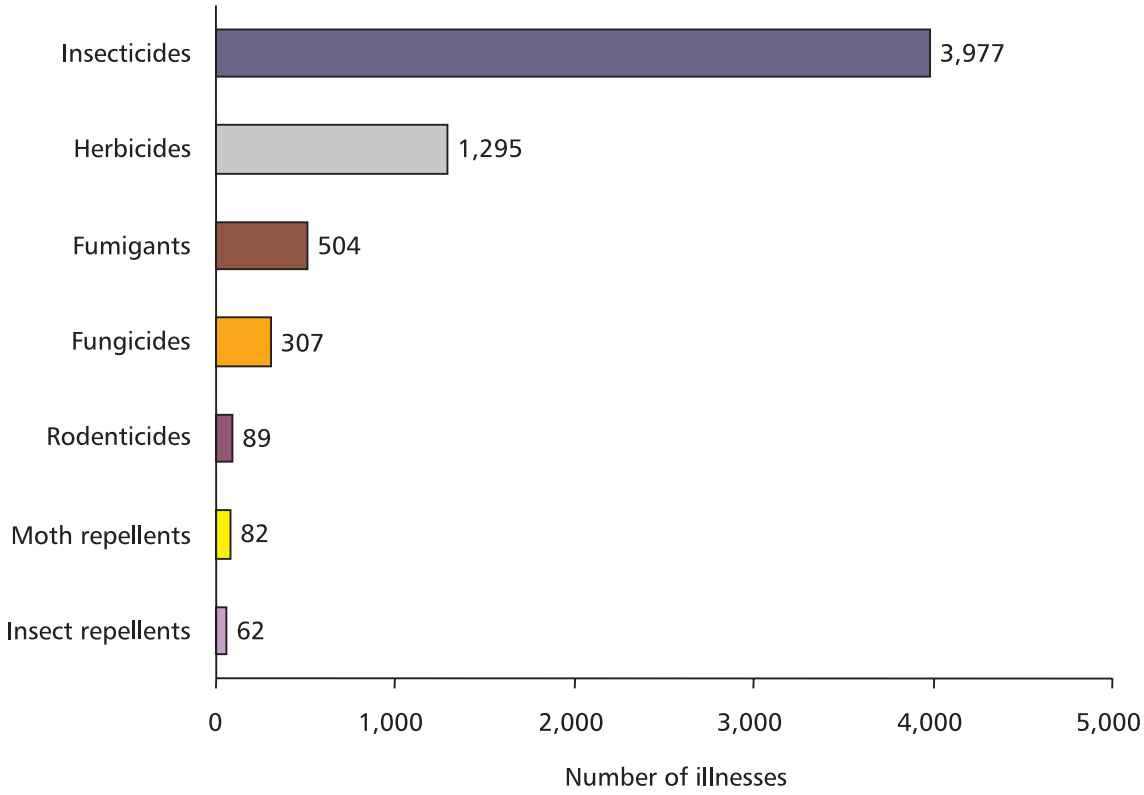

Figure 37. Number of acute occupational illnesses related to pesticides by pesticide category (excludes antimicrobials), 1993–1996. (Source: TESS [1998].)

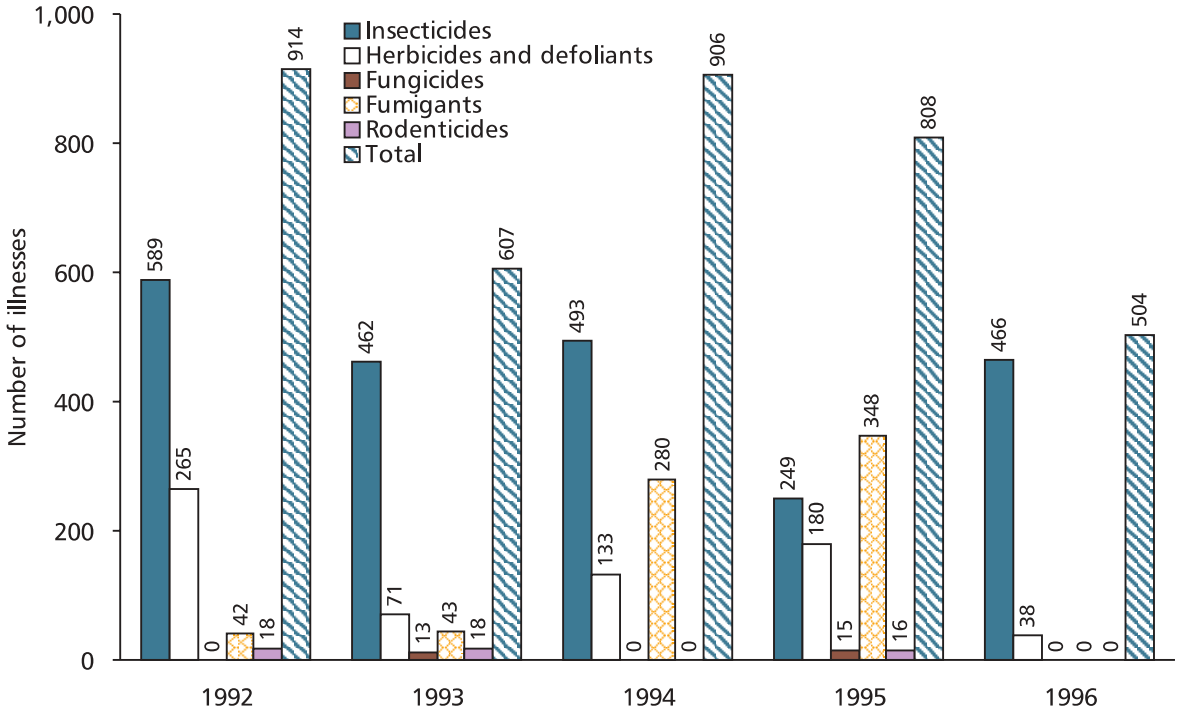

Figure 38. Number of occupational pesticide-related illnesses with days away from work in private industry by pesticide category, 1992–1996. (Source: SOII [1999].)

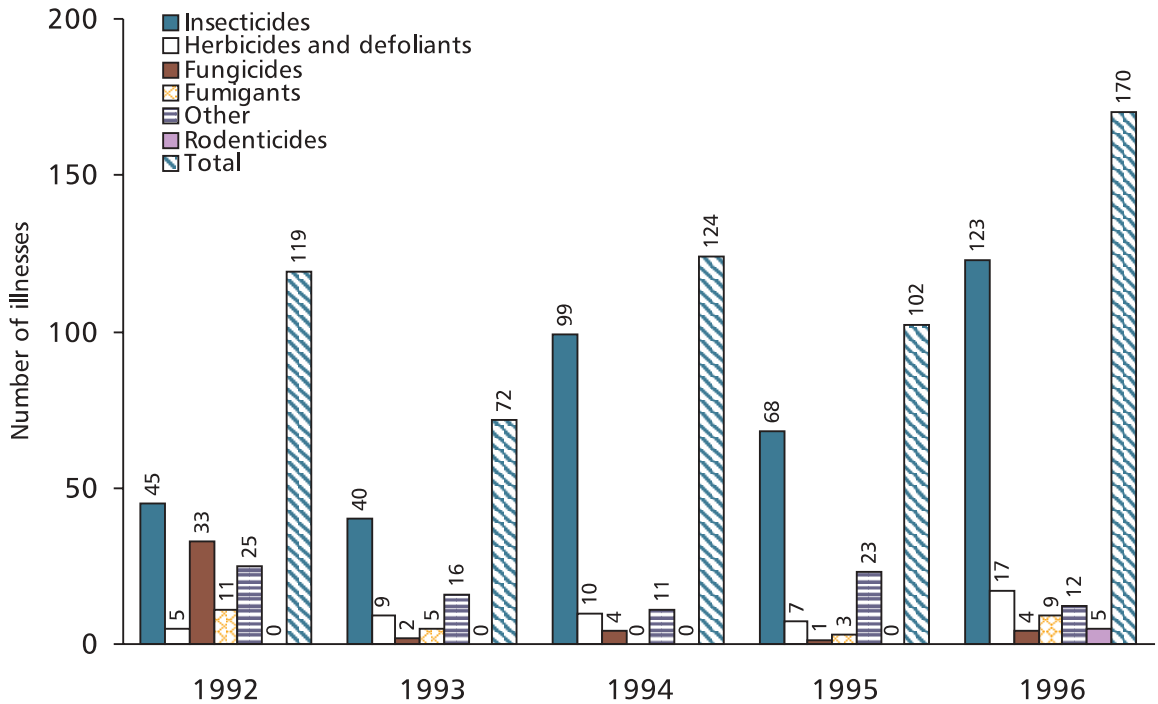

Figure 39. Number of occupational illnesses related to pesticides in New York, Oregon, and Texas by pesticide category, 1992–1996. (Source: SENSOR [New York State Department of Health 1999; Oregon Health Division 1999; PEST 1999].)

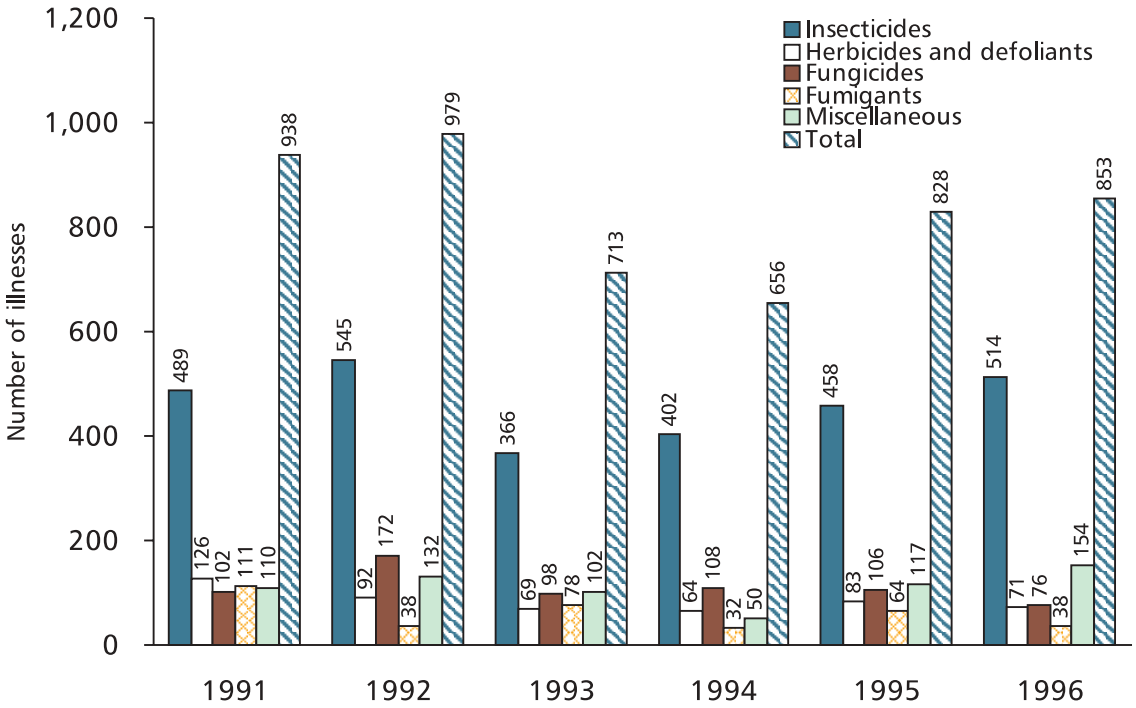

Figure 40. Number of occupational illnesses related to pesticides in California by pesticide category (excludes antimicrobials and unknown agents), 1991–1996. (Source: CDPR [1999].)

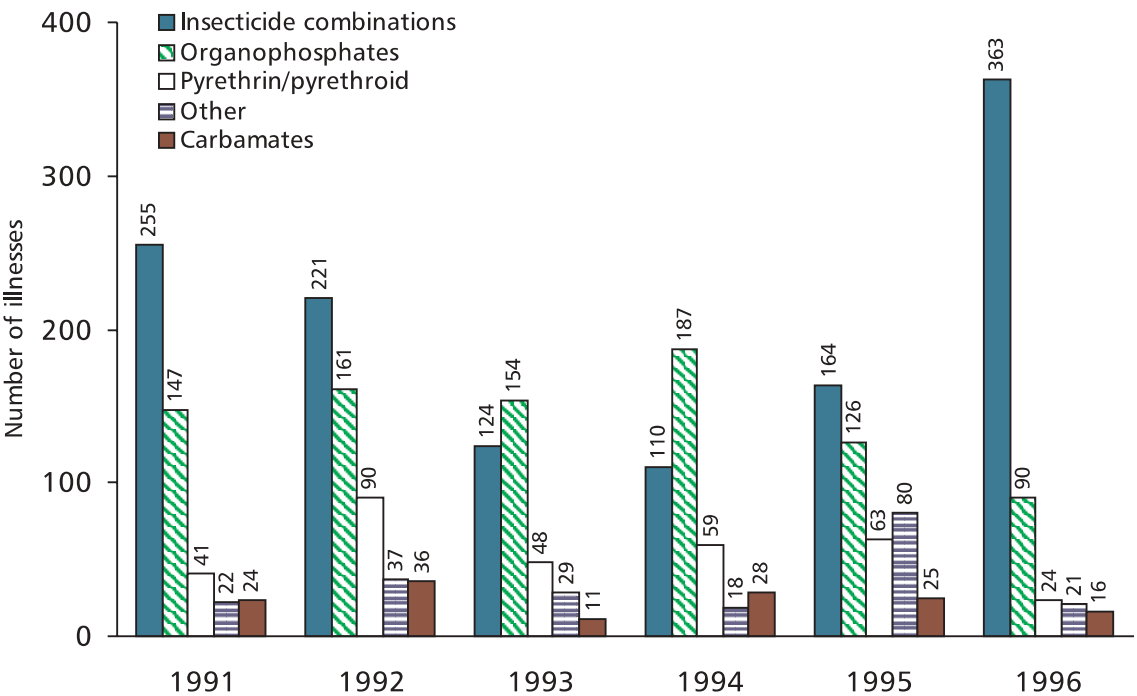

Figure 41. Number of occupational illnesses related to insecticides in California by insecticide category, 1991–1996. (Source: CDPR [1999].)

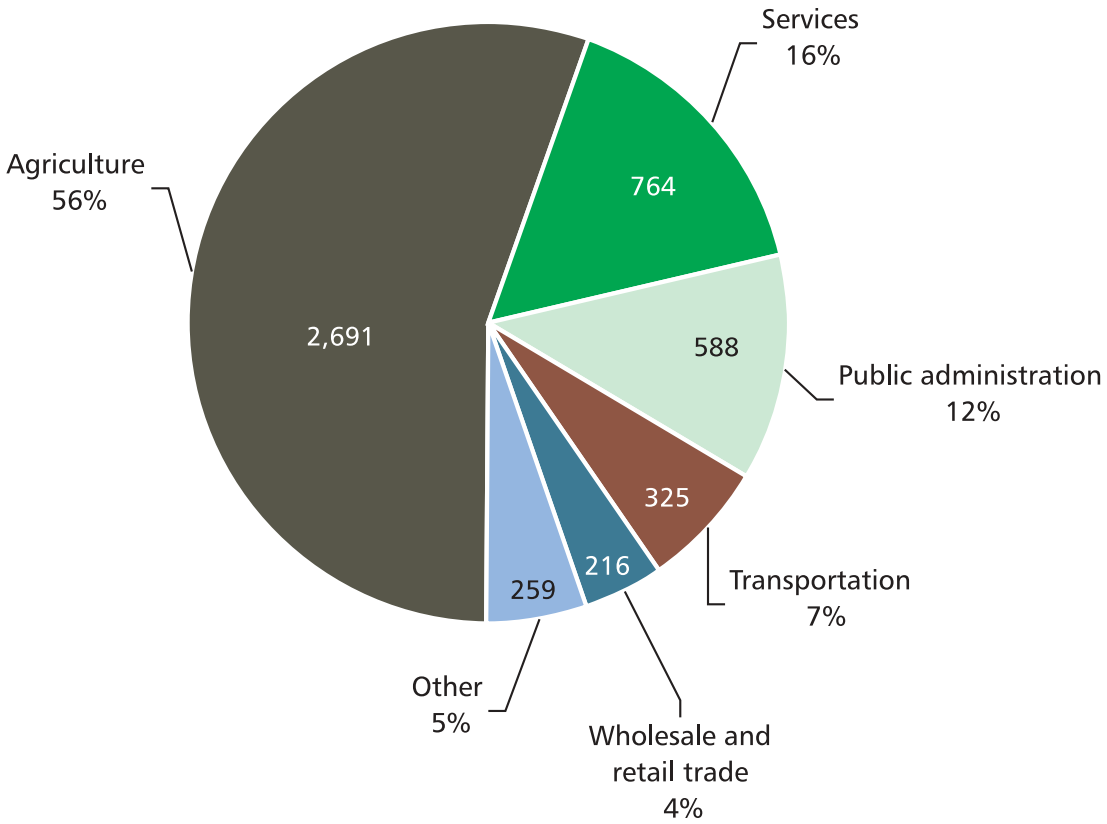

Figure 42. Number and distribution of occupational illnesses related to pesticides (excluding antimicrobials and unknown agents) in California, by industry division, 1991–1996. (Source: CDPR [1999].)

Infections in Health Care Workers

The 10 million health care workers in the United States constitute approximately 8% of the workforce. Health care workers can be exposed to a variety of occupational hazards, including repeated trauma, toxins, and a broad range of infectious agents. Surveillance data on infections in these workers are included in four Federal health databases:

- NaSH tracks exposures to and infections from several agents, including TB, vaccine-preventable diseases, and bloodborne pathogens.
- The Viral Hepatitis Surveillance Program (VHSP) and the Sentinel Counties Study of Acute Viral Hepatitis track hepatitis infection.
- Cases of AIDS and HIV infection among health care workers are ascertained from several sources, including the HIV/AIDS Reporting System (HARS), which is maintained by CDC.
- *staffTRAK–TB* is used by health department TB control programs to monitor skin testing in employees of their clinics and affiliated institutions.

Between June 1995 and October 1999, 60 participating NaSH hospitals reported 6,983 cases of exposure to blood or body fluids. Most of these cases occurred in nurses (43%) and physicians (29%) (Figure 43). The largest number of exposures to blood or body fluids occurred in inpatient (30%) and operating/procedure room settings (29%) (Figure 44). The major route of exposure was percutaneous (puncture/cut injury) (Figure 45).

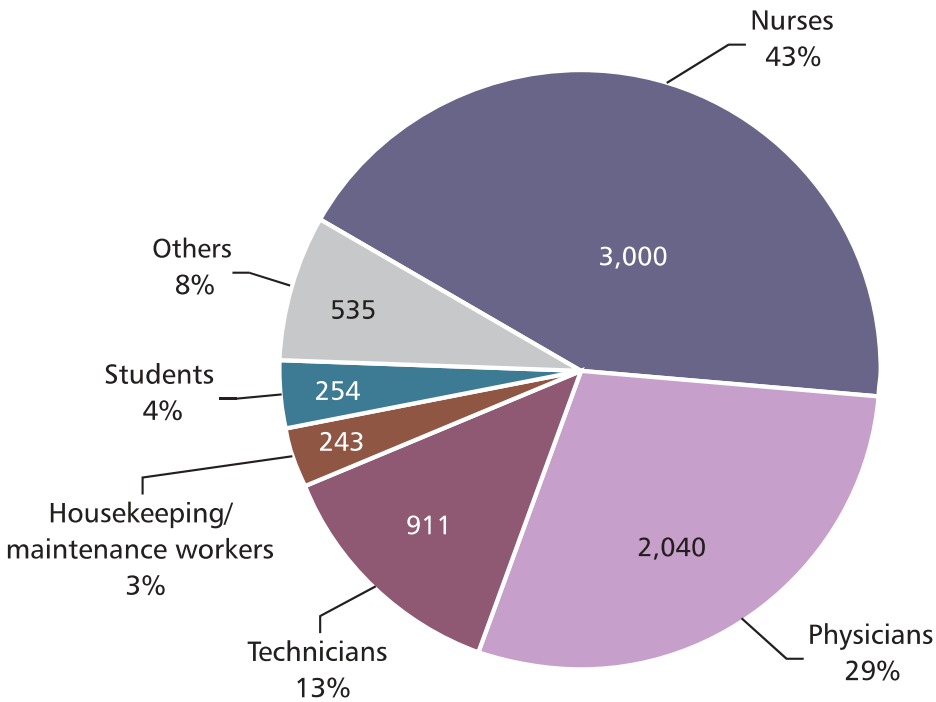

Figure 43. Number and distribution of reported health care worker exposures to blood or body fluids in 60 participating hospitals by occupational group, June 1995 to October 1999. (Source: NaSH [1999].)

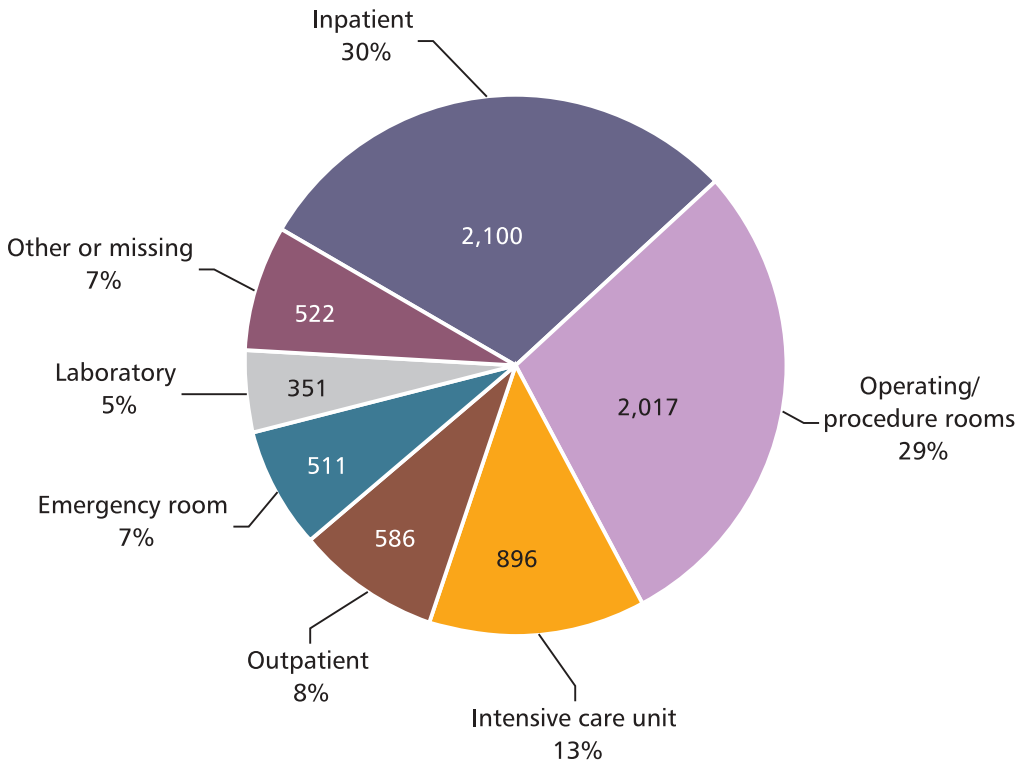

Figure 44. Number and distribution of reported health care worker exposures to blood or body fluids in 60 participating hospitals by work location, June 1995 to October 1999. (Source: NaSH [1999].)

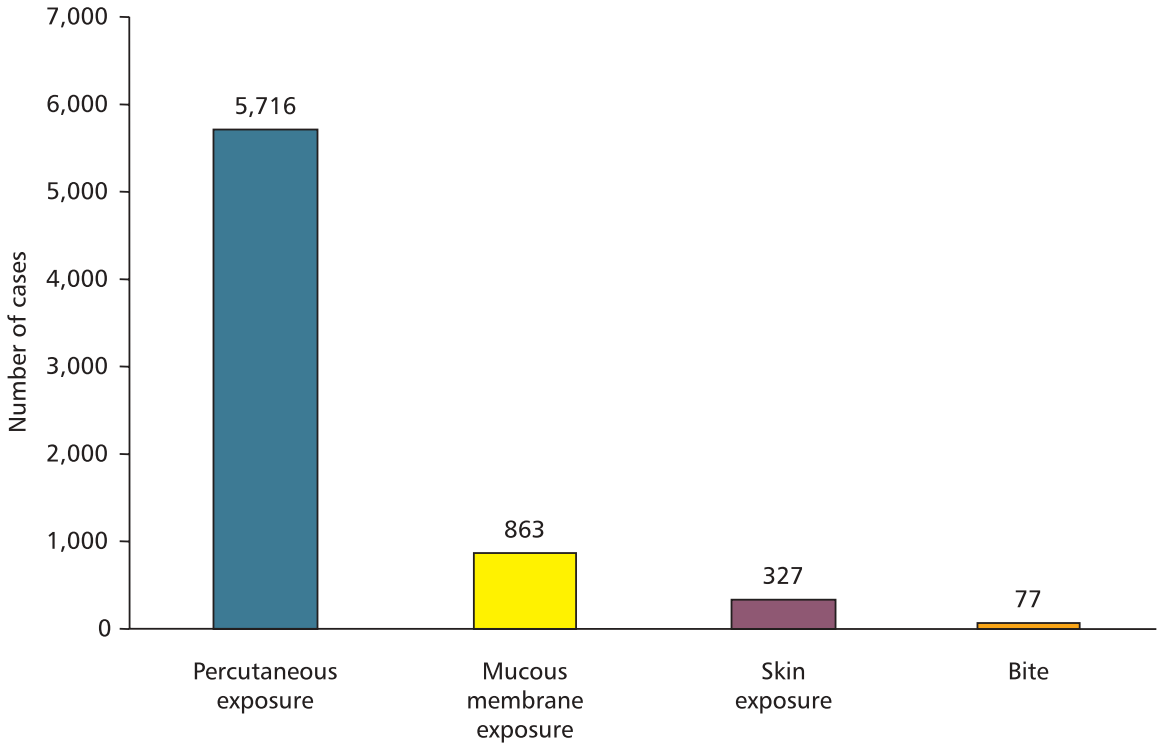

Figure 45. Number of reported health care worker exposures to blood or body fluids in 60 participating hospitals by exposure type, June 1995 to October 1999. (Source: NaSH [1999].)

Consequences of Bloodborne Exposures

Hepatitis B Virus

VHSP and the Sentinel Counties Study of Acute Viral Hepatitis indicate a 93% decline in hepatitis B viral infections in health care workers over a 10-year period—from approximately 12,000 cases in 1985 to 800 cases in 1995 (Figure 46). Infections also declined among the general population during this time, but not as dramatically. The greater decline among health care workers may be attributed to the adoption of universal precautions against exposure to body fluids and vaccinations against hepatitis B.

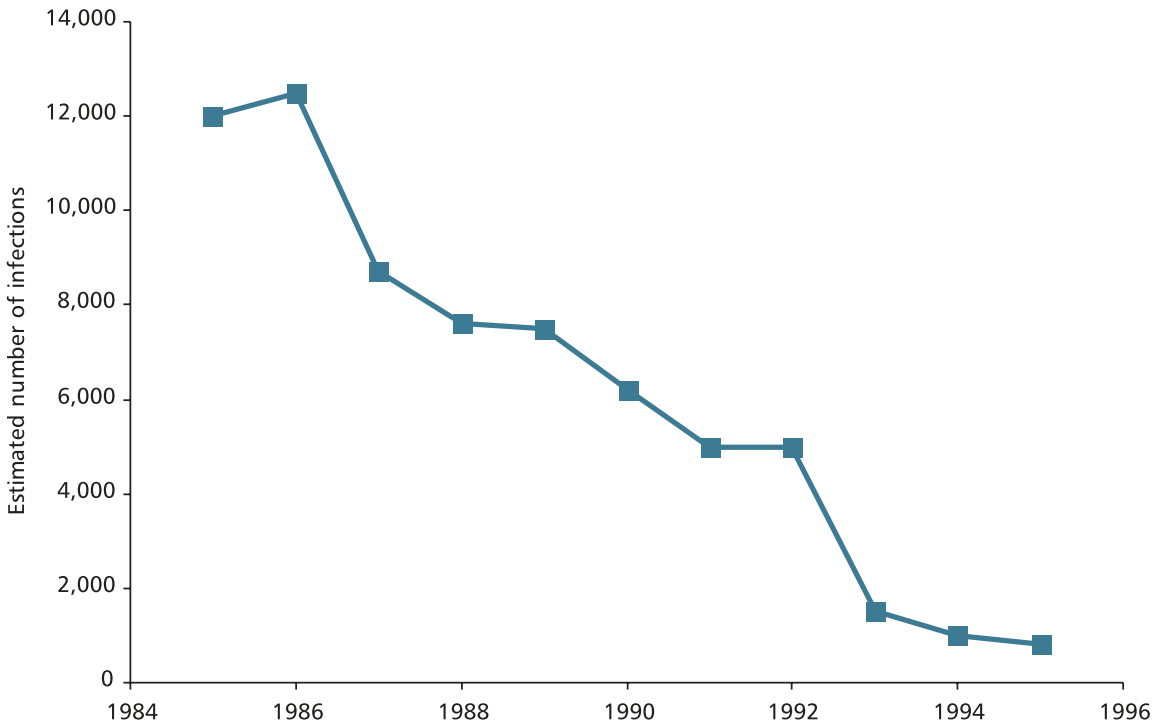

Figure 46. Estimated number of hepatitis B infections among U.S. health care workers, 1985–1995. (Source: VHSP [1999]; NCID [1999].)

Hepatitis C Virus

Hepatitis C virus infection is the most common chronic bloodborne infection in the United States. Although the prevalence of hepatitis C virus infection in health care workers is similar to that in the general population (1% to 2%), health care workers have an increased occupational risk from needlestick injuries. The number of health care workers who have acquired hepatitis C infections occupationally is not known. But approximately 2% to 4% of acute infections in the United States occurred among health care workers exposed to blood in the workplace. Most workers exposed to hepatitis C were physicians or nurses (Figure 47).

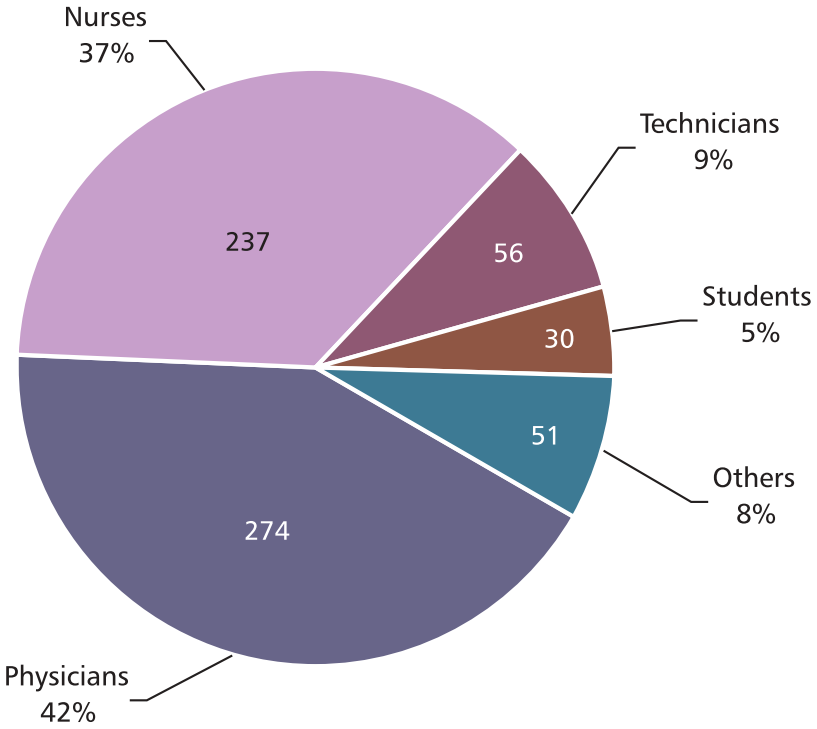

Figure 47. Number and distribution of health care workers exposed to hepatitis C virus by occupational group, June 1995 to October 1999. (Source: NaSH [1999].)

Human Immunodeficiency Virus

Fifty-five cases of documented and 136 cases of possible occupational HIV transmission were recorded in HARS through June 1999. Among the documented cases of HIV seroconversion following occupational exposure, 85% resulted from percutaneous exposure and 93% involved exposure to blood or visibly bloody fluid. Most documented cases of occupational HIV transmission occurred among nurses (42%) and laboratory workers (35%) (Figure 48).

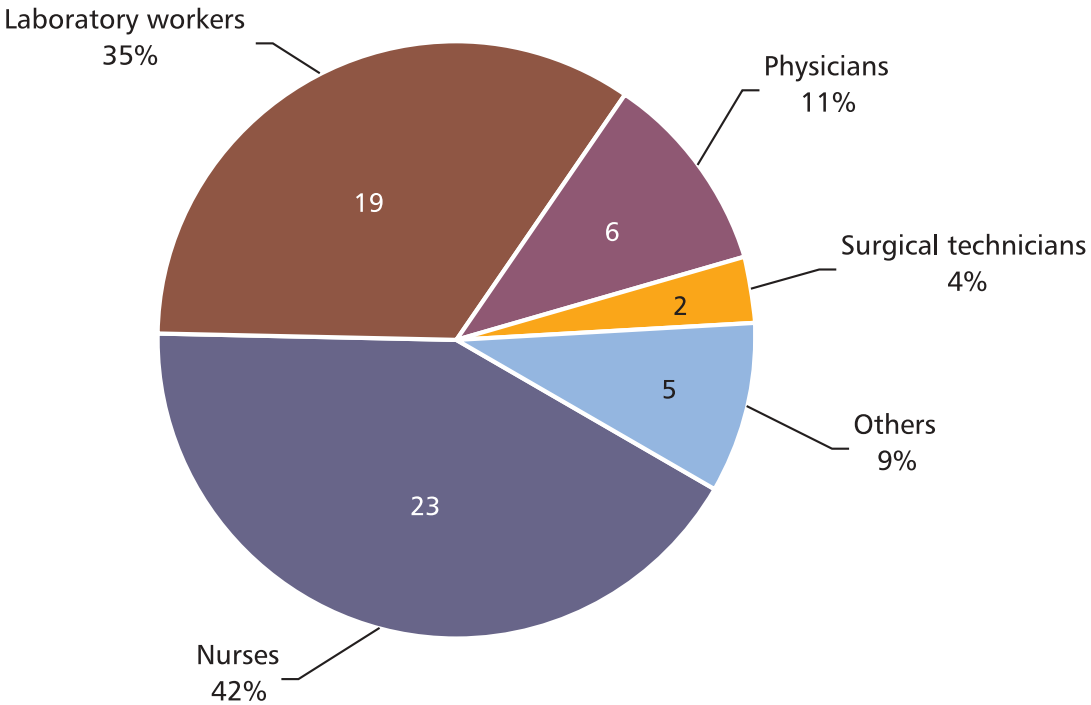

Figure 48. Number and distribution of health care worker cases with documented occupational transmission of HIV by occupation through June 1999. (Source: HARS [CDC 1999].)

Tuberculosis (TB)

Health care workers have long been at risk of contracting TB. This risk increased in the 1980s with the resurgence of TB in the United States and the subsequent development of drug-resistant TB bacteria during the AIDS epidemic. From 1994 through 1998, there were 2,732 cases of TB in health care workers reported to the Centers for Disease Control and Prevention (CDC) through *staffTRAK–TB* from the 50 States, the District of Columbia, and Puerto Rico. Incidence rates in health care workers are shown in Figure 49 for each year from 1994 through 1998. These rates are not associated specifically with occupational exposure because that information is not available. Cases in health care workers constituted 3% of all TB cases.

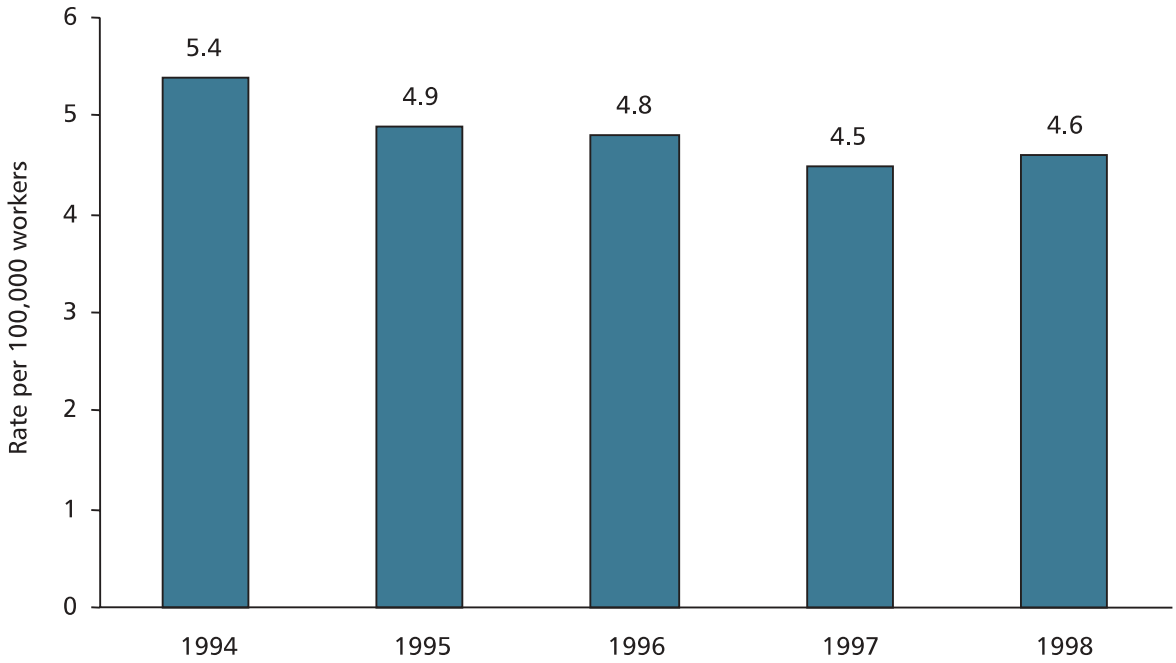

Figure 49. Incidence rates of TB in health care workers, 1994–1998. (Source: *staffTRAK–TB* [1999].)

Physical Agents

Disorders attributable to physical agents represented 4% (16,600) of all nonfatal occupational illness cases recorded in SOII in 1997. Disorders attributable to physical agents include heatstroke, sunstroke, heat exhaustion, and other effects of environmental heat; freezing and frostbite; effects of ionizing radiation (isotopes, X-rays, radium); and effects of nonionizing radiation (welding flash, ultraviolet rays, microwaves, and sunburn). Illnesses from toxic exposures are excluded. Among industry divisions, manufacturing accounted for 55% of the disorders attributable to physical agents in private industry in 1997 (Figure 50). Among individual industries, the highest illness rates occurred in metal sanitary ware (294 cases per 10,000 workers), primary aluminum (89 cases per 10,000 workers), ship building and repairing (79 cases per 10,000 workers), and plumbing and heating, except electric (73 cases per 10,000 workers).

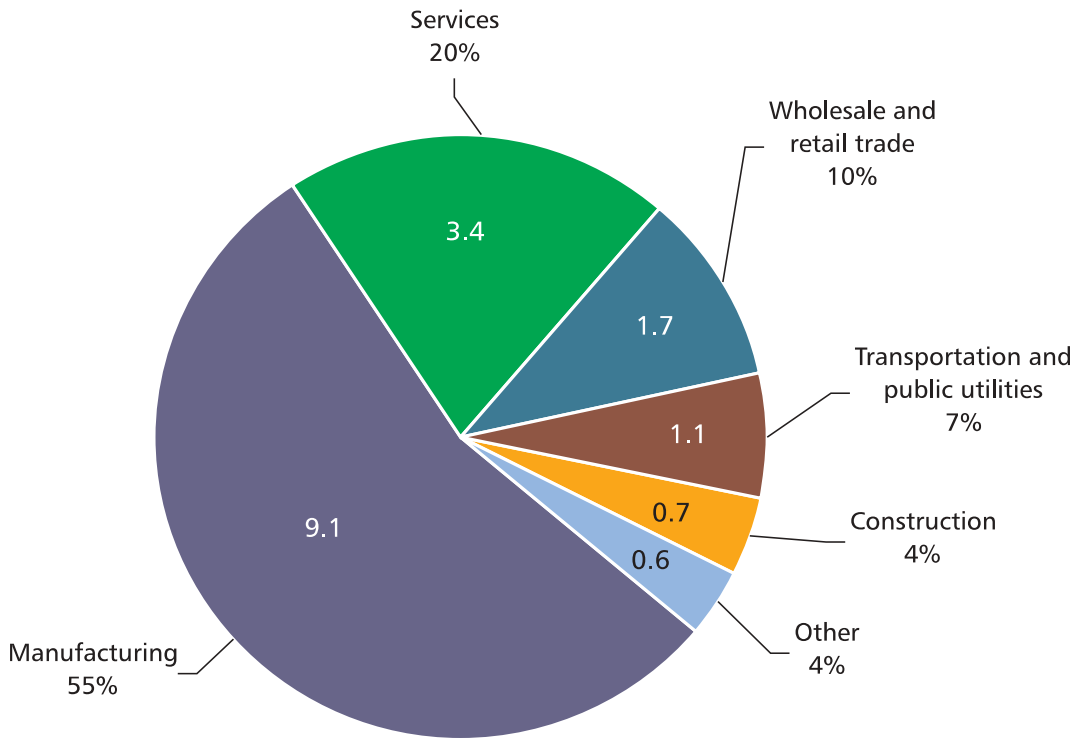

Figure 50. Number (thousands) and distribution of disorders attributable to physical agents in private industry by major industry division, 1997. (Source: SOII [1999].)

Anxiety, Stress, and Neurotic Disorders

Nearly 5,300 cases of anxiety, stress, or neurotic disorders with time away from work were recorded in SOII in 1997. These represent 1% of all reported nonfatal occupational illness cases. Women accounted for more than 60% of all occupational anxiety, stress, and neurotic disorder cases with time away from work. Half of all such disorder cases required 23 or more days away from work, and more than 40% of workers with these disorders required more than 31 days away from work. The industry divisions accounting for most cases were services (35%), wholesale and retail trade (20%), and manufacturing (20%) (Figure 51). The occupational groups most frequently experiencing these disorders were technical, sales, and administrative personnel (47%) and operators, fabricators, and laborers (18%) (Figure 52). The exposures most frequently associated with anxiety, stress, or neurotic disorders were harmful substances (30%) and assaults or violent acts (13%) (Figure 53).

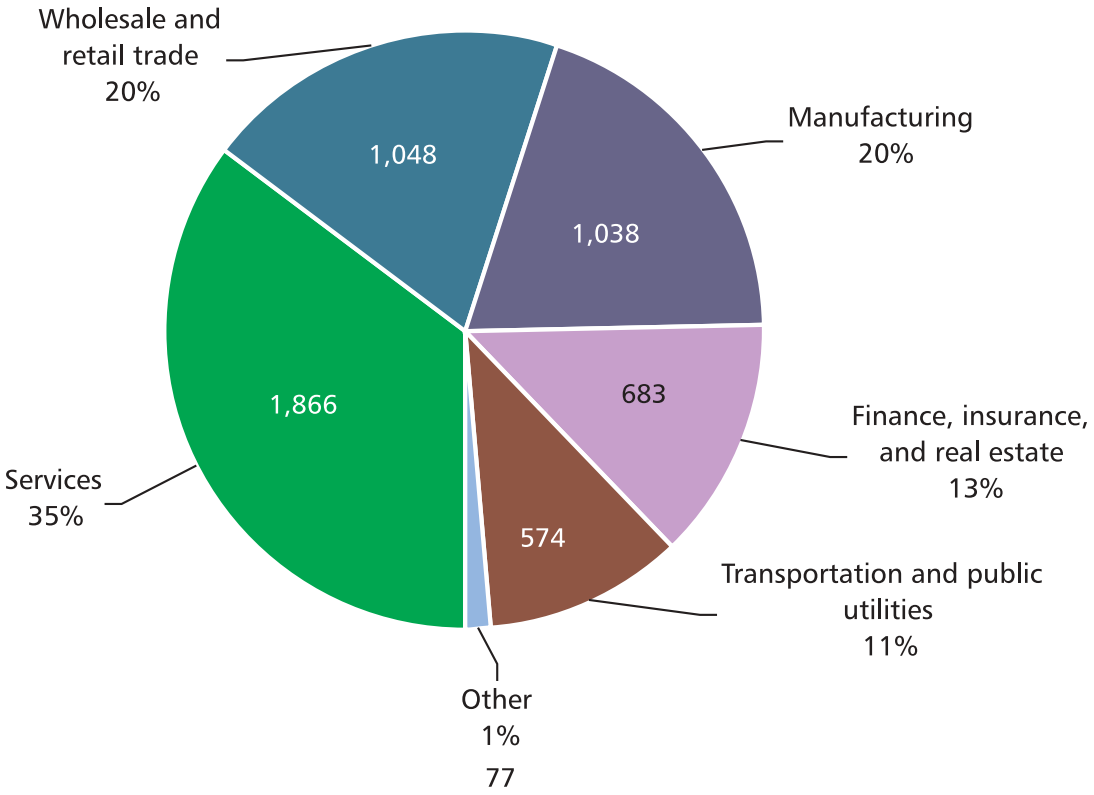

Figure 51. Number and distribution of anxiety, stress, and neurotic disorder cases with days away from work in private industry by industry division, 1997. (Source: SOII [1999].)

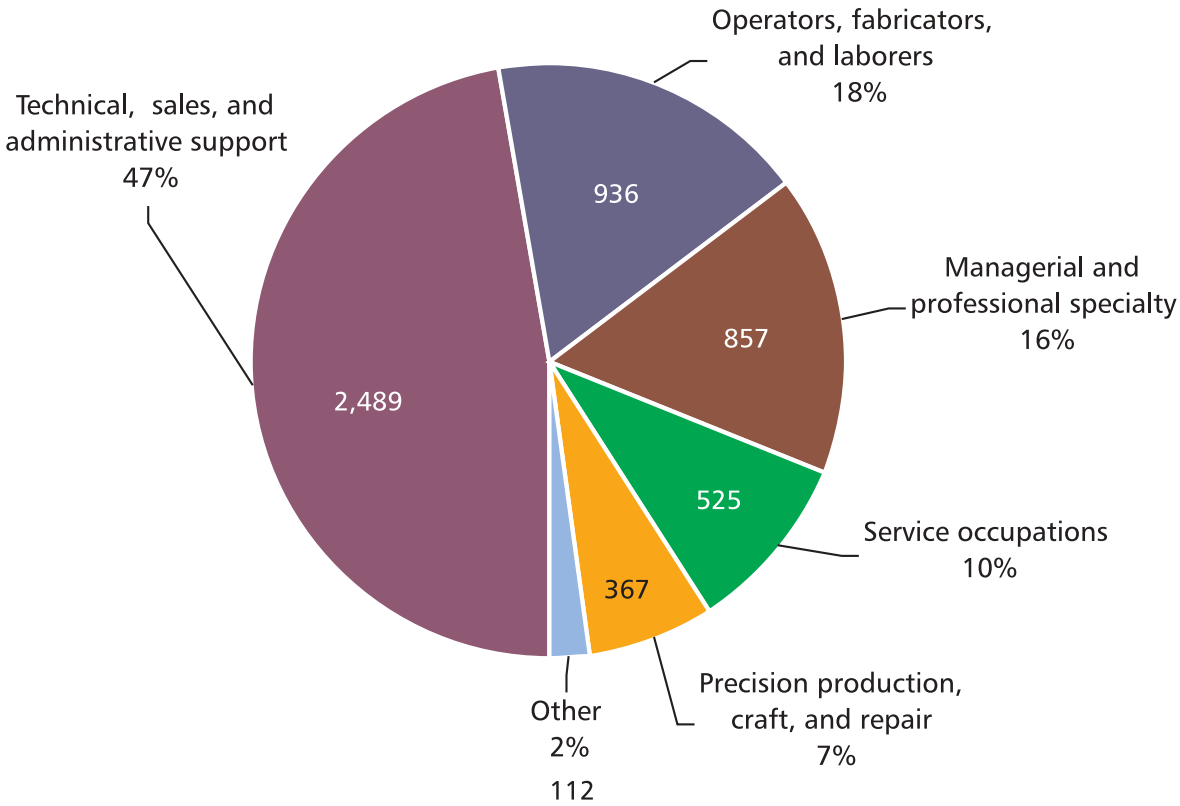

Figure 52. Number and distribution of anxiety, stress, and neurotic disorder cases with days away from work in private industry, by occupational group, 1997. (Source: SOII [1999].)

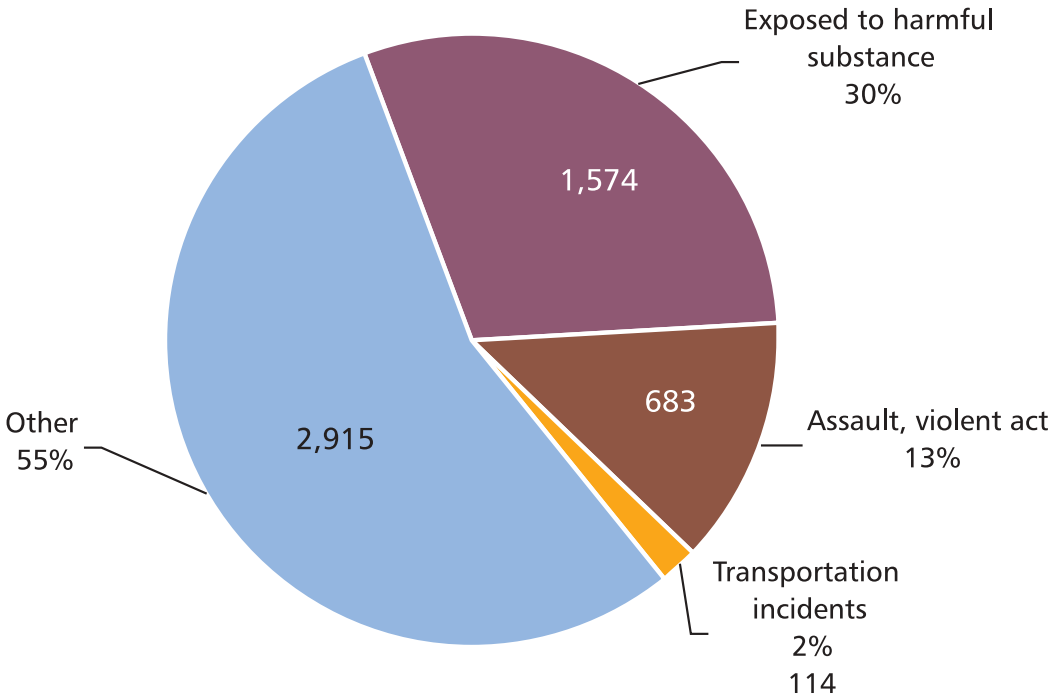

Figure 53. Number and distribution of anxiety, stress, and neurotic disorder cases with days away from work in private industry, by event or exposure, 1997. (Source: SOII [1999].)

All Other Nonfatal Occupational Illnesses

All other nonfatal occupational illnesses represented 12% (50,400) of all illness cases recorded in SOII in 1997. This category captures illnesses such as anthrax, brucellosis, hepatitis B and C, HIV disease, malignant and benign tumors, food poisoning, histoplasmosis, and coccidioidomycosis. The largest percentages of such cases in 1997 occurred in services (41%) and manufacturing (29%) (Figure 54). Industries reporting the highest incidence rates were luggage (163 cases per 10,000 workers), secondary smelting and refining of nonferrous materials (120 cases per 10,000 workers), prefabricated metal buildings (66 cases per 10,000 workers), and iron and steel forgings (61 cases per 10,000 workers).

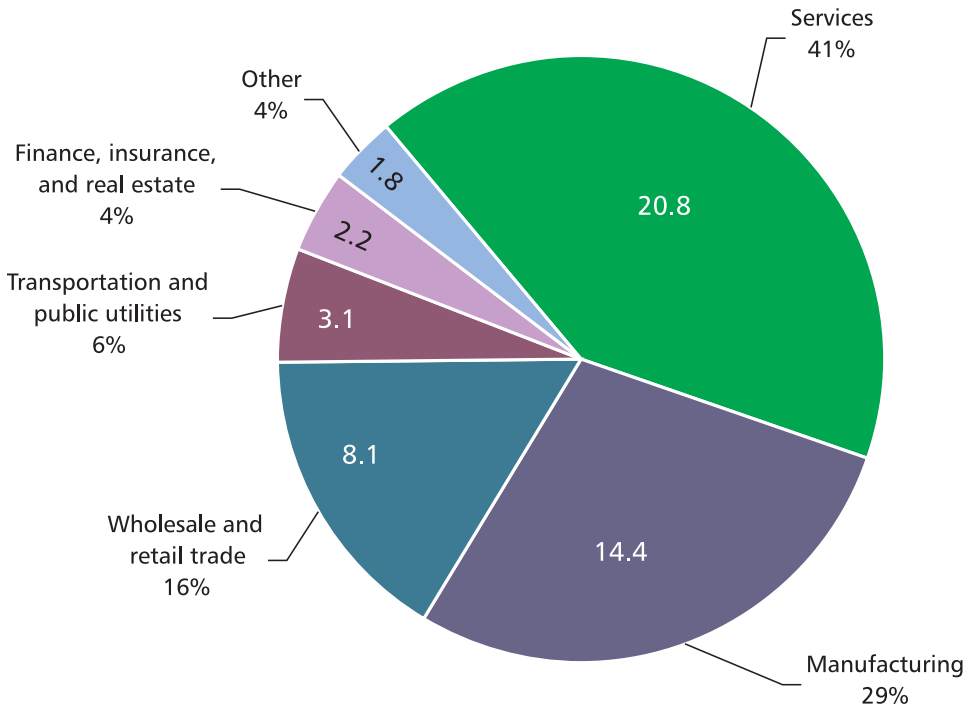

Figure 54. Number (thousands) and distribution of all other occupational illnesses in private industry by major industry division, 1997. (Source: SOII [1999].)

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